

Ecological site R070BY059NM Breaks north exposure

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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.



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.

Classification relationships

Characteristic Soils Are: Lacoca, Latom, Potter, Regnier

Ecological site concept

The central concept of this ecological site is steep, north-facing erosional features over Triassic sedimentary formations.
 It is associated with the Sandstone Savanna and Shallow Sandstone ecological sites.

Table 1. Dominant plant species

Tree	(1) <i>Pinus edulis</i>
Shrub	(1) <i>Yucca</i> (2) <i>Nolina microcarpa</i>
Herbaceous	(1) <i>Bouteloua eriopoda</i> (2) <i>Bouteloua curtipendula</i>

Physiographic features

Soils of this ecological site site formed in residuum and colluvium derived from shale, siltstone, or sandstone of the Santa Rosa and Chinle Formations of Triassic age and has many outcrops of sandstone. Landforms include low ridgetops, escarpments, and side slopes of erosional plains, and have a northerly aspect. Slope ranges from 0 to 80 percent. Mean annual precipitation is about 14 inches and mean annual temperature is about 59 degrees F. Elevations range from 4,300 to 5,300 feet.

Table 2. Representative physiographic features

Landforms	(1) Scarp slope (2) Cuesta (3) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	1,311–1,615 m
Slope	20–80%
Aspect	N

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

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

Soil features

These soils are shallow and very shallow over caliche, siltstone, or sandstone. Surface textures are stony sandy loam, loam, gravelly loam, clay loam, extremely gravelly fine sandy loam, or gravelly clay loam. Subsoil is stony sandy loam, loam, gravelly loam, clay loam, extremely gravelly fine sandy loam, or gravelly clay loam. Strongly cemented calcareous sandstone or siltstone occurs at a depth of 8 to 20 inches. Available water-holding capacity is low to moderate. Effective rooting depth is controlled by bedrock contact.

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

Characteristic Soils:

Lacoca

Latom

Potter

Regnier

Note: the Potter component is a very deep soil that has greater than 60 percent petronodes (cemented carbonate masses) below a depth of 20 inches.

Table 4. Representative soil features

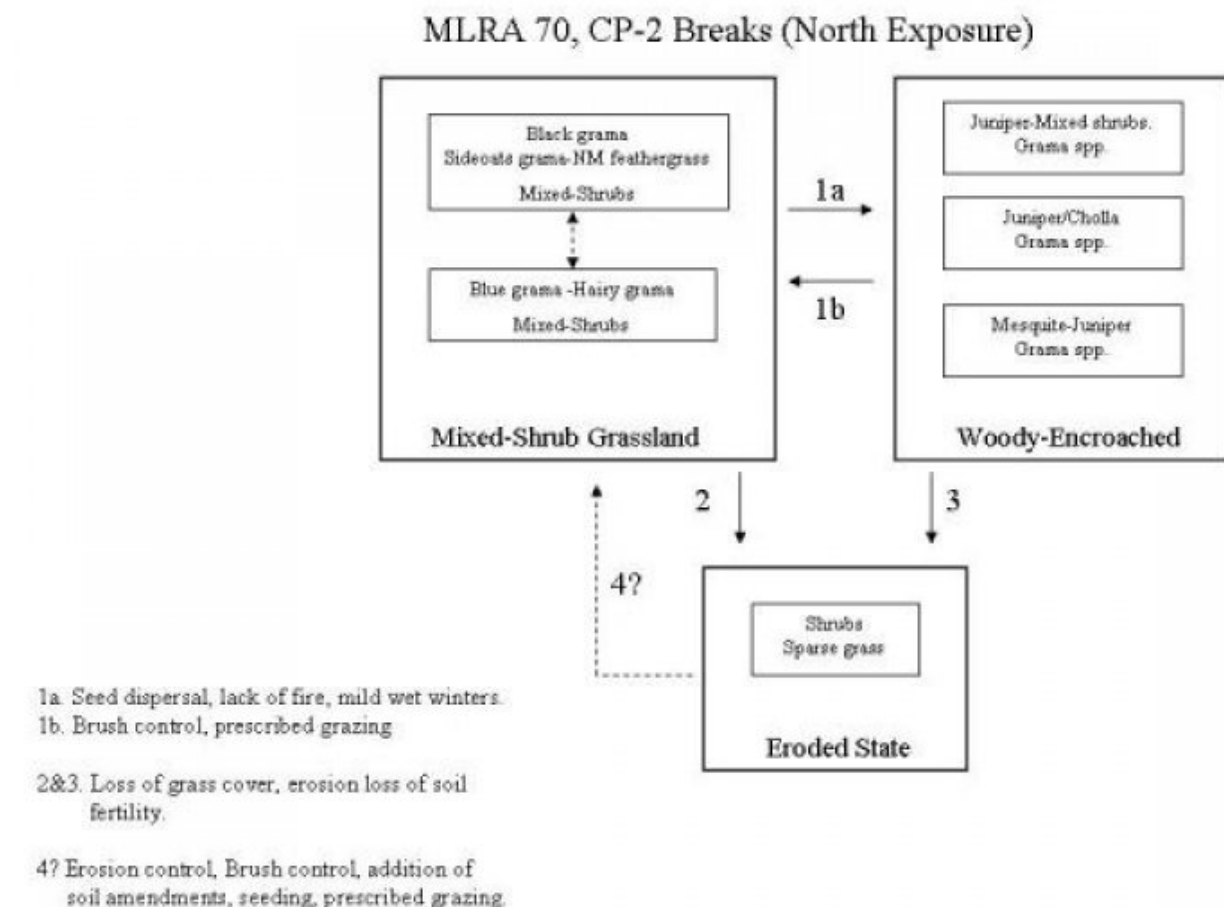
Surface texture	(1) Gravelly loam (2) Stony sandy loam (3) Very gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	20–51 cm
Surface fragment cover ≤3"	10–35%
Surface fragment cover >3"	1–10%
Available water capacity (0–101.6cm)	7.62–15.24 cm
Calcium carbonate equivalent (0–101.6cm)	1–10%
Electrical conductivity (0–101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0–101.6cm)	0–1
Soil reaction (1:1 water) (0–101.6cm)	7.4–8.8
Subsurface fragment volume ≤3" (Depth not specified)	10–50%
Subsurface fragment volume >3" (Depth not specified)	1–5%

Ecological dynamics

The plant communities on this ecological site are dominated by warm-season grasses with a significant component of trees and shrubs. The dominant grasses of the reference plant community are typically black grama, sideoats grama, New Mexico feathergrass, and blue and hairy grama. Seed dispersal by livestock and wildlife, decreased fire frequency, and possibly periods of increased winter precipitation may facilitate an increase in woody species including juniper, cholla and mesquite. Steep slopes and shallow soils make this site susceptible to accelerated erosion. Continuous heavy grazing can cause a loss of grass cover and accelerate erosion, reducing the capacity of the site to sustain grasses.

This ecological site provides limited access to grazing due to steepness of slopes and roughness of topography. Livestock tend to graze the flatter slopes with less use occurring on the rougher steeper areas.

State and transition model



State 1 Reference State

Community 1.1 Reference Plant Community

Mixed-Shrub Grassland: In the reference plant community, black grama, sideoats grama and New Mexico feathergrass are the dominant grasses. Blue grama, hairy grama, and little bluestem are sub-dominants. Common forbs include fleabane, bladderpod, and ironplant. There are a large variety of woody species that can be found on this site, including juniper, pinyon, mountain mahogany, feather dalea, yucca, sacahuista, cholla, and broom snakeweed. Heavy grazing pressure can cause a decrease in black grama, sideoats, little bluestem, and New Mexico feathergrass. This can result in a community dominated by blue and hairy grama. Other subordinate species that typically increase in representation include galleta, threeawns wolftail, and hairy tridens. Diagnosis: Woody species are a noticeable component, but grasses are dominant. Rock outcrop and boulders occupy a significant portion of the area, but grass cover tends to be fairly uniform across the more stable areas. Evidence of erosion such as pedestalling around plants, extended flow patterns, and rills are typically restricted to the steeper portions of the site.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	504	841	1177
Shrub/Vine	101	168	235
Forb	67	112	157
Total	672	1121	1569

Figure 5. Plant community growth curve (percent production by month).
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Breaks North Exposure HCPC.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	12	20	25	25	5	1	0	0

State 2

Woody-Encroached

This state exhibits increased cover by woody plants.

Community 2.1

Woody-Encroached

Woody-Encroached: This phase is characterized by the noticeable increase of woody species, especially juniper, mesquite, and cholla. Grass cover is highly variable. Large bare areas are often present on flatter slopes. Diagnosis: Woody species, especially juniper, cholla, or mesquite, are present in increased densities. Grass cover is variable ranging from fairly uniformly to patchy with frequent large bare areas present. Grass species are similar to those in the Mixed-Shrub Grassland state. Transition to Woody-Encroached (1a) Seed dispersal by livestock and wildlife and decreased fire frequency may facilitate the encroachment of juniper, cholla and mesquite. A period of mild wet winters may produce conditions favorable to the establishment and growth of woody species, thereby initiating periods of increased recruitment and establishment. Key indicators of approach to transition: Decrease or change in distribution of grass cover. Increase in amount of woody seedlings. Transition back to Mixed-Shrub Grassland (1b) Brush control is necessary to reduce the competitive influence of woody species and assist with grass reestablishment. Prescribed grazing will help ensure proper forage use following brush control.

State 3

Eroded State

This state exhibits evidence of marked erosion such as rills and pedestalling of soil.

Community 3.1

Eroded State

This phase is characterized by accelerated erosion and loss of soil fertility. Grass cover is sparse, typically consisting of widely scattered patches of blue grama, galleta, and/or threeawns. Diagnosis: Grass and litter cover is sparse with large, interconnected bare areas present. Rills and gullies are common and actively eroding. Transition to Eroded State (2, 3): Transitions to the Eroded State occur in response to the loss of grass cover and subsequent erosion. As grass cover is reduced, organic matter, infiltration, and soil surface stability decrease, making the site susceptible to accelerated erosion. Loss of topsoil can decrease the site's ability to support vegetation. Key indicators of approach to transition: Increase in size and frequency of bare patches. Pedestalling of plants. Increase in size and length of flow patterns and rills. Transition back to Mixed-Shrub Grassland (4?) Erosion control structures would be necessary to help accumulate soil, restore natural overland flow patterns, and prevent further soil and nutrient loss. Seeding would be necessary to reestablish ground cover. Brush control is necessary to reduce the competitive influence of shrubs on establishing grasses. The addition of organic matter or other soil amendments may be needed to restore soil fertility and facilitate grass recovery. Prescribed grazing will help to ensure adequate rest following seeding. Following grass recovery, proper forage use is required. Steep slopes, shallow soils, low available water capacity, and limited precipitation limit the potential for recovery.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				157–179	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	157–179	–
2				123–146	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	123–146	–
3				123–146	
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	123–146	–
4				90–112	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–112	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–112	–
5				78–101	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	78–101	–
6				22–34	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	22–34	–
7				0–34	
	threeawn	ARIST	<i>Aristida</i>	0–34	–
	ring muhly	MUTO2	<i>Muhlenbergia torreyi</i>	0–34	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–34	–
8				0–22	
	hairy woollygrass	ERPI5	<i>Erioneuron pilosum</i>	0–22	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	0–22	–
9				0–22	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–22	–
	pinyon ricegrass	PIFI	<i>Piptochaetium fimbriatum</i>	0–22	–
10				0–56	
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	0–56	–
	silver bluestem	BOSA	<i>Bothriochloa saccharoides</i>	0–56	–
Forb					
11				22–34	
	fleabane	ERIGE2	<i>Erigeron</i>	0–34	–
	bladderpod	LESQU	<i>Lesquerella</i>	0–34	–
	plains ironweed	VEMA2	<i>Vernonia marginata</i>	0–34	–
	fleabane	ERIGE2	<i>Erigeron</i>	22–34	–
	bladderpod	LESQU	<i>Lesquerella</i>	22–34	–
	plains ironweed	VEMA2	<i>Vernonia marginata</i>	22–34	–
12				22–45	
	Forb, perennial	2FP	<i>Forb, perennial</i>	22–45	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	22–45	–
13				22–45	

13	Forb, annual	2FA	<i>Forb, annual</i>	22–45	–
Shrub/Vine					
14				34–45	
	yucca	YUCCA	<i>Yucca</i>	34–45	–
15				34–45	
	sacahuista	NOMI	<i>Nolina microcarpa</i>	34–45	–
16				34–45	
	juniper	JUNIP	<i>Juniperus</i>	34–45	–
17				22–34	
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	22–34	–
18				22–34	
	oak	QUERC	<i>Quercus</i>	22–34	–
19				22–34	
	hairy mountain mahogany	CEMOP	<i>Cercocarpus montanus var. paucidentatus</i>	22–34	–
21				0–34	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–34	–
	featherplume	DAFO	<i>Dalea formosa</i>	0–34	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	0–34	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–34	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–34	–
22				11–22	
	honey mesquite	PRGL2	<i>Prosopis glandulosa</i>	11–22	–
Tree					
20				11–22	
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	11–22	–

Animal community

Habitat for Wildlife: This site supports a resident animal community that is characterized by spotted skunk, bobcat, eastern cottontail, southern plains woodrat, rock squirrel, great horned owl, white-throated raven, rock wren, fence lizard, and checkered whiptail. There is seasonal use by mule deer. Many species of shrub-nesting birds will breed in the oaks.

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

Lacoca----- D

Latom----- D

Potter----- C

Regnier----- D

Recreational uses

This site has fair to good recreation potential. Hiking, picnicking and camping is fair to good, although limited by lack of surface water. Screening is fair. Hunting for deer and rabbits is fair to good. Hunting for upland game birds is poor to fair. The aesthetic appeal is enhanced by the break in the physiography from open flat grasslands to steep wooded grasslands. The natural beauty is also enhanced by the large variety of plants; many of, which bloom from early spring to late fall.

Wood products

Limited fence posts and firewood are furnished by juniper and pinyon pine.

Other products

Grazing: This ecological site can be grazed during any season of the year. However, it has limited grazing potential due to its steep slopes. Distribution of domestic livestock is the main problem. All ages and classes of livestock tend to graze the flatter slopes and avoid steeper terrain. However, younger animals will better-utilize the latter. Goats would most effectively utilize this site.

Approximately 75 percent of the total annual yield is from species that furnish forage for grazing animals. This site has a large variety of grasses, forbs, and woody species that provide a good feed and excellent nutrition for domestic livestock and browsing wildlife. Continuous yearlong grazing will cause the plant community to deteriorate to a plant community of low forage value, characterized by juniper, cholla, and forbs. A system of deferred grazing, which varies the seasons of grazing and rest in successive years, is needed to maintain or to improve the plant community. Different seasons of rest benefit different species. Fall rest allows most warm-season species to mature. Winter rest will benefit species such as mountain mahogany, oak, and winterfat. Since cattle show a definite preference to black grama during the late winter, rest during this period will reduce the grazing pressure on this species. Spring rest (April-June) will benefit cool-season species such as New Mexico feathergrass, bottlebrush squirreltail, pinyon ricegrass and early forbs. Summer rest will benefit sideoats grama, black grama, and little bluestem.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM

100 - 76 3.0 – 6.0

75 – 51 3.9 – 7.5

50 – 26 5.3 – 12.0

25 – 0 12.0+

Other references

Data collection for this site was done in conjunction with the progressive soil surveys within the Pecos-Canadian Plains and Valleys 70 Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: San Miguel, Quay, Guadalupe, De Baca and Chaves

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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	05/16/2024
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:**
-