

Ecological site R070BY068NM

Limy

Last updated: 9/12/2023
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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.

Ecological site concept

This site occurs on soils that are calcareous (limy) throughout with significant accumulations of calcium carbonate (calcalc horizons) occurring within 20 inches of the soil surface. This site occurs on various alluvial landforms, such as toeslopes and inset fans. Slopes are generally less than 5 percent, but range up to 15 percent. This site often occurs in a complex or association with the Loamy and Sandy Loam ecological sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is on broad pediment foot, inset fans on fan piedmonts or toeslopes of upland mesas, ridges, fans of broad plains and valley sides. Slopes are typically less than 5 percent, but may range from 0 to 15 percent. These soils formed in calcareous upland alluvium modified by eolian deposits. Exposure varies and is not significant. Elevation ranges from 3500 to 4800 feet.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Plain (3) Alluvial fan
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	Rare to occasional
Elevation	1,067–1,463 m
Slope	0–15%
Ponding depth	0–5 cm
Water table depth	152–251 cm
Aspect	Aspect is not a significant factor

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

Playas sometimes occur at the margins of this site. Otherwise, this site is not associated with wetlands or surface water features.

Soil features

Soils are deep to very deep with a calcic horizon (5-15% or greater calcium carbonate equivalent) beginning within the upper 20 inches of the soil. Surface layers are strongly calcareous with textures of fine sandy loam, very fine sandy loam, or loam. The underlying layers may be loam, clay loam, or silt loam. These layers are violently effervescent, carbonates are slightly cemented, and some cemented lenses are scattered along the contact with the overlying horizon. Susceptibility to wind erosion index is high if the surface is not protected by vegetation or organic residue.

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

Note: Armesa and Chispa soils are MLRA 42 soils that have been mapped in MLRA 70B. Karde soils are MLRA 70C soils that are mapped in MLRA 70B.

Table 4. Representative soil features

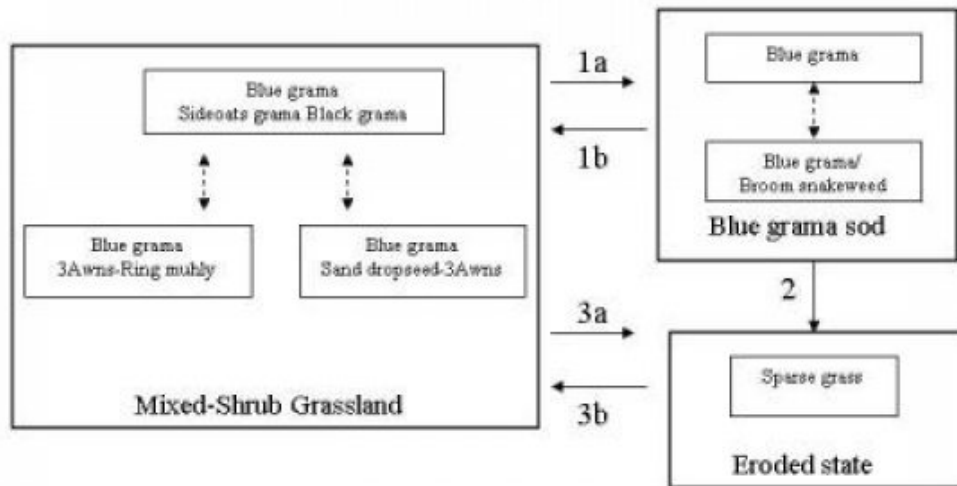
Surface texture	(1) Fine sandy loam (2) Very fine sandy loam (3) Loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	127–203 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–22.86 cm
Calcium carbonate equivalent (0-101.6cm)	30–65%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–1
Soil reaction (1:1 water) (0-101.6cm)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The site is dominated by warm-season short- and mid-grasses, with scattered shrubs and forbs. Blue grama is the dominant grass of the reference plant community with sideoats grama and black grama occurring as sub-dominants. Small soapweed yucca and winterfat are common shrubs. Under continuous yearlong grazing, blue grama, sand dropseed, ring muhly, threeawns, and broom snakeweed typically increase. Eventually, blue grama may become the sole dominant, forming a low, dense sod. Continuous heavy grazing in conjunction with drought can leave the site with only sparse grass cover and susceptible to accelerated erosion.

State and transition model

MLRA 70, CP-2 Limy



- 1a. Continuous heavy grazing.
 1b. Long term prescribed grazing, or mechanical or chemical treatment of strips, seeding, prescribed grazing.
 2, 3a. Continuous heavy grazing and drought, erosion, decreased soil fertility.
 3b. Erosion control, seeding, prescribed grazing.

State 1 Mixed-Shrub Grassland

This state contains a mix of shrubs and grasses.

Community 1.1 Mixed-Shrub Grassland

In the reference plant community, blue grama is the dominant grass with sideoats grama and black grama occurring as the sub-dominants. Other grasses common to this site include New Mexico feathergrass, sand dropseed, and hairy grama. Common shrubs include winterfat, yucca, fourwing saltbush, Mormon tea, and broom snakeweed. Continuous yearlong grazing can cause a decrease in black grama, sideoats grama, New Mexico feathergrass, winterfat, and fourwing saltbush. This typically results in a corresponding increase in blue grama, threeawns, sand dropseed, ring muhly, and broom snakeweed. Diagnosis: Blue grama is the dominant grass. Sideoats grama and black grama occur as sub-dominants or are present on the site in significant amounts. Grass cover is uniform with few large (greater than 1 meter) bare areas.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	415	785	1177
Shrub/Vine	78	168	235
Forb	56	112	157
Total	549	1065	1569

Figure 5. Plant community growth curve (percent production by month).
NM4068, R070BY068NM Limy Reference State. R070BY068NM Limy
Reference State.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	0	0

State 2
Blue Grama Sod

This state is characterized by abundant, sod-bound blue grama.

Community 2.1
Blue Grama Sod

Under continuous grazing pressure and without adequate recovery periods, blue grama may form a low-growing, less productive, dense sod. Species such as black grama, sideoats grama, New Mexico feathergrass, vine mesquite, and fourwing saltbush are present only in minor amounts or are absent. Threeawns, ring muhly, and wolfstail typically increase in representation. Broom snakeweed may be a major component on sites that have received increased amounts of early spring or fall moisture. Diagnosis: Blue grama is either the sole dominant or is co-dominant to broom snakeweed (the latter is uncommon). Black grama, sideoats grama, and New Mexico feathergrass are only sparsely represented or absent. Transition to Blue Grama Sod (1a) Continuous grazing without adequate recovery periods may cause this transition. Blue grama is resistant to grazing due to the location of its growing points at or near the soil surface and high ratio of vegetative shoots. When grazed or clipped close to the ground, it can spread laterally by tillers and form a low-growing sod. Key indicators of approach to transition: Decrease in black grama, sideoats grama, and New Mexico feathergrass Increase in the cover of blue grama Transition back to Mixed-Shrub Grassland (1b) Long term prescribed grazing may be successful in returning the community to a Mixed-Shrub Grassland state. The timeframe is affected by the presence and/or recruitment of key species such as black grama, sideoats grama, and New Mexico feathergrass. Alternatively, chemical or mechanical treatment of the portions of the area dominated by blue grama may reduce competition for nutrients and available water. This may accelerate the change back to a more upright, bunchgrass form and increase production. Seeding may be necessary to reestablish key species where they are sparse or absent. Prescribed grazing will help to maintain proper forage utilization.

Figure 6. Plant community growth curve (percent production by month).
NM4068, R070BY068NM Limy Reference State. R070BY068NM Limy
Reference State.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	0	0

State 3
Eroded State

This state shows evidence of significant erosion such as truncated topsoil and/or pedestalling at the surface.

Community 3.1
Eroded State

Eroded State: This state is characterized by accelerated erosion, loss of soil fertility, and decreased productivity. Grass and litter cover is sparse consisting of widely spaced patches of blue grama. Diagnosis: Grass and litter cover is sparse. Large bare areas are common. Rills and gullies are present and actively eroding. Transition to Eroded State (2, 3a) Continuous heavy grazing pressure, especially in conjunction with drought, can cause the loss of grass cover and subsequent erosion. The redistribution and loss of topsoil, organic matter and nutrients greatly decreases productivity and limits the ability of the plant community to recover.3 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 (3b) Erosion control structures may be necessary to regain natural overland flow patterns, accumulate soil, and prevent further nutrient and soil loss. Seeding is necessary to

reestablish grass cover. Prescribed grazing will help assure proper forage use and maintain adequate grass and litter cover to help protect the site from erosion.

Figure 7. Plant community growth curve (percent production by month).
NM4068, R070BY068NM Limy Reference State. R070BY068NM Limy
Reference State.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	0	0

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	black grama			157–269	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	160–267	–
2				101–157	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	106–160	–
3				101–314	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	106–319	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	106–319	–
4				56–101	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	54–106	–
5				101–157	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	106–160	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	106–160	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	106–160	–
6				34–56	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	33–54	–
7				22–56	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	21–54	–
	pinyon ricegrass	PIFI	<i>Piptochaetium fimbriatum</i>	21–54	–
8				34–56	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	33–54	–
9				34–56	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	33–54	–
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	33–54	–
10				34–56	
	threeawn	ARIST	<i>Aristida</i>	33–54	–
11				56–90	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	54–85	–
Forb					
12				11–22	
	dotted blazing star	LIPU	<i>Liatris punctata</i>	11–21	–
13				11–22	
	silverleaf nightshade	SOEL	<i>Solanum elaeagnifolium</i>	11–21	–

14				22–56	
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	21–54	–
15				11–22	
	ragwort	SENEC	<i>Senecio</i>	11–21	–
16				11–34	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	11–33	–
Shrub/Vine					
17				56–101	
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	54–106	–
18				34–56	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	33–54	–
19				11–34	
	jointfir	EPHED	<i>Ephedra</i>	11–33	–
20				11–34	
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	11–33	–
21				34–56	
	rubber rabbitbrush	ERNAN5	<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>nauseosa</i>	33–54	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	33–54	–
22				34–56	

Animal community

Wildlife: This ecological site provides habitats which support a resident animal community that is characterized by pronghorn antelope, desert cottontail, plains pocket gopher, marsh hawk, horned lark, meadow lark, lesser earless lizard, bullsnake, and ornate box turtle.

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

Jal like -----B

Armesa-----B

Chispa-----B

Karde -----B

Recreational uses

This ecological site is suitable for camping and hiking; picnicking here is fair. The aesthetic appeal is enhanced by the "wide open spaces" of the area. The natural beauty is limited due to the high-carbonate soils that limit the variety and abundance of flowering plants. Hunting is fair for small game, upland game birds, and antelope. Recreational potential is limited largely by the lack of surface water.

Wood products

This site produces no significant wood products.

Other products

Grazing: This site can be grazed any season of the year by all classes and ages of livestock. Roughly 85 percent of the annual production is from species that provide forage for grazing animals. This site is better-suited to cow-calf pairs or yearlings due to the large percentage of grass in the reference plant community. A minor portion of the stocking rate could be represented by sheep or antelope. Continuous grazing year-long or grazing continually during the period from March through October will result in a decrease of species such as black grama, sideoats grama, New Mexico feathergrass, plains bristlegrass, vine mesquite, little bluestem, winterfat, and fourwing saltbush. Species such as blue grama, sand dropseed, ring muhly, threeawns, and rabbitbrush will increase. Mesquite and burrograss will invade this site under heavy, continuous grazing pressure.

A system of deferred grazing by domestic livestock, which varies the season of grazing and rest during successive years, will result in a healthy, productive plant community. Fall and winter rest will benefit species such as winterfat and black grama. Spring rest (April through June) will allow species such as New Mexico feathergrass to grow and reproduce. Summer rest (July through September) benefits warm-season species such as black grama, sideoats grama, blue grama, plains bristlegrass, and vine mesquite, allowing them to gain vigor and reproduce. Cattle show a definite seasonal preference for black grama and usually utilize it heavily during the late winter (January through March). Black grama cures well and is higher in protein than other dormant grasses in this period.

Other information

Guideline for Initial stocking rates in acres per animal unit month.

-----Favorable years-----Unfavorable years

Similarity

Index

100 to 76-----2.6 to 3.4-----3 to 4.9

75 to 51-----3.3 to 4.5-----4.8 to 6

50 to 26-----4.4 to 6.8-----5.9 to 9.2

25 or less----6.4 plus-----9.3 plus

Type locality

Location 1: Chaves County, NM

Other references

References.

1. Branson, F. A. 1953. Two factors affecting resistance of grasses to grazing. Journal of Range Management. 6: 165-171.

2. McGinnies, W. J. 1984. Chemically thinning blue grama range for increased forage and seed production. Journal of Range Management. 37: 412-415.

3. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheets. Rangeland Soil Quality—Erosion. Rangeland Sheets 9 & 10 [Online]. Available: <http://www.statlab.iastate.edu/survey/SQL/range.html>

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	05/19/2024
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:**
-