

Ecological site R070BY065NM

Gravelly

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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 site occurs on very deep soils that have high fragment content in the surface and/or subsurface horizons. Subsurface horizons have high calcium carbonate equivalent. This site occurs on alluvial landforms such as stream terraces and fan remnants. Slopes range from 0 to 35 percent. The Gravelly ecological site typically occurs on ridges and gravelly alluvial terraces adjacent to the Loamy or Sandy Loam sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Yucca glauca</i> (2) <i>Dalea formosa</i>
Herbaceous	(1) <i>Bouteloua eriopoda</i> (2) <i>Bouteloua gracilis</i>

Physiographic features

Legacy narrative:

"This site occurs on loamy unconsolidated eolian, lacustrine, or fluvial sediments that are on nearly level to undulating, concave plains in broad, shallow basins, terraces along drainageways and on the fans at the foot of escarpments. Slopes are convex and range from 0 to 35 percent. Elevation ranges from approximately 3,800 to 5,300 feet above sea level. Aspect varies and significantly different only on the north-facing steep slopes. The mean annual precipitation is 483 millimeters (19 inches) and the mean annual air temperature is 16 degrees C (61 degrees F)."

Note that the Concept section includes "ridges" as settings for this site. Presumably, "ridges" in this context are elongated highs on alluvial features rather than structural ridges.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace (3) Plain
Flooding frequency	None

Ponding frequency	None
Elevation	1,160 – 1,620 m
Slope	0 – 40 %
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)	190 days
Freeze-free period (average)	220 days
Precipitation total (average)	410 mm

Influencing water features

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

Soil features

Soils are deep to very deep. Surface texture is fine sandy loam, gravelly loam, gravelly loamy fine sand, very gravelly fine sandy loam, very gravelly sandy clay loam, or very gravelly loam. The subsurface layers are gravelly loam, loam, gravelly loamy fine sand, very gravelly fine sandy loam, very gravelly sandy clay loam, extremely gravelly sandy loam, or very gravelly loam. Calcium carbonate equivalent ranges from 15 to 40 percent in the lower horizons. Soils have moderate permeability. The available water-holding capacity is medium. The effective rooting depth is from 40 to 72 inches. Air and water move freely through these soils.

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

Characteristic soils:

Bascom
Gallegos
Gallen
Torriorthents

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very gravelly fine sandy loam (3) Loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderately rapid
Soil depth	100 – 180 cm
Surface fragment cover <=3"	10 – 40 %
Surface fragment cover >3"	0 – 20 %
Available water capacity (0-101.6cm)	15.24 – 22.86 cm
Calcium carbonate equivalent (0-101.6cm)	10 – 40 %
Electrical conductivity (0-101.6cm)	0 – 10 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 10

Subsurface fragment volume <=3" (Depth not specified)	40 – 80 %
Subsurface fragment volume >3" (Depth not specified)	0 – 30 %

Ecological dynamics

This site is dominated by warm-season short and mid-grasses, with scattered shrubs and forbs. Grasses make up approximately 75 percent of the annual vegetative production. Shrubs and forbs are evenly distributed and can make up an important portion of the plant community. Black grama, blue grama, and sideoats grama are the dominant grasses of the reference plant community. Seed dispersal by livestock and wildlife, decreased fire frequency, and loss of grass cover may facilitate an increase in woody species.

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				157-191	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	160-192	–
2				135-168	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	139-170	–
3				123-157	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	128-160	–
4				56-78	
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	0-75	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	0-75	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0-75	–
5				34-56	
	threeawn	ARIST	<i>Aristida</i>	0-54	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0-54	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0-54	–
	slim tridens	TRMUE	<i>Tridens muticus var. elongatus</i>	0-54	–
6				11-34	
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	11-33	–
7				22-34	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-33	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	0-33	–
	ring muhly	MUTO2	<i>Muhlenbergia torreyi</i>	0-33	–
Forb					
8				45-67	
	buckwheat	ERIOG	<i>Eriogonum</i>	0-64	–
	Adonis blazingstar	MEMU3	<i>Mentzelia multiflora</i>	0-64	–

	whitestem paperflower	PSCO2	<i>Psilostrophe cooperi</i>	0-64	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	0-64	–
	desert zinnia	ZIAC	<i>Zinnia acerosa</i>	0-64	–
9				45-67	
	Forb, perennial	2FP	<i>Forb, perennial</i>	43-64	–
10				34-56	
	Forb, annual	2FA	<i>Forb, annual</i>	33-54	–
Shrub/Vine					
11				34-56	
	soapweed yucca	YUGL	<i>Yucca glauca</i>	33-54	–
12				11-34	
	featherplume	DAFO	<i>Dalea formosa</i>	0-33	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0-33	–
13				11-22	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0-21	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0-21	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0-21	–
14				0-22	
	juniper	JUNIP	<i>Juniperus</i>	0-21	–
	mesquite	PROSO	<i>Prosopis</i>	0-21	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

Habitat for Wildlife: This site provides habitat which supports a resident animal community characterized by pronghorn antelope, spotted skunk, desert cottontail, silky pocket mouse, Colorado chipmunk, ferruginous hawk, roadrunner, scaled quail, Great Plains toad, and fence lizard. There is seasonal use by mule deer.

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 Bascom -----B Gallegos -----B Gallen -----B Philder -----D

Recreational uses

This site has limited recreation potential, largely due to the lack of surface water and shade. Screening is poor; camping is poor; hiking and picnicking are fair. Hunting for antelope is fair, and hunting for rabbits and upland game birds is fair to good. The natural beauty of the site is enhanced by the variety of plants that bloom from spring to early fall.

Wood products

This site produces no wood products.

Other products

Grazing: This site can be grazed during any season of the year by all classes of livestock, generally without regard to age. However, where slopes exceed 20 percent, livestock distribution becomes a problem and younger livestock will better utilize the steeper slopes. Due to the site's potential to produce forbs, it may be better suited to sheep and antelope. Approximately 85 percent of the total annual yield is from species that furnish forage for grazing animals, and the variety of grasses, forbs, and shrubs furnish good nutrition for these animals during most of the year. Continuous grazing by cattle will cause the site to deteriorate and become less productive. Species such as black grama, sideoats grama, New Mexico feathergrass, little bluestem, and winterfat will decrease in the percent composition. These

will be replaced by plants such as galleta, sand dropseed, rough tridens, threeawns, ring muhly, catclaw acacia, broom snakeweed, juniper, and forbs. Mesquite will easily invade this site as it deteriorates. A system of deferred grazing, which varies the season of rest and grazing during successive years, is needed to improve or to maintain a healthy, well-balanced plant community. Deferment during different seasons of the year benefits different species. Winter rest will benefit woody species such as winterfat and feather dalea. Cattle show a definite preference to black grama during the late winter, and it can easily be overgrazed; winter rest will reduce the grazing pressure on this grass. Spring rest (April-June) will benefit species such as New Mexico feathergrass, bottlebrush squirreltail, and early forbs. Summer rest will benefit black grama, blue grama, sideoats grama, little bluestem, plains bristlegrass, and forbs. Summer rest will allow the cool-season species to complete their growth cycle. Fall rest allows the warm-season species to complete their growth cycle.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month Similarity Index Ac/AUM 100 - 76 2.9 – 4.7 75 – 51 3.4 – 7.0 50 – 26 4.4 – 12.0 25 – 0 12.0+

Inventory data references

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

Other references

References.

1. Drewa, P.B., D.P.C. Peters, and K. M. Havstad. 2001 Fire grazing and honey mesquite invasion in black grama-dominated grasslands of the Chihuahuan Desert: a synthesis. Pages 31-39 in K.E.M. Galley and T.P. Wilson (eds.) Proceedings of the Invasive Species Workshop: the Role of fire in the Control and Spread of Invasive Species. Fire Conference 2000: the First National Congress on Fire Ecology, Prevention, and Management. Miscellaneous Publication No. 11, Tall Timbers Research Station, Tallahassee, FL.

2. Hastings, J. R. and R. M. Turner. 1965 The changing mile: An ecological study of vegetation change with time in the lower mile of an arid and semiarid region. Tuscon AZ: University of Arizona Press. 317 p.

3. Wright, H.A., S.C. Bunting, and L.F. Neuenschwander. 1976. Effect of fire on honey mesquite. Journal of Range Management 29:467-471.

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	09/17/2026
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:
