

Ecological site R070BY065NM Gravelly

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.

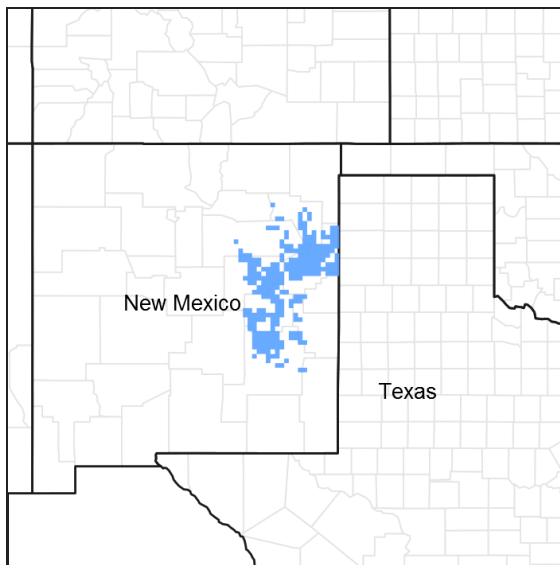


Figure 1. Mapped extent

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 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	1,158–1,615 m
Slope	0–35%
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

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 characteristic soils for this site.

Characteristic soils:

Bascom

Gallegos

Gallen

Torriorthents

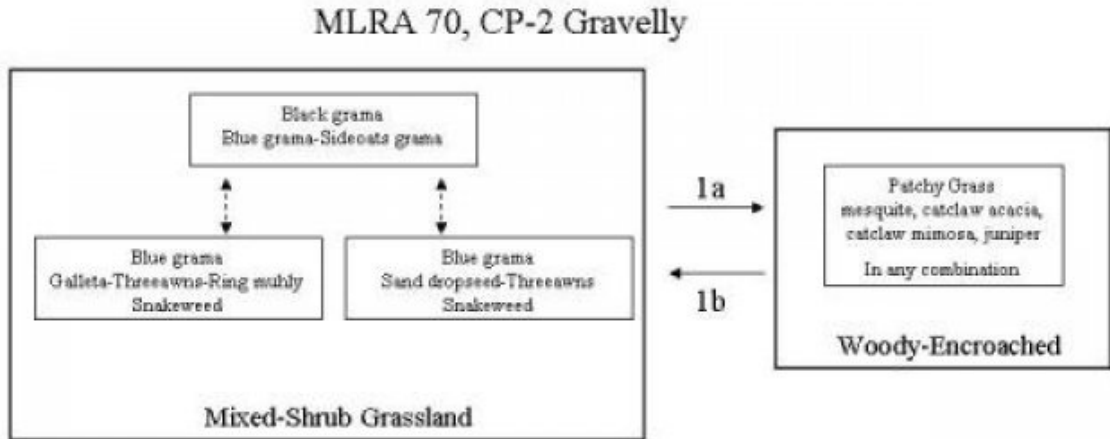
Table 4. Representative soil features

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	104–183 cm
Surface fragment cover <=3"	10–40%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	15.24–22.86 cm
Calcium carbonate equivalent (0-101.6cm)	7–40%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–10
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	35–75%
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



- 1a. Seed dispersal, loss of grass cover, lack of fire.
1b. Brush control, 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, black grama, blue grama, and sideoats grama are the dominant grasses. Common forbs include globemallow, species of buckwheat, paper flower, and plains zinnia. Soapweed yucca, catclaw mimosa, feather dalea, and broom snakeweed are a few of the shrubs common to this site. Continuous heavy grazing pressure can cause a decrease in black grama and sideoats grama and result in communities dominated by blue grama, with galleta, threeawns, sand dropseed, ring muhly, and broom snakeweed becoming sub-dominant. Other subordinate species that typically increase in representation include hairy grama, wolfstail, and rough tridens. Diagnosis: Species of grama dominate the site. Grass cover is uniform with few large bare areas. Shrubs are present and evenly distributed. There is little evidence of erosion.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	381	796	1222
Forb	78	157	247
Shrub/Vine	45	101	157
Total	504	1054	1626

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	5-15%
Forb foliar cover	1-2%
Non-vascular plants	0%
Biological crusts	0%
Litter	1-5%
Surface fragments >0.25" and <=3"	35-60%
Surface fragments >3"	15-35%
Bedrock	0%
Water	0%
Bare ground	20-30%

Figure 5. Plant community growth curve (percent production by month). NM4014, R070BY065NM Gravelly Reference State. R070BY065NM Gravelly Reference State Grassland with warm-season short and mid-grasses. Shrubs and forbs are an important component..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	5	10	25	30	15	7	0	0

State 2 Woody-Encroached

This state a marked increase in cover by woody plants.

Community 2.1 Woody-Encroached

This phase is characterized by the noticeable increase of woody species including mesquite, catclaw acacia, catclaw mimosa, and juniper. These species may occur individually or in combination. Mesquite, catclaw acacia, and catclaw mimosa tend to be more widespread across the extent of the Gravelly site, while increases in juniper may be more representative of the northern portion of this resource area. Blue grama is typically the dominant grass with threeawns, galleta, ring muhly, and sand dropseed occurring as sub-dominants. Diagnosis: Woody species, including mesquite, catclaw acacia, catclaw mimosa, or juniper are found at increased densities. Grass cover is patchy with frequent large bare areas present. Rills and small gullies may be present, especially on the steeper sideslopes. Transition to Woody-Encroached (1a) Seed dispersal, loss of grass cover, and decreased fire frequency are believed to initiate this transition. Seed dispersal by livestock and wildlife may be a key factor in facilitating the encroachment of woody species. The seeds of mesquite and catclaw mimosa are highly palatable to livestock and wildlife. Birds and numerous small mammals consume and transport juniper berries and catclaw acacia seed. A reduction in grass cover can provide competition-free areas for the establishment of woody species. It also can reduce fine fuels, decrease burn intensity, and negatively affect the site's ability to carry fire. Fire generally causes high mortality rates for oneseed juniper. Conversely, mesquite, catclaw mimosa, and catclaw

acacia are resistant to, and typically re-sprout following, fire. However, periodic fire may have helped to check the encroachment of these species by killing young seedlings, disrupting seed production cycles, and damaging the plants, making them more susceptible to disease and insects. 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.

Figure 6. Plant community growth curve (percent production by month).
 NM4014, R070BY065NM Gravelly Reference State. R070BY065NM Gravelly Reference State Grassland with warm-season short and mid-grasses.
 Shrubs and forbs are an important component..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	5	10	25	30	15	7	0	0

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	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	–

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. Deferral 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	05/03/2024
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:**
