

Ecological site R077BY026NM Gravelly Loam

Last updated: 9/11/2023 Accessed: 05/17/2024

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.

MLRA notes

Major Land Resource Area (MLRA): 077B–Southern High Plains, Northwestern Part

MLRA 77B is characterized by nearly level to gently sloping plains with a minimal number of playa depressions and moderately sloping breaks along drainageways. Loamy and sandy soils are generally deep and occur in a mesic soil temperature regime and ustic soil moisture regime bordering on aridic. Current land use is dominantly rangeland with minor cropland.

Classification relationships

This ecological site is correlated to soil components at the Major Land Resource Area (MLRA) level which is further described in USDA Ag Handbook 296.

Characteristic Soils Are: Amarillo, Bascom, Clovis, Friona, Larimer Mansker, Olton, Portales, Potter, Pullman, Slaughter

Ecological site concept

The Gravelly Loam ecosite occurs over moderately deep and deep, well drained soils on uplands and alluvial fans. These soils may be loamy to sandy. The reference vegetation consists of midgrasses and shortgrasses with scattered forbs and shrubs. Abusive grazing practices can lead to a decline in the more palatable species and a shift in the plant community. Without fire or alternative brush management activities, woody species canopy may increase across the site. This site may have up to 35 percent surface gravel present.

Associated sites

R077BY016TX	Limy Upland 12-17" PZ Adjacent and slightly downslope from the Gravelly Loam site. The soils are loam to clay loam in surface texture. Shortgrasses dominate but a good mixture of midgrasses are found on this site. Production is higher than on the Gravelly Loam site.
R077BY021TX	Sandy Loam 12-17" PZ Adjacent and slightly downslope from the Gravelly Loam site. The soils are sandy loam in surface texture. Midgrasses dominate but some tallgrasses can be found on this site. Production is less than on the Gravelly Loam site.
R077BY658TX	Sandy 12-17" PZ Adjacent and slightly downslope from the Gravelly Loam site. The soils are loamy sand in surface texture. Tallgrasses dominate but some midgrasses can be found on this site. Production is less than on the Gravelly Loam site.

Similar sites

R077BY009NM	Gravelly Similar to the Gravelly Loam site is the Gravelly site. The soils are loamy to sandy in surface texture. Midgrasses dominate but there is a good mixture of shorgrasses on this site. Production is higher than the Gravelly Loam site.
R077EY053TX	Gravelly 16-24" PZ Similar to the Gravelly Loam site is the Gravelly site in MLRA 77E. Slopes are greater, up to 25%. Mean annual temperature is greater (59 to 63 degrees F). Mean annual precipitation is greater (16 to 24 inches). Production is higher than the Gravelly site in MLRA 77B.

Table 1. Dominant plant species

Tree	Not specified	
Shrub	(1) Yucca madrensis	
Herbaceous	(1) Bouteloua gracilis(2) Bouteloua dactyloides	

Physiographic features

This site is on nearly level to undulating plains. Elevation ranges from approximately 3,800 to 5,000 feet above sea level. Slopes range from 0 to 9 percent.

Table 2. Representative	physiographic features
-------------------------	------------------------

Landforms	(1) Plateau > Plain (2) Plateau > Alluvial fan
Runoff class	Very low to low
Flooding frequency	None
Ponding frequency	None
Elevation	1,158–1,524 m
Slope	0–9%

Water table depth	203 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

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

Annual average precipitation ranges from 15 to 19 inches. Seventy percent of the moisture usually falls during the six-month period 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. Spring precipitation (March, April, May) accounts for approximately 25 percent of the annual precipitation. Most of this comes as light rain showers. Winter moisture may occur as either rain or snow and usually averages less than ½ inch per month. Temperatures are characterized by distinct seasonal change and large annual and diurnal temperature ranges. Summers are moderately warm; maximum temperatures average above 90 degrees F in July and August. Temperatures usually fall rapidly after sundown and range in the low 60's on most summer nights. Winters are mild, sunny and dry. Daytime shade temperatures in mid-winter usually rise to the 50's. However, freezing temperatures normally occur at night from mid-November to mid-March.

The frost-free season ranges from 181 to 199 days. Dates of the last freeze vary from April 10th to April 23rd and the first freeze varies from October 18th to October 26th.

Wind velocities in this area are high and average about 5.3 miles per hour on an annual basis. The spring months are characterized by frequent windstorms with velocities in excess of 45 miles per hour, which cause excessive erosion on soils not protected by a good ground cover of vegetation. Humidity is low and evaporation is high. Both temperature and rainfall distribution favor production of warm-season, perennial plants in this area. However, sufficient late winter and early spring moisture allows cool-season species to occupy an important component within most plant communities.

Climate data was obtained from the WCCR web site using 50 % probabilities for freeze-free and frost-free season using 28.5 degrees F and 32.5 degrees F respectively.

Frost-free period (characteristic range)	140-145 days
Freeze-free period (characteristic range)	169-170 days
Precipitation total (characteristic range)	432-457 mm
Frost-free period (actual range)	139-147 days
Freeze-free period (actual range)	168-170 days
Precipitation total (actual range)	406-457 mm
Frost-free period (average)	143 days
Freeze-free period (average)	169 days
Precipitation total (average)	432 mm

Table 3. Representative climatic features

Climate stations used

- (1) ROSEBUD 7NW [USC00297585], Mosquero, NM
- (2) MCCARTY RCH [USC00295516], Nara Visa, NM
- (3) UTE DAM [USC00299284], Logan, NM
- (4) AMISTAD 5 SSW [USC00290377], Amistad, NM
- (5) DALHART 6 SW [USC00412235], Hartley, TX
- (6) CLAYTON 1 N [USC00291883], Clayton, NM

Influencing water features

Water features are not an influencing factor in this site.

Wetland description

None.

Soil features

These are moderately deep and deep, well drained soils on uplands and alluvial fans. The surface layers are silt loam, loam or clay loam. The subsoil and substratum ranges in texture from sandy loam through clay loam. The surface runoff is medium. The permeability is slow to moderately rapid. Infiltration rate is medium to moderately slow. Available water-holding capacity is high. Effective rooting depth is 20 to 60 inches or more.

Soils correlated to this site: Bascom fine sandy loam

Parent material	(1) Alluvium–igneous, metamorphic and sedimentary rock(2) Eolian deposits–igneous, metamorphic and sedimentary rock	
Surface texture	(1) Gravelly loam(2) Gravelly fine sandy loam(3) Gravelly sandy clay loam	
Family particle size	(1) Fine-Ioamy (2) Loamy-skeletal	
Drainage class	Well drained	
Permeability class	Moderate to moderately rapid	
Soil depth	25–203 cm	
Surface fragment cover <=3"	15–35%	
Surface fragment cover >3"	0%	
Available water capacity (0-101.6cm)	7.62–15.24 cm	
Calcium carbonate equivalent (0-101.6cm)	5–55%	
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm	
Sodium adsorption ratio (0-101.6cm)	0	
Soil reaction (1:1 water) (0-101.6cm)	6.6–9	
Subsurface fragment volume <=3" (0-101.6cm)	35–60%	
Subsurface fragment volume >3" (0-101.6cm)	15–35%	

Table 4. Representative soil features

Ecological dynamics

Warm-season short grasses, principally blue grama and buffalograss dominate this site. Mid-grasses and forbs are in smaller amounts. Cool-season grasses make up a minor component of the plant community. Few woody species are found in the plant community. Western wheatgrass and switchgrass usually grow in the small depressions in which water collects.

State and transition model

Ecosystem states



State 1 submodel, plant communities

1.1. Reference community phase	

State 1 Reference State

The reference vegetation consists of midgrasses and shortgrasses with scattered forbs and shrubs.

Dominant plant species

- blue grama (Bouteloua gracilis), grass
- buffalograss (Bouteloua dactyloides), grass

Community 1.1 Reference community phase

Warm-season short grasses, principally blue grama and buffalograss dominate this site. Mid-grasses and forbs are in smaller amounts. Cool-season grasses make up a minor component of the plant community. Few woody species are found in the plant community. Western wheatgrass and switchgrass usually grow in the small depressions in which water collects.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	628	897	1435
Forb	118	168	269
Shrub/Vine	39	56	90
Total	785	1121	1794

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	2%
Grass/grasslike foliar cover	40%
Forb foliar cover	2-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	20%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%

Bedrock	0%
Water	0%
Bare ground	0%

Figure 9. Plant community growth curve (percent production by month). NM4726, R077BY026NM Gravelly Loam Reference State. R077BY026NM Gravelly Loam Reference State.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	3	3	5	5	25	30	15	10	2	0

Additional community tables

Table 7. Community 1.1 plant community composition

Common Name	Symbol	Scientific Name	(Kg/Hectare)	(%)			
Grass/Grasslike							
Blue Grama	336–392						
blue grama	BOGR2	Bouteloua gracilis	336–392	-			
Galleta Tobosa	112–135						
James' galleta	PLJA	Pleuraphis jamesii	112–135	_			
tobosagrass	PLMU3	Pleuraphis mutica	112–135	-			
Buffalograss	90–112						
Sideoats grama	90–112						
sideoats grama	BOCU	Bouteloua curtipendula	90–112	_			
sand dropseed	56–78						
sand dropseed	SPCR	Sporobolus cryptandrus	56–78	_			
western wheatgrass switchg	56–78						
western wheatgrass	PASM	Pascopyrum smithii	56–78	-			
switchgrass	PAVI2	Panicum virgatum	56–78	-			
ring muhly wolftail	34–56						
common wolfstail	LYPH	Lycurus phleoides	34–56	-			
ring muhly	MUTO2	Muhlenbergia torreyi	34–56	-			
Threeawn Spp.	34–56						
threeawn	ARIST	Aristida	34–56	-			
vine-mesquite	34–56						
vine mesquite	PAOB	Panicum obtusum	34–56	-			
cane and silver bluestem			34–56				
cane bluestem	BOBA3	Bothriochloa barbinodis	34–56	_			
silver bluestem	BOSA	Bothriochloa saccharoides	34–56	-			
Bottlebrush squirreltail			34–56				
squirreltail	ELEL5	Elymus elymoides	34–56	-			
Little bluestem	34–56						
little bluestem	SCSC	Schizachyrium scoparium	34–56	-			
needleand thread black grama plains bristlegrass s			34–56				
Graminoid (grass or grass- like)	2GRAM	Graminoid (grass or grass- like)	34–56	_			
	/GrasslikeBlue Gramablue gramaGalleta TobosaJames' galletatobosagrassBuffalograssSideoats gramasideoats gramasand dropseedwestern wheatgrass switchgwestern wheatgrassswitchgrassring muhly wolftailcommon wolfstailring muhlyThreeawn Spp.threeawnvine mesquitecane bluestemsilver bluestemsquirreltailsquirreltailsquirreltailsquirreltailittle bluestemfireaminoid (grass or grass- like)	// GrasslikeBlue GramaBOGR2blue gramaBOGR2Galleta TobosaPLJAJames' galletaPLMU3tobosagrassPLMU3BuffalograssBOCUSideoats gramaBOCUsand dropseedSPCRsand dropseedSPCRwestern wheatgrass switc+==swestern wheatgrass switc+=swestern wheatgrass switc+ing muhly wolftailPAVI2common wolfstailLYPHring muhlyMUTO2Threeawn Spp.MUTO2threeawn Spp.ARISTvine mesquitePAOBcane bluestemBOBA3silver bluestemBOSA3silver bluestemBOBA3silver bluestemSCSCIttle bluestemSCSCfuedleand thread black grass-SGRAMlike)SCSC	ReframaBUGR2Bouteloua gracilisBUGR2Bouteloua gracilisGalleta TobosaPLJAPleuraphis jamesiitobosagrassPLMU3Pleuraphis muticaBuffalograssBuffalograssSideoats gramaBOCUBouteloua curtipendulaSand dropseedSand dropseedSPCRSporobolus cryptandrussand dropseedSPCRSporobolus cryptandrusswestern wheatgrass switch:western wheatgrass switch:western wheatgrass switch:western wheatgrassPASMPascopyrum smithiiswitchgrassPASMPascopyrum smithiiswitchgrassPASM	GrassilkeBlue GramaBOGR2Bouteloua gracilis336–392blue gramaBOGR2Bouteloua gracilis336–392Galleta TobosaPLJAPleuraphis jamesii112–135James' galletaPLJAPleuraphis jamesii112–135tobosagrassPLMU3Pleuraphis mutica112–135BuffatograssPLMU3Pleuraphis mutica112–135Sidecats gramaBOCUBoteloua curtipendula00112Sidecats gramaBOCUSporbolus cryptandrus66–78sand dropseedSPCRSporbolus cryptandrus56–78switchgrassSPCRSporbolus cryptandrus56–78switchgrassPASMPascoprum smithii56–78switchgrassPASMPascoprum smithii56–78switchgrassPASMPascoprum smithii56–78switchgrassPASMPascoprum smithii34–56fing muhly wolftailLYPHIzeura splecides34–56ring muhlyMUT02Mulenbergia torreyi34–56fing muhlyMUT02Mulenbergia torreyi34–56funeawnPAOBPanicum obtusum34–56funeawnPAOBPanicum obtusum34–56funeawnBOSABothrichla barbinodis34–56fune mesquitePAOBPanicum obtusum34–56fune mesquiteBOSABothrichla barbinodis34–56fune mesquiteBOSABothrichla barbinodis34–56fune mesquiteBOSABothr			

	black grama	BOER4	Bouteloua eriopoda	34–56	_
	needle and thread	HECO26	Hesperostipa comata	34–56	_
	Hall's panicgrass	PAHA	Panicum hallii	34–56	-
	plains bristlegrass	SEVU2	Setaria vulpiseta	34–56	_
	slim tridens	TRMU	Tridens muticus	34–56	_
Forb					
14	globemallow	11–34			
	globemallow	SPHAE	Sphaeralcea	11–34	-
15	annual sunflower	-		11–34	
	common sunflower	HEAN3	Helianthus annuus	11–34	-
16	astragulas spp.			11–34	
	milkvetch	ASTRA	Astragalus	11–34	-
17	annual forbs		34–56		
	Forb, annual	2FA	Forb, annual	34–56	_
18	perennial forbs	34–56			
	Forb, perennial	2FP	Forb, perennial	34–56	_
Shrub	/Vine		-		
19	yucca spp.			11–34	
	уисса	YUCCA	Yucca	11–34	_
20	winterfat groundsel spp.			11–34	
	winterfat	KRLA2	Krascheninnikovia lanata	11–34	-
	ragwort	SENEC	Senecio	11–34	_
21	pricklypear cholla cactus			0–11	
	plains pricklypear	OPPO	Opuntia polyacantha	0–11	_
	pricklypear	OPUNT	Opuntia	0–11	_

Hydrological functions

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

Soil Series----Hydrologic Group

Amarillo-----B Bascom----B Clovis-----B Friona-----C Larimer-----B Mansker-----B Olton-----C Portales-----B Potter-----D, B Pullman-----C Slaughter-----C

Recreational uses

Recreation potential is limited largely by the lack of water and firewood. Suitability for camping, hiking and picnicking is fair. The terrain typical of the "wide open spaces" of the area enhances aesthetic appeal. Hunting is fair for small game and upland game birds and hunting is good for antelope.

Wood products

This site produces no wood products.

Other products

Grazing:

This site can be grazed any season of the year by all classes and ages of livestock. The site provides good winter grazing but offers little natural protection against storms. It is better suited to cow-calf or yearlings due to the large percentage of grass in the potential plant community. Continuous yearlong grazing or grazing continually during the period from March through October by cattle will result in a decrease of species such as sideoats grama, vinemesquite, little bluestem, western wheatgrass, bottlebrush squirreltail and winterfat. Species such as blue grama, galleta or tobosa, buffalograss, ring muhly, threeawn spp. and broom snakeweed will increase. Cholla cactus will increase on this site under continuous heavy grazing pressure where there is an available seed source. Blue grama will form a low dense turf under 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 healthy, high forage producing plant community. Fall and winter rest will benefit species such as winterfat. Spring rest (April-June) will allow species such as western wheatgrass and bottlebrush squirreltail to grow and reproduce. Summer rest will benefit warmseason species such as blue grama, sideoats grama and vine-mesquite to gain vigor and produce. Ninety-five percent of the annual production is from species that provide forage for grazing animals. Where the plant community has deteriorated to low turflike blue grama, buffalograss and ring muhly, grazing management alone may not achieve the desired range improvement. Mechanical range treatment and interseeding may be needed also.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index-----Ac/AUM 100 - 76-----2.3 - 4.9 75 - 51-----2.8 - 5.9 50 - 26-----4.0 - 9.0 25 - 0-----9.0+

Type locality

Location 1: Curry County, NM Location 2: Harding County, NM Location 3: Quay County, NM

Other references

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern High Plains 77 Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: Curry, Harding & Quay

Contributors

Christine Bishop Don Sylvester Elizabeth Wright John Tunberg Todd Carr

Approval

Bryan Christensen, 9/11/2023

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	05/17/2024
Approved by	Bryan Christensen
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):

- 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 annualproduction):
- 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: