

Ecological site R077BY016NM Very Shallow

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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.

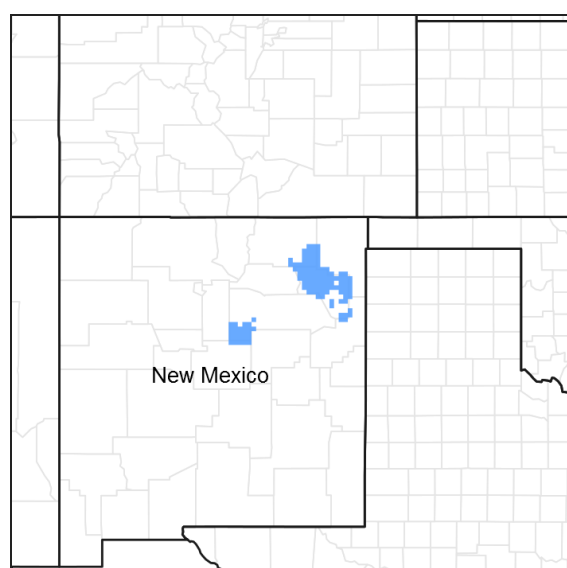


Figure 1. Mapped extent

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.

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.

Ecological site concept

The Very Shallow ecosite occurs over shallow soils on nearly level to moderately sloping narrow ridge tops or on the convex portion on small hills. 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

R077BY722TX	High Lime 12-17" PZ Adjacent, downslope or upslope from the Very Shallow site. The soils are sandy to loamy in surface texture and very highly calcareous. Midgrasses dominate but some shortgrasses occur on this site. Production is higher than the Very Shallow site.
R077BY021TX	Sandy Loam 12-17" PZ Adjacent and downslope from the Very Shallow site. The soils are fine sandy loam or sandy loam in surface texture. Midgrasses dominate but some tallgrasses occur on this site. Production is higher than the Very Shallow site.
R077BY016TX	Limy Upland 12-17" PZ Adjacent and downslope from the Very Shallow site. The soils are loam to clay loam in surface texture and highly calcareous. Shortgrasses dominate but a good mixture of midgrass occur on this site. Production is higher than the Very Shallow site

Similar sites

R077AY013TX	Very Shallow 16-22" PZ Similar to the Very Shallow site is the Very Shallow site in MLRA 77A. Mean annual precipitation is greater (16 to 22 inches). Production is higher than the Very Shallow site in MLRA 77B.
R077EY068TX	Very Shallow 16-24" PZ Similar to the Very Shallow site is the Very Shallow site in MLRA 77E. Mean annual temperature is greater (59 to 63 degrees F). Mean annual precipitation is greater (16 to 24 inches). Production is higher than the Very Shallow site in MLRA 77B.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Krascheninnikovia arborescens</i>
Herbaceous	(1) <i>Bouteloua curtipendula</i> (2) <i>Bouteloua gracilis</i>

Physiographic features

This site occurs on nearly level to moderately sloping narrow ridge tops or on the convex portion of the landscape at elevations from about 3,800 to 5,900 feet above sea level. Slopes are generally 0 to 9 percent but may range to 15 percent.

Table 2. Representative physiographic features

Landforms	(1) Plateau > Hill (2) Plateau > Ridge
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	3,800–5,900 ft
Slope	0–15%
Water table depth	80 in
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

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

Precipitation averages from about 15 to 16 inches annually with approximately 75 percent of this yearly moisture falling during the period of May through October. Most summer rainfall is associated with usually brief afternoon and evening thundershowers, which occasionally produce heavy rain over a small area, and sometimes bring a little hail. Winters are generally dry, with only one or two days a month when as much as one-tenth inch of moisture falls. However, winter average 20 inches of snow, although most snowfalls are light with an occasional storm producing up to six inches. Following these storms, snow may lie on the ground for several days and occasionally moderate to strong winds accompanying these storms result in blizzard conditions and heavy drifting. Although the precipitation patterns favor the production of warm-season plants, sufficient moisture is received in the late winter and the spring to support cool-season plants. Approximately 25 percent of the annual precipitation is received during April and May. May is generally the wettest month followed by July and then August.

Temperatures show the seasonal changes and large annual and diurnal ranges characteristic of such a climate. Summers are generally mild. The high daily temperature reading exceed 90 degrees F about one-third of the time, and readings of 100 degrees F occur about once a year. Rapid cooling after sundown results in minimum temperatures below 60 degrees F on most nights, even in midsummer. Winter shade temperatures usually rise to the mid-40's and an average of only 15 days fail to see temperatures rise above the freezing mark most of the time from early November through March; below zero readings occur on an average of only three times a year.

The freeze-free season ranges from 168 days to 171 days between April 28th to October 16th. Both temperatures and annual precipitation favor warm-season plants. About 40 percent of the annual precipitation is received during the season where temperatures will benefit cool-season plants and only 10 percent falls during the dormant season.

While open to winter invasions of arctic air over the Great Plains, this area is far enough south and west to miss many of these outbreaks. Mountains to the north and west intercept much of the precipitation from the Pacific northwest storms coming through this area during the winter. An average hourly wind velocity for the year is 15 miles per hour. Somewhat higher winds prevail during the spring months, but velocities exceeding 24 mile per hour are experienced only 10 percent of the usual year. Stronger winds blow chiefly from a westerly or southwesterly direction during the spring. Relative humidity is moderately low.

Climate data was obtained from <http://www.wrcc.sage.dri.edu/summary/climsmnm.html> web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (characteristic range)	140-145 days
Freeze-free period (characteristic range)	169-170 days
Precipitation total (characteristic range)	17-18 in
Frost-free period (actual range)	139-147 days
Freeze-free period (actual range)	168-170 days
Precipitation total (actual range)	16-18 in
Frost-free period (average)	143 days
Freeze-free period (average)	169 days
Precipitation total (average)	17 in

Climate stations used

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

Influencing water features

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

Wetland description

None.

Soil features

The significant soils that characterized this site are loams, fine sandy loams and clay loams that average less than 20 inches in depth and more than five inches in depth. The underlying materials are indurated caliche. Permeability of these soils is slow to moderate. The available water-holding capacity is low. Effective rooting depth is from 6 to 20 inches. The plant-soil-moisture-air relationship enables plants to respond to light rainfalls.

Soils correlated to this site: Plack loam

Table 4. Representative soil features

Parent material	(1) Eolian deposits—igneous, metamorphic and sedimentary rock
Surface texture	(1) Loam (2) Gravelly loam (3) Stony fine sandy loam (4) Clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	6–20 in
Soil depth	6–20 in
Surface fragment cover ≤3"	5–35%
Surface fragment cover >3"	5–35%
Available water capacity (0-20in)	1–3 in
Calcium carbonate equivalent (0-20in)	0–14%
Electrical conductivity (0-20in)	0–4 mmhos/cm
Sodium adsorption ratio (0-20in)	0–2
Soil reaction (1:1 water) (0-20in)	7.9–9
Subsurface fragment volume ≤3" (0-20in)	2–81%
Subsurface fragment volume >3" (0-20in)	3–16%

Ecological dynamics

Historic Climax Plant Community

This site is a grassland dominated by warm-season short and mid-grasses with forbs and cool-season grasses occupying an important component of the plant community. Shrub and half-shrubs occupy a minor component.

State and transition model

Ecosystem states

1. Historic Climax Plant Community

State 1 submodel, plant communities

1.1. Historic Climax Plant Community

State 1

Historic Climax Plant Community

Dominant plant species

- winterfat (*Krascheninnikovia arborescens*), shrub
- sideoats grama (*Bouteloua curtipendula*), grass

Community 1.1

Historic Climax Plant Community

Historic Climax Plant Community This site is a grassland dominated by warm-season short and mid-grasses with forbs and cool-season grasses occupying an important component of the plant community. Shrub and half-shrubs occupy a minor component.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	312	702	1092
Forb	52	117	182
Shrub/Vine	32	72	112
Total	396	891	1386

Table 6. Ground cover

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

Water	0%
Bare ground	0%

Figure 9. Plant community growth curve (percent production by month). NM4716, R077BY016NM Very Shallow Reference State. R077BY016NM Very Shallow Reference State.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	4	2	4	25	30	15	10	3	5

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Sideoats Grama			153–180	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	153–180	–
2	Little Bluestem			153–180	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	153–180	–
3	Blue Grama			153–180	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	153–180	–
4	New Mexico Feathergrass, Needleandthread			90–135	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	90–135	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	90–135	–
5	Hairy Grama			27–45	
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	27–45	–
6	Sand Dropseed			27–45	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	27–45	–
7	Threeawn spp., Wolftail, Silver Bluestem			27–45	
	threeawn	ARIST	<i>Aristida</i>	27–45	–
	silver bluestem	BOSA	<i>Bothriochloa saccharoides</i>	27–45	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	27–45	–
8	Other Grasses			27–45	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	27–45	–
Forb					
9	Buckwht sp., An Sunflwr, Dotted Gayflwr, Pr. Confl			27–45	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	31–51	–
	buckwheat	ERIOG	<i>Eriogonum</i>	27–45	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	27–45	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	27–45	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	27–45	–
10	Other Forbs			27–45	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	27–45	–
Shrub/Vine					
11	Wintrfat, Fringd Sagewrt, Biglw Sagebrsh, Sknk Sum			27–45	
	aster	ASTER	<i>Aster</i>	21–51	–
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	27–45	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	27–45	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	27–45	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	27–45	–
12	Other Shrubs			27–45	
	Forb, perennial	2FP	<i>Forb, perennial</i>	21–51	–
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	27–45	–

Animal community

No Data.

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

Dean-----C

Pastura-----D

Plack-----D

Recreational uses

This site has limited recreation potential, limited mainly by the lack of live water and shade. Hunting for small game and antelope is good. Photography of small animals, birds, antelope and flowering plants is fair to good. The natural beauty of the site is enhanced by the large variety of flowering plants that bloom from spring to fall.

Wood products

This site has no significant potential for wood products.

Other products

Grazing:

This site can be grazed any season of the year by all kinds of livestock, generally without regard to age. A portion of the total stocking rate favors sheep and antelope due to the site's potential to produce forbs. The large variety of plants provides good nutrition during most seasons of the year. Supplemental protein is needed only during late winter. Emergency feed is required during heavy snow cover; however, this site is among the first that snow will melt off. This site is among the first to green up in the spring and will usually respond to light amounts of rainfall. Continuous yearlong grazing or grazing continually by cattle during the period from April through October will cause the site to deteriorate and become less productive. Species such as sideoats grama, little bluestem, New Mexico feathergrass, needleandthread and winterfat will decrease and blue grama, threeawn spp., wolftail, tridens, broom snakeweed and forbs will increase. A system of deferred grazing, which varies the season of grazing and rest in each pasture during successive years, is needed to maintain or improve the plant community. Different seasons of rest and grazing benefit different plants. Spring rest (April-June) will allow cool-season forbs and grasses such as New Mexico feathergrass and needleandthread to grow and reproduce. Summer rest will benefit warm-season grasses such as sideoats grama, little bluestem, and blue grama. Fall rest allows plants to complete their growth cycle. Winter rest will benefit the woody species such as winterfat and sagebrush. Grazing is beneficial after the seed sets and aids in trampling in the seed.

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Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index-----Ac/AUM

100 - 76-----2.6 – 4.4

75 – 51-----3.2 – 6.8

50 – 26-----4.4 – 12.0

25 – 0-----12.0+

Type locality

Location 1: Colfax County, NM

Location 2: Harding County, NM
Location 3: Union 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: Union, Harding Colfax.

Characteristic Soils Are:
Plack

Other Soils included are:
Dean-----Pastura

Contributors

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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	05/10/2025
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):**
-
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:**
-