

Ecological site R070BY075NM

Shallow (Cool)

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.

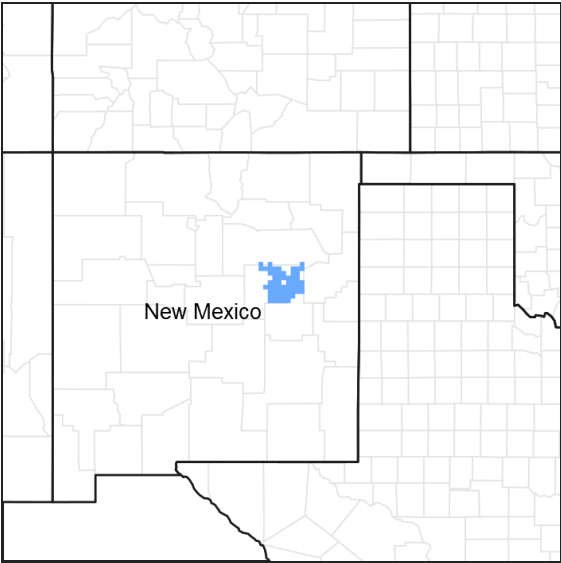


Figure 1. Mapped extent

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 shallow or very shallow soils with base textures of sandy loam or fine sandy loam. Slopes range from 0 to 5 percent.

While climatic criteria have not been specified, this site occupies cooler areas than R070BY062NM.

The Shallow (Cool) ecological site occurs on plains and plateaus at elevations of 4,400 to 6,600 feet. It often occurs in association with the Very Shallow or Loamy sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is on nearly level to gently undulating soils of the upland plains, mesas, and ridges. Slopes range from 0 to 5 percent. Exposure varies and is not significant. Elevation ranges from 4,200 to 5,300 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Plain (3) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	4,200–5,400 ft
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

The narrative below applies to MLRA 70B in general. However, this site is distinguished as being “cool.” Thus, it can be expected to either occur at the cooler end of this climatic spectrum or, perhaps, extend beyond it.

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)	196 days
Freeze-free period (average)	218 days
Precipitation total (average)	16 in

Influencing water features

There are no surface water features or wetlands typically associated with this ecological site.

Soil features

Soils are very shallow to shallow. Surface and subsurface textures are very fine sandy loam, sandy loam, fine sandy loam, very fine sandy loam, and gravelly very fine sandy loam. Root-restrictive materials including caliche, gypsum, sandstone, or limestone occur at depths of 9 to 20 inches.

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

Characteristic soils:

Kolar

Palo

Table 4. Representative soil features

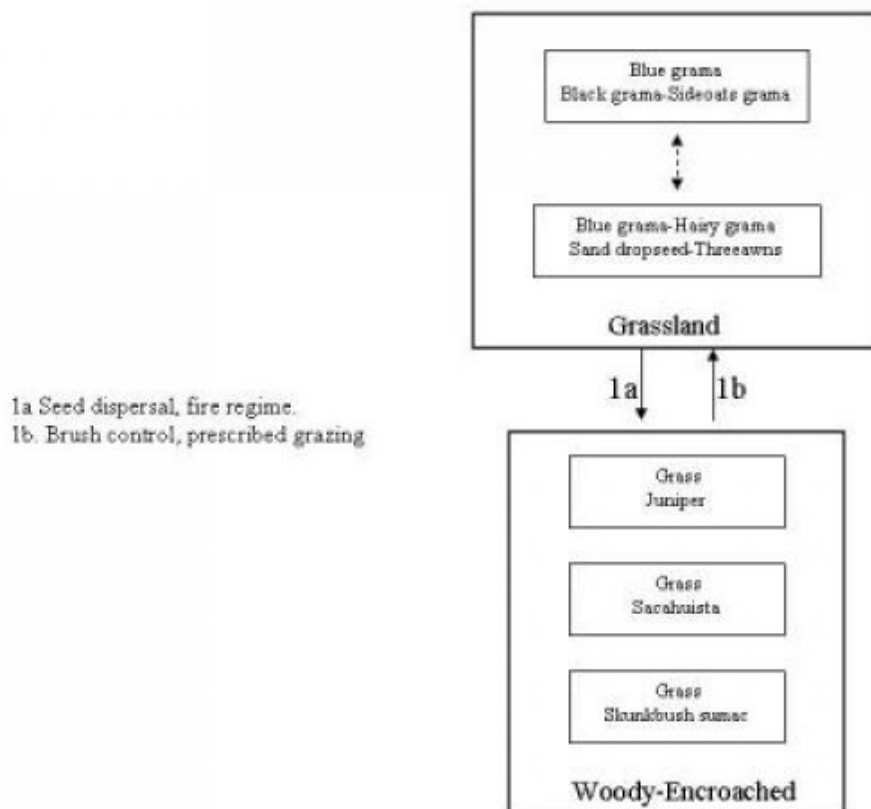
Surface texture	(1) Fine sandy loam (2) Sandy loam (3) Gravelly very fine sandy loam
Family particle size	(1) Sandy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	10–20 in
Surface fragment cover ≤3"	0–25%
Surface fragment cover >3"	0–1%
Available water capacity (0–40in)	1–4 in
Calcium carbonate equivalent (0–40in)	5–15%
Electrical conductivity (0–40in)	0–2 mmhos/cm
Sodium adsorption ratio (0–40in)	0–1
Soil reaction (1:1 water) (0–40in)	7.4–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–25%
Subsurface fragment volume >3" (Depth not specified)	0–1%

Ecological dynamics

The reference plant community is a grassland dominated by warm-season short- and mid-grasses dotted with shrubs. Black grama and blue or hairy grama are the dominant grasses. Forbs are typically a minor component with their distribution and abundance dependent on precipitation. A variety of shrubs are associated with this site, but plants such as juniper, skunkbush sumac, and sacahuista are prone to increase with disturbance. Seed dispersal by wildlife or livestock may facilitate the transition to a Woody-Encroached state. Decreased fire frequency may also contribute to an increase in juniper and/or sacahuista. Alternatively, skunkbush sumac sprouts vigorously following fire. Fire may also initiate germination of dormant skunkbush sumac seed and result in thick, localized stands of this plant.

State and transition model

MLRA 70, CP-2 Shallow (cool)



State 1 Grassland

This state is dominated by grasses.

Community 1.1 Grassland

In the reference plant community, black grama, blue grama, and hairy grama are the dominant grasses. Sideoats grama, little bluestem, and New Mexico feathergrass or needle and thread are the sub-dominants. Shrubs including small soapweed yucca, winterfat, oneseed juniper, skunkbush sumac, and sacahuista are usually found scattered across most areas. Continuous grazing pressure can cause a decrease in less grazing-resistant and more desirable forage plants such as black grama, little bluestem, sideoats grama, and New Mexico feathergrass. Concurrently, blue grama, hairy grama, sand dropseed, and threeawns typically increase. This can result in a community dominated by blue grama/hairy grama, with sand dropseed and threeawns as sub-dominants. Diagnosis: Grass and litter cover is fairly uniform with few large (greater than 1 meter) bare areas present. Shrubs constitute a minor portion of the plant community with combined canopy averaging 5 percent or less. Evidence of erosion is minimal. Other grasses that appear on this site include sand muhly, sand bluestem, mesa dropseed, plains bristlegrass, red lovegrass, wolfstail, bush muhly, Indian ricegrass, and Arizona cottontop. Other shrubs that appear on this site include cholla cactus, broom snakeweed, sand sagebrush, and Bigelow sagebrush. Forbs that often appear on this site include scarlet globemallow, silverleaf nightshade, verbena, annual mustard, and *Astragalus* spp.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	340	800	1120
Shrub/Vine	20	70	140
Forb	20	70	140
Total	380	940	1400

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	3-5%
Grass/grasslike foliar cover	20-25%
Forb foliar cover	5-7%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-10%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0-5%
Bedrock	0%
Water	0%
Bare ground	35-45%

**Figure 5. Plant community growth curve (percent production by month).
NM4075, R070BY075NM Shallow Cool Reference State. R070BY075NM
Shallow Cool 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 Woody-Encroached

This state contains abundant woody species.

Community 2.1 Woody-Encroached

This phase is characterized by a notable increase in shrubs, including juniper, skunkbush sumac, and sacahuista. Skunkbush sumac may occur in thickets on areas previously burned. Blue grama, hairy grama, and threeawns are the prominent grasses. Diagnosis: Grass cover varies in response to the amount of shrub increase and grazing pressure, ranging from fairly uniform to fragmented with large bare areas present. Blue and/or hairy grama are the dominant grasses. Few mid-grasses remain. Shrubs, especially juniper, skunkbush sumac, or sacahuista occur at increased densities relative to the Grassland state. Transition to Woody-Encroached (1a) Transitions to the Woody Encroached state are believed to occur mainly in response to seed dispersal by livestock and wildlife. Drought may also favor shrubs over grasses. Historically, if fire was important in controlling shrub densities on shallow sites, then decreased fire frequency may favor juniper or sacahuista encroachment. Alternatively, fire may initiate increases in skunkbush sumac by stimulating increased germination of dormant seed. Key indicators of approach to transition: Decrease in black grama, sideoats grama, and little bluestem Increase in blue/hairy grama Increase in size and number of bare patches Increase in amount of juniper, sacahuista, or skunkbush sumac seedlings Transition back to Grassland (1b) Brush control is necessary to initiate the transition back to the Grassland state. Prescribed grazing will help ensure adequate rest following brush control and will assist in the establishment and maintenance of grass cover.

Figure 6. Plant community growth curve (percent production by month).
NM4075, R070BY075NM Shallow Cool Reference State. R070BY075NM
Shallow Cool 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 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	black grama			70–280	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	68–280	–
2	sideoats grama			70–210	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	68–210	–
3	little bluestem			40–210	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	45–210	–
4	NM feathergrass needleand thread			40–210	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	45–210	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	45–210	–
5	hairy grama blue grama			70–280	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	68–280	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	68–280	–
6	sand dropseed			10–100	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	13–105	–
7	threeawn			10–100	
	threeawn	ARIST	<i>Aristida</i>	13–105	–
Shrub/Vine					
8	winterfat small soapweed			10–100	
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	13–105	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	13–105	–
9	onseed juniper skunkbrush sumac sacahuista			10–100	
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	13–105	–
	sacahuista	NOMI	<i>Nolina microcarpa</i>	13–105	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	13–105	–
Forb					
10	leather croton wildbuckwheat wooly indianwheat			10–100	
	leatherweed	CRPOP	<i>Croton pottsii</i> var. <i>pottsii</i>	13–105	–
	buckwheat	ERIOG	<i>Eriogonum</i>	13–105	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	13–105	–

Animal community

Habitat for Wildlife:

This site provides habitats which support a resident animal community that is characterized by pronghorn antelope, blacktailed jackrabbit, spotted ground squirrel, plains pocket mouse, southern plains woodrat, horned lark, scaled

quail, and round-tailed horned lizard.

Hydrological functions

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

Hydrologic Interpretations

Kolar D

Palo D

Recreational uses

Recreation potential is limited. Suitability for camping, picnicking, and hiking are poor to fair and limited mainly by lack of shade and surface water. Hunting is good for antelope, quail, dove, and small game. The natural beauty of this site is enhanced by the variety of flowering plants that bloom from early spring to late fall following significant precipitation events.

Wood products

This site produces no significant wood products.

Other products

Grazing:

This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. Approximately 80 percent of the total annual yield is from species that furnish forage to grazing animals. Continuous grazing during the growing season will cause the more desirable forage plants such as black grama, sideoats grama, little bluestem, and New Mexico feathergrass to decrease. Plants most likely to increase are hairy grama, sand dropseed, threeawns, oneseed juniper, sacahuista, and skunkbush sumac. As the ecological conditions deteriorate, there is a sharp increase in hairy and/or blue grama. Most of the mid-grass species will disappear as the deterioration advances. In some areas, there may be large patches of skunkbush sumac, sacahuista, or oneseed juniper that will increase to the point of dominating the area. As the condition deteriorates, it is usually accompanied by the loss of plant cover which causes a wind erosion hazard and a loss of productivity. A system of rotational grazing, which varies the time of grazing and rest in pastures during successive years, is needed to maintain or improve the plant community. Rest during April, May, and June benefits cool-season species such as New Mexico feathergrass and needle and thread. Late spring and summer rest is needed for little bluestem and sideoats grama to grow and reproduce. Rest during the winter is beneficial mainly to black grama. Cattle show a definite preference for black grama during the late winter, often leading to over-utilization of this plant. Thus, winter rest benefits black grama. Where sheep have historically grazed, New Mexico feathergrass or needle and thread may increase and dominate the site.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM

100 - 76 2.4 – 3.2

75 – 51 3.0 – 4.3

50 – 26 4.0 – 6.9

25 – 0 6.9+

Inventory data references

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

Type locality

Location 1: De Baca County, NM
Location 2: Guadalupe County, NM
Location 3: Chaves County, NM

Other references

1. Johnsen, T. N., Jr. 1962. One-seeded juniper invasion of northern Arizona grasslands. Ecological Monographs. 32:187-207.
2. Van Dyne, G.M., G.F. Payne, compilers. 1964. Grazing responses of western range plants. Bozeman, MT: Montana State College, Department of Animal and Range Sciences. 69 p.

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	05/10/2025
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:**
-