

Ecological site R070BY074NM

Sandy Plains (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 deep or very deep soils with coarse surface textures and a significant clay increase with depth. Slopes range from 0 to 15 percent. While climatic criteria have not been specified, this site occupies cooler areas than R070BY055NM.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Ephedra</i> (2) <i>Krascheninnikovia lanata</i>
Herbaceous	(1) <i>Andropogon gerardii</i> (2) <i>Andropogon hallii</i>

Physiographic features

This site occurs on level to gently sloping or undulating piedmont slopes or plains. Slopes average less than 10 percent, but range as high as 15 percent. Aspect varies but is not ecologically significant. Elevation ranges from 5,000 to 7,000 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Plain (2) Sand sheet
Flooding frequency	None
Ponding frequency	None
Elevation	1,524–2,134 m
Slope	10–15%
Water table depth	183 cm
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 and, 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)	406 mm

## Influencing water features

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

## Soil features

The soils of this site are well-drained, and range from moderately deep to very deep. Typically, the surface horizon

is 5 to 8 inches thick with a texture of loamy fine sand. Subsoil has a texture of sandy clay loam, clay loam, or very fine sandy loam. Permeability is moderately rapid to rapid with moderate to high water-holding capacity. Due to the coarse-textured surfaces, these soils are subject to blowing when plant cover does not protect the surface.

**Table 4. Representative soil features**

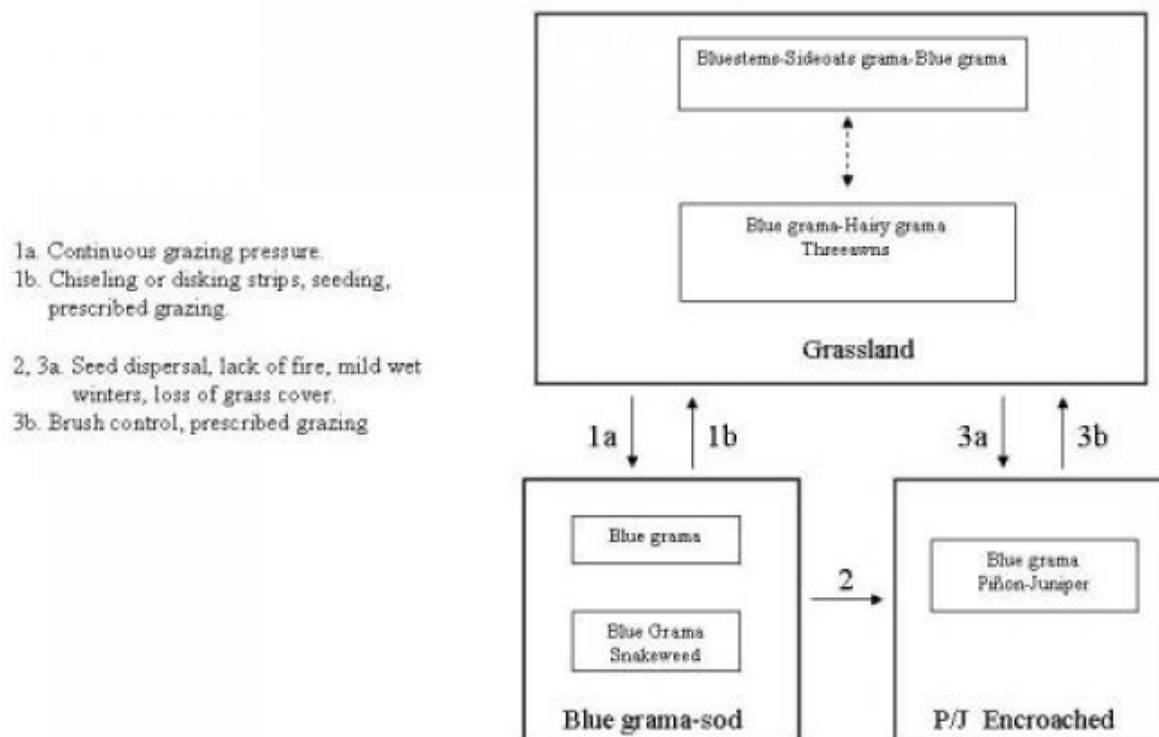
Surface texture	(1) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately rapid to rapid
Soil depth	Not specified
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0–3%
Available water capacity (0-101.6cm)	15.24–30.48 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–3%
Subsurface fragment volume >3" (Depth not specified)	0–3%

## Ecological dynamics

This site occurs on piedmont slopes or plains at elevations of 5,000 to 7,000 feet. Perennial grasses dominate the historic plant community in association with scattered shrubs and trees. Sand bluestem and big bluestem are the dominant grasses of the reference community. Continuous grazing pressure can result in a decrease in these and other palatable grasses and can eventually result in a less productive, sod-bound blue grama state. Pinyon/juniper may encroach due to seed dispersal, lack of fire, and decreased competition resulting from loss of grass cover. Periods of mild, wet winters may also favor pinyon/juniper encroachment.

## State and transition model

## MLRA 70, CP-2 Sandy Plains (cool)



### State 1 Grassland

This state is dominated by grasses.

### Community 1.1 Grassland

In the reference plant community, sand bluestem and big bluestem are the dominant grasses with sideoats grama, little bluestem, blue grama, and dropseeds occurring as sub-dominants. Other grasses that can occur in significant amounts include black grama and Indian ricegrass. This site will support a wide variety of woody species although they are a minor component of the reference plant community. At higher elevations, pinyon and juniper are favored, whereas yucca, fourwing saltbush, and sand sagebrush are more typical of lower elevations. Although forbs are usually a minor component, during years of abundant rainfall, their production may increase significantly.

Continuous grazing pressure can cause a decrease in bluestems, sideoats grama, and Indian ricegrass, resulting in communities dominated by blue grama, with hairy grama and threeawns occurring as sub-dominants. Diagnosis: Grass and litter cover is typically uniform with few large (greater than 1 meter) bare areas present. Blue grama exhibits an upright, bunchgrass form. Grass species such as sand bluestem, big bluestem, little bluestem, sideoats grama, and sand dropseed, are present in significant amounts. Shrubs and trees are a scattered with a combined canopy cover of less than 10 percent. Evidence of erosion is minimal.

**Forest understory.** Other grasses that could appear on this site include: cane bluestem, mesa dropseed, threeawn spp., green sprangletop, bottlebrush squirreltail, mat muhly, plains lovegrass, purple lovegrass, bush muhly and tumble windmillgrass. Other shrubs that could appear on this site include: rabbitbrush, broom snakeweed, pinyon, Bigelow sagebrush, cacti spp. and catclaw acacia. Other forbs that could appear on this site include: larkspur, purple nightshade, salsify, curly dock, Indian paintbrush, scarlet globemallow, Rocky Mountain beeplant, threadleaf

groundsel, wooly Indianwheat, tansymustard and Russian thistle.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	706	1681	2242
Shrub/Vine	101	224	415
Forb	101	224	415
Total	908	2129	3072

Table 6. Soil surface cover

Tree basal cover	2-3%
Shrub/vine/liana basal cover	3-6%
Grass/grasslike basal cover	10-15%
Forb basal cover	5-10%
Non-vascular plants	0%
Biological crusts	0%
Litter	8-10%
Surface fragments >0.25" and <=3"	0-3%
Surface fragments >3"	0-3%
Bedrock	0%
Water	0%
Bare ground	60-70%

Figure 5. Plant community growth curve (percent production by month).  
NM4074, R070BY074NM Sandy Plains Cool Reference State. R070BY074NM  
Sandy Plains 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  
Blue Grama-Sod

This state is characterized by abundant, sod-bound blue grama.

Community 2.1  
Blue grama-Sod

Under continuous grazing pressure without adequate recovery periods, blue grama may form a less productive, low growing sod. Grass species such as big bluestem, sand bluestem, little bluestem, sideoats grama, and Indian ricegrass are present only in trace amounts or are absent. Threeawns, ring muhly, and buffalograss typically increase in representation. In some instances, broom snakeweed may be a major component in response to increased amounts of fall or early spring moisture. Diagnosis: Blue grama is the dominant grass. It exhibits a low-growing, sod-like growth form. Black grama, sideoats grama, and New Mexico feathergrass are either sparsely represented or absent. Transition to Blue Grama-Sod (1a) Continuous grazing without adequate recovery periods may cause this transition. Blue grama is resilient to grazing due to the location of its growing points at or near the soil surface and high ratio of vegetative shoots. When grazed or clipped close to the ground, it can spread laterally by tillers and form a less-productive, low-growing sod. Key indicators of approach to transition: Decrease in cover of black and sideoats grama Increase in cover of blue grama Transition back to Grassland (1b) Long term prescribed grazing may be successful in reversing the transition back to a Grassland state. The timeframe is affected by the

presence/absence and the recruitment of key species such as bluestems, sideoats grama, and Indian ricegrass. Alternatively, chemical or mechanical treatment of the portion of the range dominated by blue grama may reduce competition for nutrients and available water. This may accelerate the change back to a more upright, bunchgrass form and increase production. Seeding may be necessary to reestablish desired key species where they are sparse or absent. Prescribed grazing will help to maintain proper forage utilization.

Figure 6. Plant community growth curve (percent production by month).  
 NM4074, R070BY074NM Sandy Plains Cool Reference State. R070BY074NM  
 Sandy Plains 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 3

#### Pinyon/Juniper Encroached

This state contains considerable amounts of pinyon/juniper.

### Community 3.1

#### Pinyon/Juniper Encroached

An increase in pinyon and/or juniper and decreased cover and production of grasses characterize this state. Blue grama is the dominant grass. Other species that are typically present in varying amounts include hairy grama, ring muhly, galleta, buffalograss, threeawns, and sand dropseed. Diagnosis: Pinyon/juniper is present in significant amounts. Blue grama is the dominant grass. Grass cover is variable ranging from fairly uniform to patchy with large bare areas present. Evidence of erosion such as elongated water flow patterns, pedestalling of plants, and rills may be common. Transition to Pinyon/Juniper Encroached (2, 3a) Loss of grass cover, the associated decreased competition by grasses, seed dispersal, and lack of fire are believed to facilitate the encroachment of piñon/juniper. Loss of herbaceous cover due to overgrazing and drought can provide competition-free areas for seedling establishment, and afford a competitive advantage to established woody species. Wildlife and livestock can act as dispersal agents for pinyon/juniper seed and increase the probability of invasion. Sites in close proximity to established pinyon/juniper woodlands are at greater risk of invasion. Historically, periodic fire may have helped to suppress pinyon/juniper by killing seedlings and some established trees, and by increasing the susceptibility in others to damage by insects, disease, and drought. Additionally, variation in precipitation patterns such as periods of mild wet winters may produce conditions favorable to the establishment and growth of woody species, initiating periods of increased recruitment and establishment. Key indicators of approach to transition: Increase in bare ground patch size Increase in amount of piñon/juniper seedlings Transition back to Grassland (3b) Brush control is necessary to reduce the competitive influence of pinyon/juniper and facilitate grass recovery. Prescribed fire may be useful in maintaining grass dominance, provided adequate fine fuels remain. Prescribed grazing will help ensure adequate rest following brush control and will assist in the establishment and maintenance of grass cover.

Figure 7. Plant community growth curve (percent production by month).  
 NM4074, R070BY074NM Sandy Plains Cool Reference State. R070BY074NM  
 Sandy Plains 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 (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				280–381	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	286–381	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	286–381	–
2				101–280	

2				191-200	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	191-286	-
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	191-286	-
3				90-191	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	95-191	-
4				191-280	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	191-286	-
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	191-286	-
5				191-247	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	191-252	-
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	191-252	-
6				90-191	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	95-191	-
7				56-90	
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	57-95	-
8				56-90	
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	57-95	-
9				34-56	
	sedge	CAREX	<i>Carex</i>	38-57	-
10				56-90	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	57-95	-
<b>Forb</b>					
11				34-56	
	buckwheat	ERIOG	<i>Eriogonum</i>	38-57	-
12				34-56	
	leatherweed	CRPOP	<i>Croton pottsii</i> var. <i>pottsii</i>	38-57	-
13				34-56	
	locoweed	OXYTR	<i>Oxytropis</i>	38-57	-
14				34-56	
	purple sand verbena	ABAN	<i>Abronia angustifolia</i>	38-57	-
15				34-56	
	Forb, perennial	2FP	<i>Forb, perennial</i>	38-57	-
<b>Shrub/Vine</b>					
16				34-90	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	38-95	-
	jointfir	EPHED	<i>Ephedra</i>	38-95	-
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	38-95	-
	yucca	YUCCA	<i>Yucca</i>	38-95	-
17				90-191	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	95-191	-
	juniper	JUNIP	<i>Juniperus</i>	95-191	-
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	95-191	-
18				34-90	
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	38-95	-

	Shrub, deciduous	ZSD	Shrub, deciduous	30-95	-
	sacahuista	NOMI	<i>Nolina microcarpa</i>	38-95	-

## Animal community

Habitat for Wildlife: This site provides habitat for a resident animal community characterized by pronghorn antelope, kit fox, badger, coyote, bobcat, desert cottontail, Ord's kangaroo rat, white-throated woodrat, Botta's pocket gopher, plains pocket mouse, northern grasshopper mouse, sparrow hawk, mourning dove, meadowlark, plains spadefoot toad, eastern fence lizard, plateau whiptail, shorthorned lizard, and prairie rattlesnake. Where dense stands of pinyon and/or juniper occur, woodland wildlife species such as mule deer, gray fox, rock squirrel, pinyon jay, scrubjays, and Cassin's kingbird are characteristic. Common raven and prairie falcon hunt over this site.

## 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  
Berwolf -----B  
Pojo -----C

## Recreational uses

This site offers fair potential for hiking, backpacking, camping, and picnicking, each limited by the lack of surface water and shade. Hunting for antelope, small game, and birds is good. Trapping of fur-bearing animals is also good. The natural beauty of the area is enhanced during years of abundant rainfall by a large variety of wildflowers.

## Wood products

This site has no significant potential for wood products. Where stands of pinyon or juniper occur, care must be taken when harvesting fence material or fuelwood due to the soils' susceptibility to erosion.

## Other products

Grazing: This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. However, it is not suited to continuous yearlong grazing or continuous grazing during the growing season. This site responds rapidly to any rainfall it might receive. It also responds well to a system of grazing which rotates the season of use. As this site deteriorates, palatable cool- and warm-season grasses disappear and are replaced by low-vigor sod-like blue grama. As deterioration continues, this sod-like blue grama will decrease and an increase of bare ground and woody vegetation will occur. If this happens, the site may support a good even-aged stand of pinyon and/or juniper. This site is extremely erosive when in a deteriorated state.

## Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month  
Similarity Index Ac/AUM  
100 - 76 2.1 – 2.9  
75 – 51 2.8 – 4.3  
50 – 26 4.2 – 6.8  
25 – 0 6.8+

## Type locality

Location 1: De Baca County, NM
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## Other 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.

## Contributors

Don Sylvester  
Elizabeth Wright  
John Tunberg

## 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	05/19/2024
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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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:**
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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:**
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17. **Perennial plant reproductive capability:**

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