

Ecological site R042CY114NM

Shallow Sand

Last updated: 10/21/2024
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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): 042C—Central New Mexico Highlands

Major Land Resource Area (MLRA): 070C—Central New Mexico Highlands

Major Land Resource Area (MLRA) 70C - will become 42C - is a high elevation portion of central New Mexico that is the convergence of four major physiographic provinces: Basin and Range, Southern Rocky Mountains, Great Plains, and Colorado Plateau. As such, it contains parts or characteristics of each, though tectonically, as a region, it is the easternmost extent of the Basin and Range Province and, more specifically, a structural expression of the Rio Grande Rift. It consists mostly of rangeland with some forested areas associated with numerous disconnected mountain ranges such as the Guadalupe, Sacramento, and Manzano Mountains. Other major physiographic features include the Galisteo Basin or the enclosed Estancia Basin, the structural Chupadera and Glorieta Mesas, and the piedmonts of the Buchanan and Guadalupe Mesas.

Ecological site concept

The soils on this site are shallow to very shallow over Petrocalcic (hard caliche). Slopes 3-5%. The surface texture ranges from fine sandy loam to sandy loam. The site occurs on old piedmont slopes, plateaus, mesas, terraces, ridges and hills in areas associated with

limestone. Vegetation includes black grama, sideoats grama, little bluestem, needlegrass, hairy grama, blue grama, sand dropseed, three awn, croton, wild buckwheat, winterfat, soapweed yucca, and juniper.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Krascheninnikovia lanata</i> (2) <i>Yucca glauca</i>
Herbaceous	(1) <i>Bouteloua eriopoda</i> (2) <i>Bouteloua curtipendula</i>

Physiographic features

This site occurs on nearly level to gently sloping undulating topography with slopes ranging up to 15 percent. Slope average is 3 to 5 percent by may range as high as 15 percent. Aspect varies but is not significant. It occurs at elevations ranging from 4,400 to 6,600 feet above sea level. The differentiating characteristics of this site are shallow sandy loams occurring from 5 to 10 inches over caliche.

The Pastura soils are on mesas, terraces, ridges and hills in areas associated with limestone. Slope ranges from 0 to 25 percent. The present topography is related to past truncation of pediment slopes. The soils formed in local medium textured material derived principally from sedimentary formations mixed with some eolian deposits. Elevation ranges from 4,200 to 6,200 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial flat (2) Plain
Elevation	1,341–2,012 m
Slope	3–15%

Climatic features

The climate of the area is ‘semi-arid continental.’

The average annual precipitation ranges from 13 to 16 inches. Variations of 5 inches, more or less, are common. Seventy-five percent of the precipitation falls during the frost-free season. Most of the summer moisture falls in the form of high-intensity, short-duration thunderstorms. Winter precipitation is mostly in the form of snowfalls of less than 6 inches.

Temperatures are characterized by moderately warm summers and fairly cool, dry winters. The average annual temperature is 50 degrees F with extremes of –29 degrees F in the

winter to 103 degrees F in the summers.

The average frost-free season is 130 to 160 days. The last killing frost falls in early May and the first killing frost in early October.

Both temperature and precipitation favor warm season perennial species. However, about 40 percent of the annual precipitation falls at a time favorable to cool season plant growth. This allows the cool season species to occupy an important component of the site. Strong winds blow across this area from the west and southwest from February through June, which can dry the soil profile rapidly during a critical period for cool season plant growth.

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.

Patura - Mean annual precipitation ranges from 10 to 13 inches, but averages to 14 inches in some areas. Mean annual temperature ranges from 50 to 57 degrees F. The frost-free period ranges from 140 to 200 days. The Thornwaite P-E Index is 25.

Table 3. Representative climatic features

Frost-free period (average)	173 days
Freeze-free period (average)	187 days
Precipitation total (average)	406 mm

Influencing water features

This is an upland site, and is not associated with water features or wetlands. During heavy rain events, this site may receive run-on moisture from landforms above and contribute runoff to landforms below.

Soil features

The soils on this site are shallow to very shallow over hard caliche. The surface texture ranges from fine sandy loam to sandy loam. Depth is usually less than 10 inches occurring over hard caliche. The soils are well drained. Permeability is rapid to moderately rapid. Available water-holding capacity is low. The plant-water-air-soil relationship is good. Sites are correlated to soil components using the Pastura series.

The Pastura series consists of soils that are shallow to a petrocalcic horizon. They are well drained, moderately permeable soils formed in material derived from sedimentary formations mixed with eolian deposits. These soils are on mesas, terraces, hills, and ridges. Slope ranges from 0 to 25 percent. Well drained. Permeability of the soil is moderate above a very slowly permeable petrocalcic horizon. Runoff is low on slopes less

than 1 percent, medium on 1 to 3 percent slopes, high on 3 to 5 percent slopes, and very high on slopes greater than 5 percent.

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Sandy loam (3) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Moderately rapid to rapid
Soil depth	13–51 cm
Available water capacity (0-101.6cm)	5.08 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	7.9–8.4
Subsurface fragment volume ≤3" (Depth not specified)	15–35%
Subsurface fragment volume >3" (Depth not specified)	15–35%

Ecological dynamics

Vegetation includes black grama, sideoats grama, little bluestem, needlegrass, hairy grama, blue grama, sand dropseed, three awn, croton, wild buckwheat, winterfat, soapweed yucca, and juniper.

Pastura - These soils are used for livestock grazing and wildlife habitat. Present vegetation is mainly consists of black grama, hairy grama, sideoats grama, and New Mexico feathergrass.

State and transition model

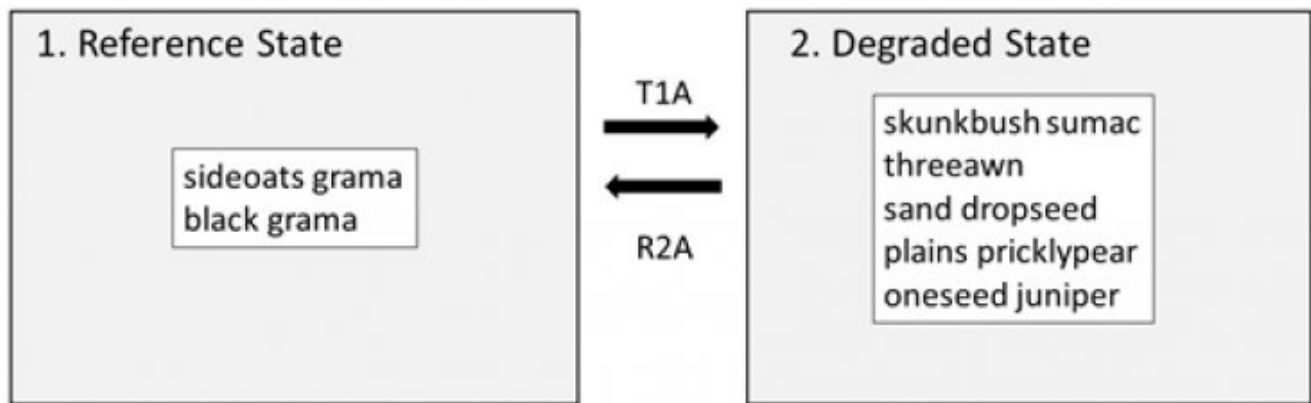


Figure 4. Generalized STM for shallow sites in 70C

State 1 Reference State

This state includes black grama, sideoats grama, little bluestem, and New Mexico feathergrass.

Resilience management. A system of deferred 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 benefit cool species such as New Mexico feathergrass and needleandthread. 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 to black grama during the late winter and it is usually over utilized. Winter rest will reduce the grazing pressure on black grama.

Community 1.1 Reference Plant Community

This phase is a grassland characterized by a mixture of warm-season, short and mid-grasses with half-shrubs and shrubs widely scattered. Woody species and forbs are a minor component of the plant community. Forbs are plentiful during years of abundant rainfall. Cool-season grasses make up a minor component of the plant community. Other grasses that could appear on this phase include: sand muhly, sand bluestem, mesa dropseed, plains bristlegrass, red lovegrass, wolftail, bush muhly, Indian ricegrass, and

Arizona cottontop. Other shrubs can include: cholla cactus, broom snakeweed, sand sagebrush and Bigelow sagebrush. Other forbs can include: scarlet globemallow, silverleaf nightshade, verbena, annual mustard and astragalus species.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	437	740	1054
Forb	45	78	112
Total	482	818	1166

**Figure 6. Plant community growth curve (percent production by month).
NM4314, R070CY114NM Shallow Sand HCPC. R070CY114NM Shallow Sand
HCPC Warm-season, mixed short/mid grasses w/ shrub and half-shrub
component. .**

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 Degraded

Increasers: hairy grama, sand dropseed, threeawn, oneseed juniper, sacahuista and skunkbush sumac

Characteristics and indicators. 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. Species most likely to increase are hairy grama, sand dropseed, threeawn, oneseed juniper, sacahuista and skunkbush sumac. As the ecological conditions deteriorate, it is accompanied by a sharp increase of hairy 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 that it is dominating the site. 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. Where sheep have historically grazed New Mexico feathergrass or needleandthread grass may increase and dominate the site.

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Transition T1A

State 1 to 2

Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization.

Restoration pathway R2A

State 2 to 1

Legacy text: "Restoration pathway resulting from the implementation of prescribed grazing." It should be noted that prescribed grazing alone may not effectively diminish woody plants here. Brush control may also be required. Future work on this ESD should seek to clarify this.

Conservation practices

Grazing Management Plan - Applied

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				191–235	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	191–239	–
2				90–146	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	95–143	–
3				90–146	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	95–143	–
4				90–146	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	95–143	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	95–143	–
5				90–146	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	95–143	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	95–143	–
6				34–56	

	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	29–48	–
7				34–56	
	threeawn	ARIST	<i>Aristida</i>	29–48	–
8				34–56	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	29–48	–
Forb					
9				34–56	
	leatherweed	CRPOP	<i>Croton pottsii</i> var. <i>pottsii</i>	29–48	–
	buckwheat	ERIOG	<i>Eriogonum</i>	29–48	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	29–48	–
10				34–56	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	29–48	–
Shrub/Vine					
11				34–56	
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	29–48	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	29–48	–
12				34–56	
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	29–48	–
	sacahuista	NOMI	<i>Nolina microcarpa</i>	29–48	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	29–48	–
13				34–56	
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	29–48	–

Type locality

Location 1: Chaves County, NM
Location 2: De Baca County, NM
Location 3: Guadalupe County, NM
Location 4: Lincoln County, NM
Location 5: San Miguel County, NM
Location 6: Santa Fe County, NM

Other references

Data collection for this site was done 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 with soils in the following soil surveys: Chaves, De Baca, Guadalupe, Lincoln, Sna Miguel, Santa Fe, Torrance.

Characteristic Soils Are:

Pastura

Other Soils included are:

Yeso

Contributors

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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	12/22/2025
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:**
-