USDA Natural Resources Conservation Service

Ecological site R042CY120NM
Shallow Plains

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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

This site occurs on plains and thin sand sheets, with slopes ranging up to 10 percent. The soils of this site are well-drained and shallow to caliche, gypsum, sandstone, or limestone. Textures include fine sand and loamy sand.

Table 1. Dominant plant species

Tree	(1) *Juniperus*
Shrub	(1) *Rhus trilobata* (2) *Yucca glauca*
Herbaceous	(1) *Bouteloua gracilis* (2) *Schizachyrium scoparium*

Physiographic features

This site is nearly level to undulating in topography with some slopes ranging up to 10 percent. Aspect varies but is not significant. It occurs at elevations ranging from 4,400 to 6,000 feet above sea level. The differentiating characteristics of this site are the shallow sands occurring from 10 to 20 inches over bedrock or caliche.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Sand sheet
Elevation	4,400–6,600 ft
Slope	0–10%
Aspect	Aspect is not a significant factor

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 and 103 degrees F in the summer.

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 rainfall distribution favor warm-season, perennial plant communities in this area. However, sufficient late winter early spring moisture allows cool-season species to occupy a minor component within the plant community. Wind velocities in this area are high. The spring months are characterized by frequent windstorms with velocities

in excess of 45 miles per hour. Excessive erosion occurs on soils not protected by good cover vegetation. Humidity is low and evaporation is high.

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 (average)	173 days
Freeze-free period (average)	187 days
Precipitation total (average)	16 in

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 and throughflow from landforms above and contribute runoff and thruoghflow to landforms below.

Soil features

The soils of this site consist of fine sands and loamy sands that are shallow in depth. Depth is from 10 to 20 inches occurring over caliche, gypsum, sandstone or limestone. The soils are well drained. Permeability is rapid. Available water-holding capacity is low. The plant-water-soil-air relationship is good.

Table 4. Representative soil features

Surface texture	(1) Fine sand (2) Loamy sand
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to rapid
Soil depth	10–20 in
Available water capacity (0-40in)	0–3 in
Electrical conductivity (0-40in)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-40in)	7.4–8.4

Subsurface fragment volume <=3" (Depth not specified)	15–35%

Ecological dynamics

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 yield are from species that furnish forage for grazing animals. Continuous grazing during the growing season will cause the more desirable forage plants such as little bluestem, sideoats grama, black grama, New Mexico feathergrass, and sand bluestem to decrease. Species most likely to invade the site are annual forbs, western ragweed, mesquite, and oneseed juniper. Species most likely to increase are blue grama, hairy grama, sand muhly, threeawn, sand dropseed, skunkbush sumac, or sacahuista. As the ecological condition deteriorates, it is accompanied by a sharp increase in blue grama. Most of the tall and mid-grass species will disappear as deterioration advances. In some areas, there may be large patches of skunkbush sumac, catclaw acacia or sacahuista that will increase to the point where it is dominating the site. As the condition deteriorates, it is usually accompanied by loss in plant cover, which causes wind erosion hazard, and a loss of productivity. 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 benefits cool-season species such as New Mexico feathergrass and early forbs. Late spring and summer rest is needed for little bluestem, sideoats grama, and sand bluestem 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 can easily be over utilized. Winter rest will reduce the grazing pressure on black grama.

State and transition model

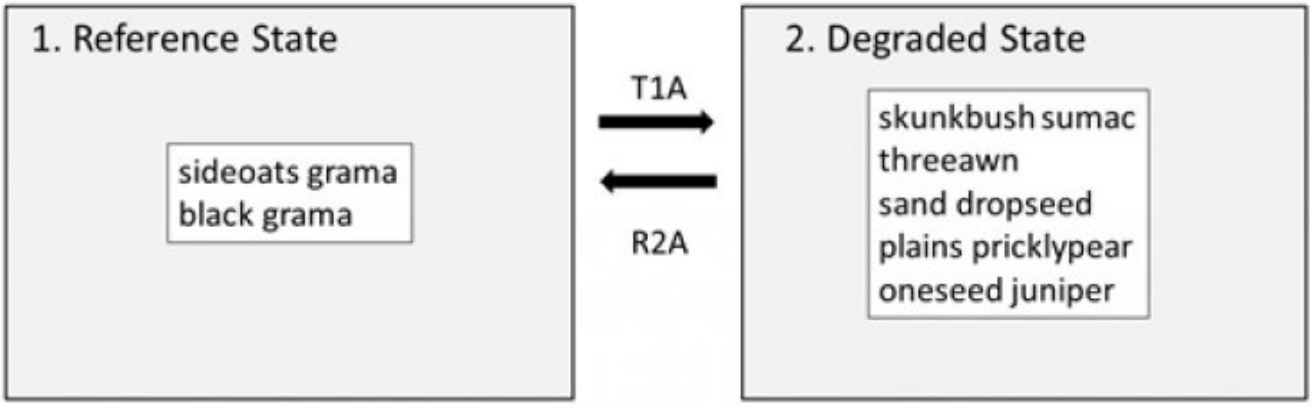

Figure 4. Generalized STM for shallow sites in 70C

State 1
Reference Plant Community

This state represents the most ecologically stable conditions in terms of resistance to erosion. Moreover, this state has the highest potential for productivity and plant diversity.

Community 1.1
Reference Plant Community

This phase is a grassland characterized by a mixture of warm season, short, mid and tall grasses. The grassland is dotted with shrubs and half-shrubs. Forbs are a minor component of the plant community but 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: threeawns, bottlebrush squirreltail, plains, bush and sand muhly, Arizona cottontop, and Indian ricegrass. Other shrubs include: broom snakeweed, algerita, sand and Bigelow sagebrush, cactus spp., fourwing saltbush, and winterfat. Other forbs include: verbena, annual mustard, purple nightshade, curly dock, tansymustard, Russian thistle, and astragalus spp.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	550	820	1090
Forb	60	80	110
Total	**610**	**900**	**1200**

Table 6. Ground cover

Tree foliar cover	2-5%
Shrub/vine/liana foliar cover	3-6%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-10%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	40-50%

Figure 6. Plant community growth curve (percent production by month). NM4320, R070CY120NM Shallow Plains Reference State. R070CY120NM Shallow Plains Reference State Warm season mixed short/mid & tall grasses w/ shrubs & half-shrubs and a minor forb 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

This state is characterized by an increase in such species as blue grama, hairy grama, sand muhly, threeawn, sand dropseed, skunkbush sumac, and sacahuista. Additionally, this state typically includes invasive plants such as annual forbs, western ragweed, mesquite, and oneseed juniper.

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 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				100–160	
	blue grama	BOGR2	*Bouteloua gracilis*	105–158	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	105–158	–
2				100–160	
	little bluestem	SCSC	*Schizachyrium scoparium*	105–158	–
3				158–210	
	sideoats grama	BOCU	*Bouteloua curtipendula*	158–210	–
4				50–160	
	black grama	BOER4	*Bouteloua eriopoda*	53–158	–
5				50–100	
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	53–105	–
6				100–160	
	sand bluestem	ANHA	*Andropogon hallii*	105–158	–
7				30–50	
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	32–53	–
8				30–50	

	sand dropseed	SPCR	*Sporobolus cryptandrus*	32–53	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	32–53	–
9				30–50	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	32–53	–
Forb					
10				30–50	
	leatherweed	CRPOP	*Croton pottsii var. pottsii*	32–53	–
	buckwheat	ERIOG	*Eriogonum*	32–53	–
	woolly plantain	PLPA2	*Plantago patagonica*	32–53	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	32–53	–
11				30–50	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	32–53	–
Shrub/Vine					
12				50–100	
	juniper	JUNIP	*Juniperus*	53–105	–
	catclaw mimosa	MIACB	*Mimosa aculeaticarpa var. biuncifera*	53–105	–
	sacahuista	NOMI	*Nolina microcarpa*	53–105	–
	skunkbush sumac	RHTR	*Rhus trilobata*	53–105	–
13				30–50	
	soapweed yucca	YUGL	*Yucca glauca*	32–53	–
14				30–50	
	Shrub, deciduous	2SD	*Shrub, deciduous*	32–53	–

Type locality

Location 1: De Baca County, NM
Location 2: Guadalupe 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:
Cardenas

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	12/19/2025
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):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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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):**

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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:**