

Ecological site R070CY122NM Shallow Sandy Savanna

Last updated: 10/21/2024
Accessed: 11/23/2024

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.

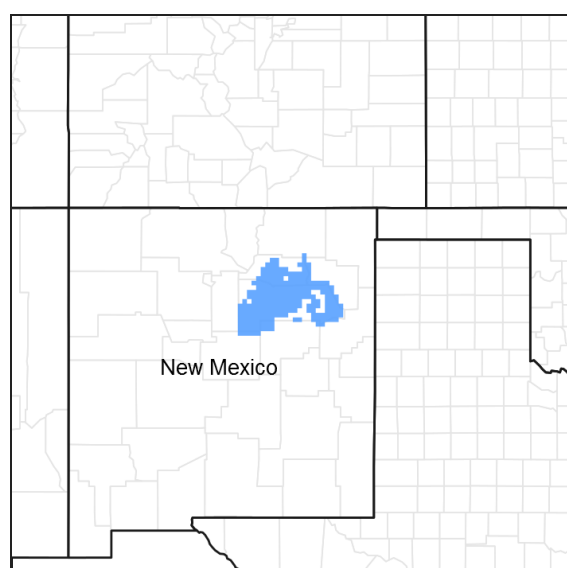


Figure 1. Mapped extent

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 nearly level to moderately sloping side slopes of foothills and on tops of hills and mesas. Slopes range from 3 to 25 percent but are usually less than 10 percent.

The soils of this site are well drained and shallow to very shallow over petrocalcic material (caliche) or sandstone. The surface texture is fine sandy loam.

Table 1. Dominant plant species

Tree	(1) <i>Juniperus</i> (2) <i>Pinus edulis</i>
Shrub	(1) <i>Rhus trilobata</i> (2) <i>Mahonia trifoliolata</i>
Herbaceous	(1) <i>Schizachyrium scoparium</i> (2) <i>Bouteloua curtipendula</i>

Physiographic features

This site occurs on nearly level to moderately sloping side slopes of foothills and on tops of hills and mesas. Typically, this site grades down from the steep slopes of physiographic breaks. Slopes range from 3 to 25 percent but are usually less than 10 percent. Direction of slope varies and is usually not significant. Elevations range from 4,500 to 7,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mesa
Elevation	1,372–2,134 m
Slope	3–25%
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 from April to October. Most of the summer precipitation falls in the form of high-intensity, short-duration thunderstorms.

Distinct seasonal changes and large annual and diurnal temperature changes characterize temperatures. The average annual temperature is about 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 falling in early May and the first killing frost in early October.

Both temperature and precipitation favor warm-season, perennial plant species. However, about 40 percent of the precipitation falls at a time favorable for cool-season plant growth. This allows the cool-season species to occupy a very important component in this plant community. Vegetation responds well to light rains due to the shallow soil depth and soil surface textures. Heavy rains produce excess runoff and can cause flash floods. Strong winds from the west and southwest blow across the area from February to June and dries the soil during a critical period for 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.

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 of this site are well drained and shallow to very shallow over petrocalcic material (caliche) or sandstone. The surface texture is fine sandy loam. This extends to a depth of 12 to 20 inches. The root-restrictive layer is encountered at 12 to 20 inches. Permeability is rapid and water-holding capacity is medium.

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow to slow
Soil depth	10–51 cm
Available water capacity (0-101.6cm)	15.24–22.86 cm
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	5–14%
Subsurface fragment volume >3" (Depth not specified)	2%

Ecological dynamics

Continuous grazing of this site during the growing season will cause the high producing desirable forage plants such as little bluestem, sideoats grama, black grama, bottlebrush squirreltail, prairie junegrass, littleseed ricegrass and sumac to decrease. This will be followed by an increase in blue grama, threeawns, ring muhly, juniper, oak, algerita, and cholla. As the condition of this site deteriorates, a sharp increase in juniper will occur. As the tree canopy increases, the understory vegetation will sharply decrease. The increased numbers of trees may be attributed partly to the control of fire. Brush management is needed once the canopy exceeds 25 percent. Mechanical control is not feasible due to the shallow and sandy nature of the soils. A system of grazing that varies the season of use is most beneficial to maintain or improve the plant community.

State and transition model

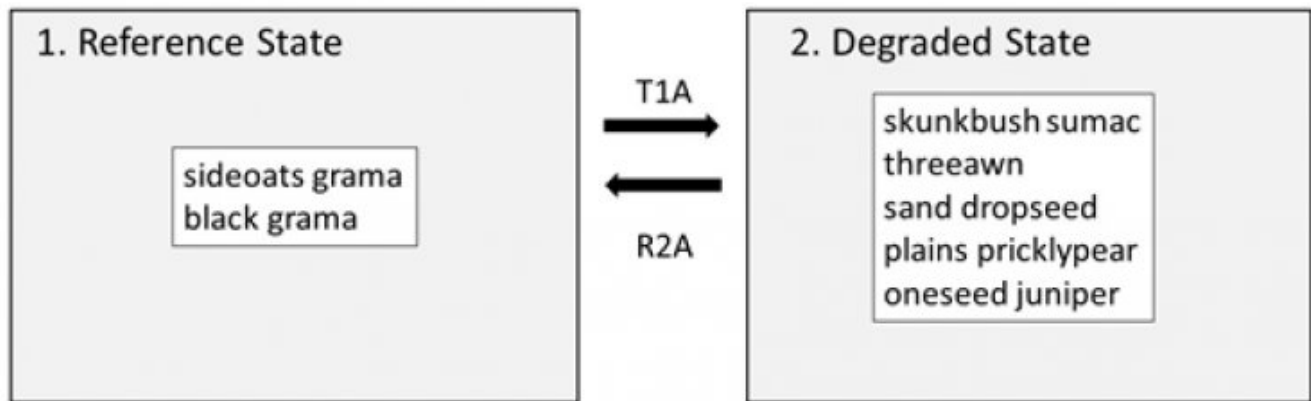


Figure 4. Generalized STM for shallow soils in 70C

State 1
Reference State

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 has an open stand of pinyon pine and/or juniper with grass understory. The understory grasses are characterized by both warm and cool-season, mid-grasses with scattered shrubs throughout. Half-shrubs and forbs are a minor part of the plant community. The open stand of pinyon and juniper at one time may have been maintained by natural fire. The tree canopy cover ranges from 10 to 25 percent. Other grasses that could appear on this phase include: hairy grama, needleandthread, New Mexico feathergrass, big bluestem, western wheatgrass, pinyon ricegrass, spike muhly, mountain muhly, Metcalfe muhly, curlyleaf muhly, silver bluestem, mat muhly, alkali sacaton, pine dropseed, sedges, and Indian ricegrass. Other woody plants include: rubber rabbitbrush, Bigelow sagebrush, winterfat, pricklypear, fourwing saltbush, sand sagebrush, threadleaf groundsel, broom snakeweed, yucca, sacahuista, ponderosa pine and mountainmahogany.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	247	628	1009
Forb	22	67	112
Total	269	695	1121

Table 6. Ground cover

Tree foliar cover	10-25%
Shrub/vine/liana foliar cover	2-5%

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	20-50%

Figure 6. Plant community growth curve (percent production by month).
NM4322, R070CY122NM Shallow Sandy Savanna Reference State.
R070CY122NM Shallow Sandy Savanna Reference State Open stand of
pinyon/juniper w/ mixed warm/cool-season mid-grasses w/ scattered
shrubs..

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 increased amounts of blue grama, threeawns, ring muhly, juniper, oak, algerita, and cholla. As the condition of this site deteriorates, a sharp increase in juniper will occur.

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 (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				123–168	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	127–168	–
2				123–168	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	127–168	–

3				45–123	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	43–127	–
4				45–123	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	43–127	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	43–127	–
5				45–78	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	43–84	–
6				45–78	
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	43–84	–
7				22–45	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	26–43	–
8				22–45	
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	26–43	–
9				45–78	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	43–84	–
10				45–67	
	pinyon ricegrass	PIFI	<i>Piptochaetium fimbriatum</i>	43–67	–
11				22–45	
	threeawn	ARIST	<i>Aristida</i>	26–43	–
12				22–45	
	ring muhly	MUTO2	<i>Muhlenbergia torreyi</i>	26–43	–
13				45–78	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	43–84	–
Forb					
14				22	
	buckwheat	ERIOG	<i>Eriogonum</i>	26–43	–
15				22–45	
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	26–43	–
16				22–45	
	golden Indian paintbrush	CALE27	<i>Castilleja levisecta</i>	26–43	–
17				22–45	
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	26–43	–
18				22–45	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	26–43	–
Tree					
19				78–213	
	juniper	JUNIP	<i>Juniperus</i>	84–211	–
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	84–211	–
Shrub/Vine					
20				22–45	
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	26–43	–
21				22–45	
	algerita	MATR3	<i>Mahonia trifoliolata</i>	26–43	–

22				22–45	
	oak	QUERC	<i>Quercus</i>	26–43	–
23				22–45	
	pricklypear	OPUNT	<i>Opuntia</i>	26–43	–
24				22–45	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	26–43	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	26–43	–
25				22–45	
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	26–43	–
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	26–43	–

Type locality

Location 1: Chaves County, NM
Location 2: Lincoln County, NM
Location 3: San Miguel County, NM
Location 4: Santa Fe County, NM
Location 5: Torrance 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:

Bond, Plack

Other Soils included are:

Dean(as mapped in San Miguel County) Sombordoro(as mapped in San Miguel County)

Contributors

Christine Bishop

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John Tunberg

Approval

Kendra Moseley, 10/21/2024

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	11/23/2024
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:**
-