Ecological site R042CY153NM
Loamy

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.

Ecological site concept

This site occurs on level to gently sloping plains and terraces at elevations ranging from 4,000 to 7,000 feet above sea level. Slopes vary from 0 to 9 percent but average less than 5 percent.
The soils on this site are well-drained and moderately deep to deep. The surface textures are loam, silt loams, silty clay loams and fine sandy loams.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Bouteloua gracilis* (2) *Bouteloua eriopoda*

Physiographic features

This site occurs on level to gently sloping plains and terraces at elevations ranging from 4,000 to 7,000 feet above sea level. Slopes vary from 0 to 9 percent but average less than 5 percent.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Terrace
Elevation	1,219–2,134 m
Slope	0–9%
Aspect	Aspect is not a significant factor

Climatic features

The climate of this area is “semi-arid continental.”

Annual average precipitation ranges from 11 to 19 inches. Variations of 5 inches, more or less, are not uncommon. Approximately 70 percent of the precipitation occurs from May through October. Most of the summer rain comes in the form of high-intensity, short- uration thunderstorms. Winter moisture is usually negligible.

Temperatures are characterized by distinct seasonal changes and large diurnal temperature changes. The average

annual temperature ranges from 55 degrees F to 60 degrees F, with extremes of 20 degrees F below zero in the winter to 110 degrees F in the summer not uncommon.

The average frost-free season is 170 to 189 days. The last killing frost is in early April and the first killing frost is in mid October.

Both temperature and precipitation favor warm-season perennial plant communities. At higher elevations, 40 percent of the precipitation is favorable for cool-season growth. Strong winds from the west and southwest blow from February through June. This accelerates the drying of the soil during a critical growth period for most cool-season plants.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site.
Data interpreted utilizing NM NRCS Climate Summarizer spreadsheet.

Table 3. Representative climatic features

Frost-free period (average)	189 days
Freeze-free period (average)	211 days
Precipitation total (average)	483 mm

Influencing water features

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

Soil features

The soils on this site are well-drained and moderately deep to deep. The surface textures are loam, silt loams, silty clay loams and fine sandy loams. Permeability is slow to moderately rapid and available water-holding capacity is medium to high with surface runoff medium. The water and wind erosion hazard is high.

Table 4. Representative soil features

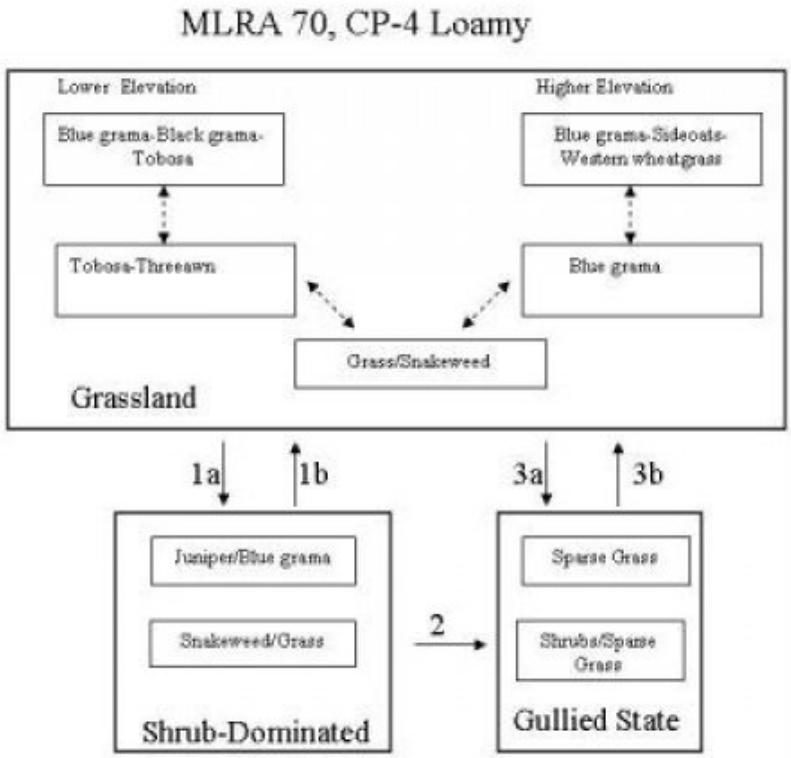
Surface texture	(1) Loam (2) Silt loam (3) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow to moderately rapid
Soil depth	51–102 cm
Available water capacity (0-101.6cm)	15.24–30.48 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4

Ecological dynamics

Overview
This site is associated with Limestone Hills and Shallow sites. Loamy sites in CP-4 typically occur as elongated units on valley terraces and fans below Limestone Hills, or adjacent to, but topographically lower than Shallow sites. The historic plant community of the Loamy site has the aspect of a grassland with a few shrubs and succulents scattered across the site. Composition and production vary with elevation. In the historic plant community, blue grama, black grama, and tobosa are the dominant grasses. This site is susceptible to encroachment by shrubs,

especially juniper and broom snakeweed. Dispersal of shrub seeds, loss of grass cover and resulting competition for resources by shrubs, and a decrease in natural fire frequency may facilitate the transition to a state that is dominated by shrubs. Persistent loss of grass cover, increased overland water flow, and resulting erosion may cause the transition to a Gullied State.

State and transition model



1a. Seed dispersal of shrubs, loss of grass cover, competition by shrubs, lack of fire. 1b. Brush control, prescribed grazing.

2. Continued loss of grass cover, erosion

3a. Persistent loss of grass cover, increased overland flow, erosion. 3b. Erosion control, prescribed grazing, (brush control if from transition 3).

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

Grassland: At lower elevations blue grama, black grama, and tobosa are the dominant grasses, with sideoats grama, vine mesquite, and plains lovegrass as sub-dominants. At higher elevations, blue grama, sideoats grama, and western wheatgrass dominate, with vine mesquite, plains lovegrass, black grama, and tobosa as sub-dominants. Continuous heavy grazing will cause a decrease in sideoats grama, western wheatgrass, black grama, vine mesquite, and fourwing saltbush. At higher elevations this may result in a community dominated by blue grama. At lower elevations, tobosa and threeawns may dominate. A community of perennial grasses with broom snakeweed as the sub-dominant component may occur in response to overgrazing, or as a result of late fall/early spring moisture following drought. 6 Shrubs and succulents common to the site include yucca, fourwing saltbush, sumac species, juniper, broom snakeweed, and cholla. Diagnosis: Grass cover is uniform and evenly distributed. Litter cover is high, averaging 25 percent. Shrub/succulent cover is low averaging only 2 percent. Evidence of

erosion such as large water flow patterns, rills and gullies are infrequent. Other grasses which would appear on this site include: bottlebrush squirreltail, galleta, alkali sacaton, hairy grama, mat muhly, ring muhly, green sprangletop, Hall's panicum, plains bristlegrass, little bluestem, silver bluestem, Indiangrass, fluffgrass, buffalograss, wolftail, tridens spp., and needle grass. Other shrubs include: cholla, juniper, pinyon, creosotebush, oak spp., broom baccharis, pricklypear, Apacheplume, dalea spp., winterfat, and algerita. Other forbs include: wooly loco, wooly Indianwheat, cudweed, thistles, annual sunflowers, mullin, wildbuckwheat spp., nightshade spp., milkweed spp., and bladderpod.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	701	1003	1311
Forb	73	101	135
Total	**774**	**1104**	**1446**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	32%

Figure 5. Plant community growth curve (percent production by month). NM4603, R070DY153NM Loamy Reference State. Mixed short/mid warm-season grassland with scattered shrubs and half-shrubs and a fluctuating forb component. .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

State 2
Shrub-Dominated

Community 2.1
Shrub-Dominated

Additional States: Shrub Dominated: This state is characterized by the predominance of shrubs with perennial grasses as the subordinate component. Grass cover varies inversely with shrub density. Typically juniper and broom snakeweed are the dominant shrubs. Juniper tends to dominate at mid-to upper elevations with blue grama as the subordinate grass component. Broom snakeweed may come to dominate across most elevation ranges with either blue grama or tobosa as the subordinate grass species. Diagnosis: Shrubs are found at increased densities relative to the Grassland State. Grass cover is variable ranging from fairly uniform to patchy with large connected bare areas present. Blue grama or tobosa are the dominant grasses, and threeawns, ring muhly, cholla and prickly pear typically increase in representation. Transition to Shrub Dominated State (1a): Seed dispersal of shrubs, loss of grass cover, resource competition between shrubs and grasses, and lack of fire are all believed to facilitate the

12 encroachment of shrubs. Wildlife and livestock (especially birds and sheep) are instrumental in the dispersal of juniper seed. 3, 4 Broom snakeweed produces abundant light seed and the dispersal mechanism is mainly wind.5 Sites that receive above-average late fall/early spring moisture following drought,6 or that have been overgrazed 7may be quickly invaded by broom snakeweed. Drought is detrimental to grasses and the establishment of juniper seedlings, but larger, established trees may gain a competitive edge facilitating juniper dominance. Competition is an important constraint on the establishment of shrub seedlings, because grass roots preempt resources, such as water.2 However, during wet years shrub seedlings may establish in good stands of grass due to reduced moisture competition. Once shrub seedlings become established, and if their roots are capable of extending below this zone, competition for soil moisture declines.2 Overgrazing may facilitate the establishment of shrub seedlings by providing competition free areas, but livestock exclusion alone would not prevent shrub expansion. Historically, periodic fire may have helped to suppress shrubs by completely killing some species, disrupting seed production cycles, and suppressing the establishment of shrub seedlings.1 Key indicators of approach to transition: * Decrease or change in composition or distribution of grass cover. * Increase in size and frequency of bare patches. * Increase in amount of shrub 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. Once the transition back to the Grassland State is achieved, prescribed fire may help in maintaining grass dominance.

State 3
Guillied State

Community 3.1
Guillied State

Gullied State: Loss of grass cover, accelerated erosion, and gully formation characterize this state. Blue grama or tobosa are typically the dominant grasses. Shrub densities reflect either those of the Grassland State or The Shrub-Dominated State, depending on the transition pathway. Diagnosis: Grass cover is patchy with large bare areas present. Erosion is evident by the presence of water flow patterns, rills and gullies. Transition to Gullied State (2,3a): Transitions to the Gullied State occur in response to the loss of grass cover, and subsequent erosion. As grass cover is reduced, organic matter, infiltration, and soil surface stability decrease. Key indicators of approach to transition: * Reduction in grass cover (on site, or on surrounding uplands). * Increase in size and frequency of bare patches. * Presence of litter dams, water flow patterns, rills and gullies. Transition back to Grassland (3b) Erosion control structures or shaping and filling gullies may help regain natural flow patterns and allow natural revegetation to take place. Prescribed grazing will help ensure proper forage utilization and reduce grass loss due to overgrazing. Brush control will be necessary if from transition (2).

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				67–454	
	blue grama	BOGR2	*Bouteloua gracilis*	65–452	–
2				67–196	
	sideoats grama	BOCU	*Bouteloua curtipendula*	65–194	–
3				129–454	
	black grama	BOER4	*Bouteloua eriopoda*	129–452	–
4				129–454	
	tobosagrass	PLMU3	*Pleuraphis mutica*	129–452	–
5				39–67	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	39–65	–
6				67–129	
	vine mesquite	PAOB	*Panicum obtusum*	65–129	–

	vine mesquite	PAOB	*Panicum obtusum*	65–129	–
7				129–196	
	western wheatgrass	PASM	*Pascopyrum smithii*	129–194	–
8				39–67	
	threeawn	ARIST	*Aristida*	39–65	–
9				39–67	
	burrograss	SCBR2	*Scleropogon brevifolius*	39–65	–
10				67–129	
	plains lovegrass	ERIN	*Eragrostis intermedia*	65–129	–
11				39–67	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	39–65	–
Forb					
12				11–39	
	dwarf desertpeony	ACNA2	*Acourtia nana*	13–39	–
13				39–67	
	croton	CROTO	*Croton*	39–65	–
	rabbitbush	ERBL2	*Ericameria bloomeri*	39–65	–
	ragwort	SENEC	*Senecio*	39–65	–
	globemallow	SPHAE	*Sphaeralcea*	39–65	–
14				11–39	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	13–39	–
Shrub/Vine					
15				39–67	
	yucca	YUCCA	*Yucca*	39–65	–
16				39–67	
	fourwing saltbush	ATCA2	*Atriplex canescens*	39–65	–
17				28–67	
	catclaw acacia	ACGR	*Acacia greggii*	26–65	–
18				28–67	
19				28–67	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	26–65	–
20				11–39	
	Shrub, deciduous	2SD	*Shrub, deciduous*	13–39	–

Inventory data references

Data collection for this site was done in
conjunction with the progressive soil surveys
within the Pecos-Canadian Plains and Valleys Major Land Resource Area of New Mexico (MLRA 70).

This site has been mapped and correlated with soils in the following soil surveys:
Otero, Eddy, Chaves, Lincoln

Other references

References

1. Brooks, M.L. and D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America.Pages 1–14 in K.E.M. Galley and T.P. Wilson (eds.). Proceedings of the Invasive Species Workshop: the Role of Fire in the Control and Spread of Invasive Species.

2. Johnsen, T. N., Jr. 1962. One-seeded juniper invasion of northern Arizona grasslands. Ecological Monographs. 32:187-207.

3. Parker, K. W. 1945. Juniper comes to the grassland. American Cattle Producer. 27: 12- 14.

4. Phillips, Frank J. 1910. The dissemination of junipers by birds. Forestry Quarterly.
8: 60-73. (From Expt. Sta. Rec. 22: 644.)

Contributors

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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	11/21/2024
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):**

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:**

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17. **Perennial plant reproductive capability:**
