USDA Natural Resources Conservation Service

Ecological site R070AY001NM
Loamy Upland

Last updated: 9/12/2023
Accessed: 05/19/2024

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.

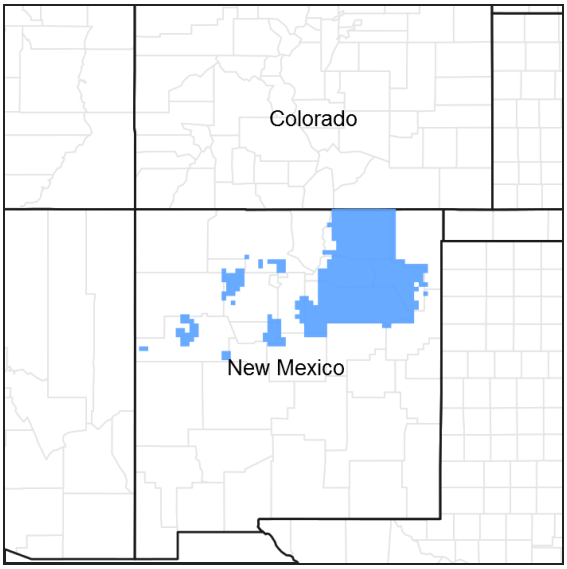

Figure 1. Mapped extent

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.

Ecological site concept

This site correlates to upland soils in MLRA 70A that have loamy surface textures, are greater than 20 inches to bedrock, and lack high salinity.
This site correlates to the Upland ecological site group.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Krascheninnikovia lanata* (2) *Artemisia frigida*
Herbaceous	(1) *Bouteloua gracilis* (2) *Pascopyrum smithii*

Physiographic features

This site occurs on nearly level to undulating upland plains, alluvial fans and some depressions. Slopes are 0 to 7 percent but may range to 10 percent. The plant-soil-air-water relationship is favorable in years of normal or above normal precipitation. The soils have the ability to store moisture from winter snowfall and early spring rains for use by cool-season forbs and grasses. Elevation ranges from 5,000 to 7,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Alluvial fan (3) Depression
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	None to rare
Ponding frequency	None
Elevation	1,524–2,134 m
Slope	0–10%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of this area can be classified as “semi-arid continental”. Precipitation averages 14 to 16 inches. Seventy seven percent of the year’s moisture normally falls during the period of May through October. Practically all of it is brought by brief afternoon and evening thunderstorms. In July and August, normally the wettest months of the year, one can expect about one day in five when rainfall exceeds one-tenth inch. Early spring precipitation in May benefits the cool-season plants. Winter precipitation, supplying 24 percent of the year’s moisture, normally has no more than two days a month with as much as one-tenth inch of moisture. Much of the winter precipitation falls as snow.

Air temperatures vary from a monthly mean of 20 degrees F in January to 69 degrees F in July. Daily high temperatures average in the 80’s and low 90’s during the summer. Winter low temperatures fall below the freezing mark much of the time from November through March with minimum temperatures approaching 25 degrees F below zero. Dates of the last killing frost may vary from May 9th through May 17th, and the first killing frost from September 27th to October 8th. The frost-free season ranges from 141 days to 153 days from early May to early October.

Wind velocities for the area average 10 to 12 miles per hour and prevail from the south and southwest. Generally, March is the windiest month. Strong winds during the spring cause rapid drying of the soil surface.

Nearby mountains to the west intercept much of the precipitation from the Pacific storms coming through this area during the winter. About 70 percent of the 14 to 16 inches of annual precipitation falls in the form of rainfall during the frost-free season. About 40 percent of the annual precipitation benefits cool-season plants, 50 percent benefits warm-season plants and 10 percent falls during the season of plant dormancy. Relative humidity is moderately low. The sun shines approximately 75 percent of the time.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50 percent 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)	149 days
Freeze-free period (average)	171 days
Precipitation total (average)	406 mm

Influencing water features

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

Soil features

Soils are moderately deep to deep, Surface textures are loams, silt loams and clay loam with a few areas with

sandy loam. Substratum textures are silt loams, clay loams or silty clay loams. Subsoil textures are silt loam, clay loam or silty clay loam with 10 to 25 percent calcium carbonate. Effective rooting depth ranges from 20 to more than 60 inches and the runoff is medium to very rapid.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic soils:
Alicia
Berthod
Capulin
Carnero
Colmor
Deacon
La Brier
Manzano
Swastika
Partri
Pastura
Tricon
Torreon
Remunda

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Silt loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	22.86–30.48 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.5
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is a grassland characterized by mid and short-grasses. Blue grama is the dominant warm-season species. Western wheatgrass is the dominant cool-season species.

Continuous grazing during the growing season will cause the more desirable forage plants such as western

wheatgrass, bottlebrush squirreltail, galleta, sideoats grama and winterfat to decrease. Species most likely to increase are blue grama, ring muhly and buffalograss. As the ecological condition deteriorates, it is accompanied by a sharp increase of blue grama. Continuous heavy grazing will cause blue grama to form a low, dense turf, which is low in productivity. A system of deferred grazing, which varies the time of grazing and rest in the pastures during successive years in needed to maintain or improve the plant community. Grazing western wheatgrass during the months of May and June will cause a sharp decrease; therefore, rest during this period will allow western wheatgrass to grow and reproduce.

State and transition model

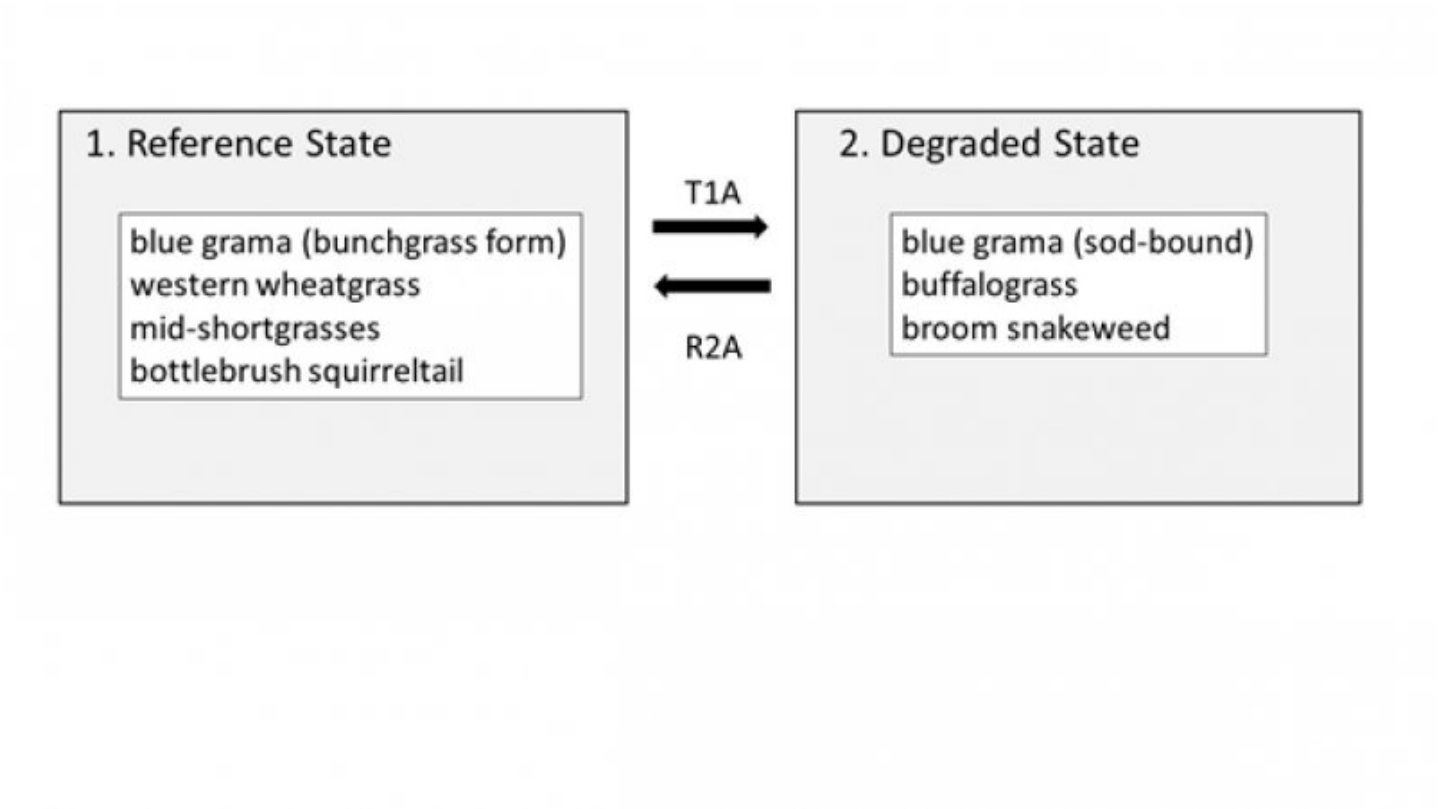

Figure 4. Generalized STM for upland sites in 70A

State 1
Reference State

Community 1.1
Reference Plant Community

This site is a grassland characterized by mid and short-grasses. Blue grama is the dominant warm-season species. Western wheatgrass is the dominant cool-season species.

Forest understory. Other shrubs that could appear include: broom snakeweed, plains pricklypear cactus, ball cactus, yucca spp., choilla cactus, and threadleaf groundsel.

Other forbs that could appear include: curlycup gumweed, bullthistle, spohora, wild buckwheat spp., and whorled milkweed.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	684	964	1233
Forb	146	146	157
Shrub/Vine	146	146	146
Total	**976**	**1256**	**1536**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	3-5%
Grass/grasslike foliar cover	30-35%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	15-20%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	35-45%

Figure 6. Plant community growth curve (percent production by month). NM3701, R070AY001NM Loamy Upland HCPC. R070AY001NM Loamy Upland HCPC A mixed mid and short-grassland.

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
Degraded

Transition T1A
State 1 to 2

Transition resulting from continuous grazing--either year-round or season-long.

Restoration pathway R2A
State 2 to 1

Restoration pathway resulting from the implementation of prescribed grazing.

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				347–404	
	blue grama	BOGR2	*Bouteloua gracilis*	350–400	–
2				202–247	
	western wheatgrass	PASM	*Pascopyrum smithii*	200–250	–
3				101–146	
	squirreltail	ELEL5	*Elymus elymoides*	100–149	–
4				45–101	
	James' galleta	PLJA	*Pleuraphis jamesii*	48–100	–
5				56–101	
	sideoats grama	BOCU	*Bouteloua curtipendula*	48–100	–
6				22–45	
	threeawn	ARIST	*Aristida*	28–49	–
7				22–45	
	ring muhly	MUTO2	*Muhlenbergia torreyi*	28–49	–
8				22–45	
	buffalograss	BODA2	*Bouteloua dactyloides*	28–49	–
9				22–45	
	common wolfstail	LYPH	*Lycurus phleoides*	28–49	–
10				22–45	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	28–49	–
Forb					
12				56–303	
	Forb, annual	2FA	*Forb, annual*	11–54	–
	Forb, perennial	2FP	*Forb, perennial*	11–54	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	11–28	–
	scurfpea	CULLE	*Cullen*	6–28	–
	prairie clover	DALEA	*Dalea*	6–28	–
	dotted blazing star	LIPU	*Liatris punctata*	6–28	–
	locoweed	OXYTR	*Oxytropis*	6–28	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	6–28	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	6–28	–
Shrub/Vine					
13				34–56	
	winterfat	KRLA2	*Krascheninnikovia lanata*	33–54	–
14				34–56	
	prairie sagewort	ARFR4	*Artemisia frigida*	33–54	–
15				34–56	
	Shrub, deciduous	2SD	*Shrub, deciduous*	33–54	–

Animal community

Habitat for Wildlife: This site provides habitats which support a resident animal community that is characterized by

pronghorn antelope, badger, black-tailed jackrabbit, black-tailed prairie dog, thirteen-lined ground squirrel, prairie pocket gopher, marsh hawk, burrowing owl, horned lark, meadowlark, scaled quail, prairie rattlesnake, Great Plains toad, and ornate box turtle. The prairie falcon hunts yearlong over these habitats. These short grass sites are breeding areas for the long-billed curlew, upland plover, and lark bunting.

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
Alicia---------- B
Berthoud---------- B
Capulin---------- B
Carnero---------- C
Charette---------- C
Colmor---------- B
Deacon---------- C
Escabosa---------- C
Kim---------- B
La Brier---------- D
Manzano---------- B
Partri---------- C
Pastura---------- D
Remunda---------- C
Swastika---------- C
Torreon---------- C
Tricon---------- C

Recreational uses

This site has fair aesthetic appeal because of the open space. The camping, hiking and picnicking are poor. Hunting is excellent for pronghorn antelope and is fair for rabbits.

Wood products

This site produces no commercial wood products. Dried cholla cactus branches can be used for ornamental purposes.

Other products

Grazing: This site can be used by all classes of livestock during any season of the year. Because of the occasional severe winter storms, emergency feed may be necessary. Yearling calves grazing from May to October may be favored because of these winter storms. Approximately 90 percent of the total yield is from species that furnish forage for grazing. Continuous grazing during the growing season will cause the more desirable forage plants such as western wheatgrass, bottlebrush squirreltail, galleta, sideoats grama, and winterfat to decrease. Species most likely to increase are blue grama, ring muhly, and buffalograss. As the ecological condition deteriorates, it is accompanied by a sharp increase of blue grama. Continuous heavy grazing will cause blue grama to form a low, dense turf, which is low in productivity. A system of deferred grazing, which varies the time of grazing and rest in the pastures during successive years in needed to maintain or improve the plant community. Grazing western wheatgrass during the months of May and June will cause a sharp decrease; therefore, rest during this period will allow western wheatgrass to grow and reproduce.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index-------- Ac/AUM

100 - 76---------- 2.8 – 3.6
75 – 51---------- 3.5 – 4.2
50 – 26---------- 4.1 – 10.8
25 – 0---------- 10.8+

Contributors

Christine Bishop
Don Sylvester
Elizabeth Wright
John E. Tunberg
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)	Kenneth Alcon
Contact for lead author	Area Rangeland Management Specialist Las Vegas Service Center 1927A 7th Street Las Vegas, NM 87701 Telephone: (505) 425-3594 Fax: (505) 425-1430
Date	04/26/2005
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

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2. **Presence of water flow patterns:** Typically none, if present (steeper slopes following intense storm events) flow patterns are short and not connected.

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3. **Number and height of erosional pedestals or terracettes:** None

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 15 to 25 percent bare ground with bare patches generally less than 5 inches in diameter. Extended drought can cause bare ground to increase and bare area patch size may increase during extended drought conditions.

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Minimal and short; usually will occur more prevalent in areas with slope associated.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface (top few millimeters) resistance to erosion (stability) values are averages; most sites will show a range of values for both plant canopy and interspaces, if different.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface (top few millimeters) resistance to erosion (stability) values are averages; most sites will show a range of values for both plant canopy and interspaces, if different.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** None

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None

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: Dominant: Warm-season, short bunchgrasses

    Sub-dominant: Cool-season mid rhizomatous>mid cool-season bunchgrass>shrubs,

    Other: Warm-season forbs>leguminous forbs=cool-season forbs=warm-season short stoloniferous>annual native grasses

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** None

14. **Average percent litter cover (%) and depth (in):** Litter depth will be reduced during and following extended drought ranges, and can be less than 10 percent.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** (Low Production 400 pounds per acre) (Average RV Production 950 pounds per acre) (High Production 1,500 pounds per acre) Production can be reduced following extended drought or in the first growing season following wildfire.

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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:** Invasive plants should not occur in reference plant community. However, cheatgrass, Russian thistle, kochia, and other non-native annuals may invade following extended drought if a seed source is available. Oneseed juniper may encroach from adjacent sites with lack of fire.

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17. **Perennial plant reproductive capability:** All plants should be vigorous, healthy and reproductive depending on disturbances i.e. drought. Plants should have numerous seed heads, vegetative tillers, etc. The only limitations are weather, wildfire, and natural disease that may temporarily reduce reproductive capability.
