USDA Natural Resources Conservation Service

Ecological site DX035X03G004
Mountain Grassland

Accessed: 05/21/2025

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.

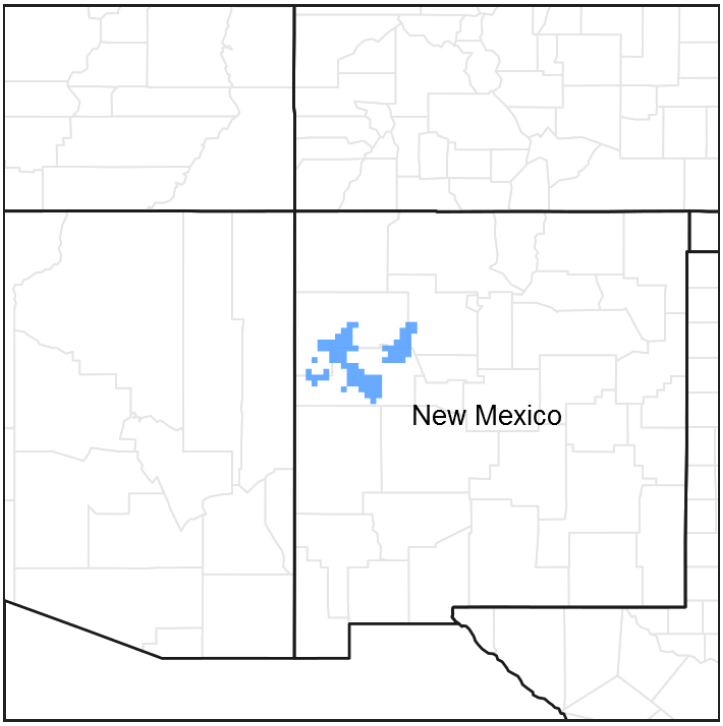

Figure 1. Mapped extent

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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Legacy ID

R035XH002NM

Physiographic features

This site occurs on variable terrain that ranges from almost flat to gently sloping. Exposures are variable. The site is located on open benchlands, outwash fans or exposed ridges. The site also occurs on benches or depressed areas within the steeper surrounding slopes of ponderosa pine. Basalt or other igneous rock outcroppings are common. Elevations are typically 7,000 to 8,500 feet above sea level, but may go over 9,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Ridge
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Elevation	2,134–2,743 m
Slope	1–10%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 18 to 25 inches. Forty percent occurs during the months of June to September. Most of the summer precipitation comes in the form of high intensity-short duration thunderstorms. Many of these storms are accompanied by hail. Snow accumulation typically occurs from November to March. Typically, depths range from 1 to 4 feet.

The average annual air temperature is about 43 degrees F. However, there are wide ranges in both yearly and daily temperatures. Temperatures may fluctuate as much as 75 degrees F in any 24-hour period. The frost-free period ranges from 80 to 100 days. The last killing frost is in June and the first killing frost is in September.

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)	174 days

Freeze-free period (average)	197 days
Precipitation total (average)	457 mm

Influencing water features

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

Soil features

These soils are well-drained and moderately deep with inclusions of deep soils. Surface is typically clay loams, but the surface may be cobbly or stony loams or loams. The subsoils are clays with few cobbles or stones. Soil-moisture relationships are good. The permeability and runoff is moderate. Available water-holding capacity is moderate to high. Effective rooting depth is 20 to 40 inches.

Soil Series
Charo
Robolata
Seco
Torreon
Trag

Table 4. Representative soil features

Surface texture	(1) Very cobbly loam (2) Clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderately slow
Soil depth	51–152 cm
Surface fragment cover <=3"	15–30%
Surface fragment cover >3"	15–30%
Available water capacity (0-101.6cm)	15.24–30.48 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4

Subsurface fragment volume <=3" (Depth not specified)	15–30%
Subsurface fragment volume >3" (Depth not specified)	15–30%

Ecological dynamics

This is a grassland site dominated by cool-season grasses. Scattered pinyon pine, juniper, oaks and ponderosa pines occur on this site. Grasses make up the majority of the vegetation. A variety of forbs are conspicuous when in bloom. Small amounts of shrubs are widely scattered throughout the site. Tree canopy does not exceed 10 percent and averages 5 percent or less.

Other grasses that could appear on this site include: pine dropseed, threeawn spp., muhlenbergia spp., western wheatgrass and brome spp.
Other shrubs and forbs that could appear on this site include: pingue, sageworts and gray horsebrush.

Approximately 85 percent of the annual yield are from species that furnish forage for grazing animals. This site is suitable for grazing during the late spring, summer and early fall. The length of the grazing season varies with elevation. At lower elevation, the grazing season can be extended from May 1st to October 15th. At higher elevations the grazing season is normally June 1st to September 15th. The site can be used by all classes of livestock; however, it is better suited for steers or sheep due to the short grazing season. To reduce spot grazing and overgrazing of the flatter slopes, herding of livestock is needed, especially when grazing sheep. Continuous grazing during the entire season will cause the more desirable species, such as Arizona fescue, mountain muhly, prairie junegrass and oatgrass to decrease. Species most likely to invade this site or increase form trace amounts are Kentucky bluegrass, sleepygrass and low-vigor blue grama. Other plants of generally low grazing value, such as ring muhly, threeawn spp., fringed sagebrush, cudweed sagewort, pingue and rabbitbrush will increase. To maintain or improve the healthy well-balanced plant community, grazing needs to be delayed until the soils are firm after winter snows and when plants have had an opportunity to make good growth. Rapid growth of plants in the spring may temporarily deplete food reserves. Delaying grazing until the plants have had an opportunity to restore these food supplies is advisable. A system of deferred grazing, which varies the time of grazing and rest in a pasture during successive years, is needed to maximize forage production and to maintain a healthy well-balanced plant community. Grazing pressure from domestic livestock needs to be reduced during the spring and fall to reduce the competition that the livestock will have with the elk in competing for forage during this period of time.

State and transition model

Ecosystem states

1. Historic Climax Plant Community

State 1 submodel, plant communities

1.1. Historic Climax Plant Community

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

This is a grassland site dominated by cool-season grasses. Scattered pinyon pine, juniper, oaks and ponderosa pines occur on this site. Grasses make up the majority of the vegetation. A variety of forbs are conspicuous when in bloom. Small amounts of shrubs are widely scattered throughout the site. Tree canopy does not exceed 10 percent and averages 5 percent or less. Other grasses that could appear on this site include: pine dropseed, threeawn spp., muhlenbergia spp., western wheatgrass and brome spp. Other shrubs and forbs that could appear on this site include: pingue, sageworts and gray horsebrush.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	500	780	1060
Shrub/Vine	10	77	143
Forb	58	76	94
Tree	29	53	76
Total	**597**	**986**	**1373**

Table 6. Ground cover

Tree foliar cover	5-10%

Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	20-35%
Forb foliar cover	5-7%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-30%
Surface fragments >0.25" and <=3"	0-5%
Surface fragments >3"	0-20%
Bedrock	0%
Water	0%
Bare ground	20-25%

Figure 5. Plant community growth curve (percent production by month). NM1002, R035XH002NM-Mountain Grassland-HCPC. R035XH002NM-Mountain Grassland-HCPC.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
50	50	0	0	0	0	0	0	0	0	0	0

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	**NM muhly mountain muhly**			143–239	
	mountain muhly	MUMO	*Muhlenbergia montana*	143–239	–
	New Mexico muhly	MUPA2	*Muhlenbergia pauciflora*	143–239	–
2	**arizona fescue**			143–239	
	Arizona fescue	FEAR2	*Festuca arizonica*	143–239	–
3	**muttongrass**			48–143	
	muttongrass	POFE	*Poa fendleriana*	48–143	–
4	**spike muhly**			29–76	
	spike muhly	MUWR	*Muhlenbergia wrightii*	29–76	–
5	**prarie junegrass**			48–95	

	prairie Junegrass	KOMA	*Koeleria macrantha*	48–95	–
6	**Bottlebrush Squirreltail**			10–48	
	squirreltail	ELEL5	*Elymus elymoides*	10–48	–
8	**Little Bluestem sideoats grama big bluestem**			48–143	
	big bluestem	ANGE	*Andropogon gerardii*	48–143	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	48–143	–
	little bluestem	SCSC	*Schizachyrium scoparium*	48–143	–
9	**wolftail blue grama needleand thread**			29–76	
	blue grama	BOGR2	*Bouteloua gracilis*	29–76	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	29–76	–
	common wolfstail	LYPH	*Lycurus phleoides*	29–76	–
Shrub/Vine					
10	**oak skunkbush wax current winterfat**			10–143	
	oak	QUERC	*Quercus*	10–143	–
	skunkbush sumac	RHTR	*Rhus trilobata*	10–143	–
	wax currant	RICE	*Ribes cereum*	10–143	–
Tree					
11	**pinion pine ponderosa pine juniper**			29–76	
	juniper	JUNIP	*Juniperus*	29–76	–
	twoneedle pinyon	PIED	*Pinus edulis*	29–76	–
	ponderosa pine	PIPO	*Pinus ponderosa*	29–76	–

Animal community

Habitat for Wildlife:
This site provides habitats which support a resident animal community that is characterized by mule deer, elk, Merriam’s turkey, bobcat, mourning dove, band-tailed pigeon and prairie rattlesnake.

Hydrological functions

Soil Series Hydrologic Group

Charo C
Robolata C
Seco C
Torreon C
Trag B

Recreational uses

This site offers recreation potential for picnicking, hiking, horseback riding, nature observation, and photography of large game animals, small animals and wildflowers. Hunting for elk, deer and turkey is also available. At higher elevations this site can be used for winter sports. The natural beauty of the site is enhanced by the variety of forbs that become conspicuous when in bloom from July through August.
The buff-breasted flycatcher may hunt over or nest on the site. The bald eagle and peregrine falcon may hunt over the site. Large prairie dog colonies may support populations of the black-footed ferret.

Wood products

This site has very little potential for wood products. However, some can be cut from the widely scattered trees located throughout the site. Because of the dominance by grasses, regeneration of trees is delayed or prevented.

Other products

Grazing:
Approximately 85 percent of the annual yield are from species that furnish forage for grazing animals. This site is suitable for grazing during the late spring, summer and early fall. The length of the grazing season varies with elevation. At lower elevation, the grazing season can be extended from May 1st to October 15th. At higher elevations the grazing season is normally June 1st to September 15th. The site can be used by all classes of livestock; however, it is better suited for steers or sheep due to the short grazing season. To reduce spot grazing and overgrazing of the flatter slopes, herding of livestock is needed, especially when grazing sheep. Continuous grazing during the entire season will cause the more desirable species, such as Arizona fescue, mountain muhly, prairie junegrass and oatgrass to decrease. Species most likely to invade this site or increase form trace amounts are Kentucky bluegrass, sleepygrass and low-vigor blue grama. Other plants of generally low grazing value, such as ring muhly, threeawn spp., fringed sagebrush, cudweed sagewort, pingue and rabbitbrush will increase. To maintain or improve the healthy well-balanced plant community, grazing needs to be delayed until the soils are firm after winter snows and when plants have had an opportunity to make good growth. Rapid growth of plants in the spring may temporarily deplete food reserves. Delaying grazing until the plants have had an opportunity to restore these food supplies is advisable. A system of deferred grazing, which varies the time of grazing and rest in a pasture during successive years, is needed to maximize forage production and to

maintain a healthy well-balanced plant community. Grazing pressure from domestic livestock needs to be reduced during the spring and fall to reduce the competition that the livestock will have with the elk in competing for forage during this period of time.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index Ac/AUM
100 - 76 2.5 – 3.2
75 – 51 3.0 – 4.0
50 – 26 3.7 – 5.5
25 – 0 5.5+

Inventory data references

Data collection for this site was done in conjunction with the progressive soil surveys within the Arizona and New Mexico Mountains 39 Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. McKinley, Cibola and Sandoval Counties.

Type locality

Location 1: Cibola County, NM
Location 2: McKinley County, NM

Contributors

Don Sylvester
Elizabeth Wright
Joe May
John Tunberg
Michael Carpinelli

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	
Approved by	
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:**
