

Ecological site R070AY014NM Hills

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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.

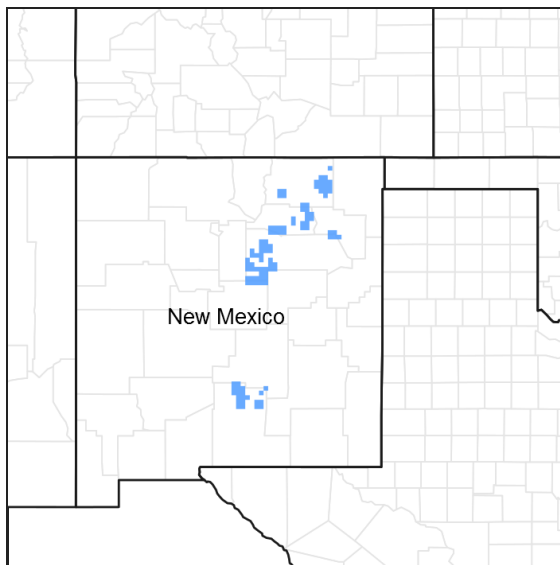


Figure 1. Mapped extent

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

From an old key to ESDs in MLRA 70A:

17B. Soils shallow to moderately deep. Slopes usually smooth but range from 0 to 35 percent, soils are shallow to moderately deep loam, clay loam, or clay. Vegetation includes blue grama, hairy grama, little bluestem, mountain muhly, sideoats grama, big bluestem, common wolftail, galleta, wild buckwheat, juniper, piñon, oak, mountain mahogany, and skunkbush sumac.

Note that the Soils section suggests that textures are modified by coarse fragments--suggesting that the textures described in the referenced key are merely base textures.

Given that the physiography of this site is quite varied, it could theoretically occur on multiple LRUs of MLRA 70A. Also, given that this site concept occurs on both shallow and moderately deep soils, it correlates to two Ecological Site Groups: Shallow (GX070A01XESG02) and Uplands (GX070A01XESG04).

Table 1. Dominant plant species

Tree	(1) <i>Juniperus</i> (2) <i>Pinus edulis</i>
Shrub	(1) <i>Quercus</i> (2) <i>Cercocarpus montanus</i>

Herbaceous	(1) <i>Bouteloua gracilis</i> (2) <i>Schizachyrium scoparium</i>
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Physiographic features

This site occurs on complex landscape of hills, mesa sides, bajada and narrow valleys. They formed in calcareous old alluvium and eolian sediments from limestone and sandstone. The slopes are usually smooth and range from 0 to 35 percent. Local relief, the difference in elevation of the bottom of the valley to the top of the ridges, is generally less than 500 feet but may be as much as 1,000 feet. Elevation ranges from 5,300 to 7,200 feet above sea level.

Note: Based on the description above, and on the correlation to soil components, it seems likely that this site occurs, in part, on High Plains deposits such as the Ogallala Formation. These deposits of sediment washed out of the Sangre De Cristo Mountains during the Tertiary and Early Quaternary, and are generally dominated by igneous rocks.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Bajada (3) Valley side
Flooding frequency	None
Ponding frequency	None
Elevation	5,300–7,200 ft
Slope	0–35%
Aspect	NE, SW

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)	16 in

Influencing water features

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

Soil features

Soils are shallow to moderately deep. Surface textures are loam, stony loam, gravelly silty loam or gravelly loam. Subsurface layers are stony loam, cobbly clay loam, silty clay loam, stony silty clay, silty clay or clay. Clay percent ranges between 19 and 35 percent. Percent calcium carbonate equivalence in the mineralogy control section ranges from 40 to 80 percent. In some pedons the weak cementation is discontinuous. There are boulders and cobbles on some areas. The soils have moderate to slow permeability. The available water-holding capacity is low to high. The effective rooting depth is 10 to 40 inches. Soils along the valley bottom receive added water as runoff from adjacent slopes.

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

Characteristic soil:

Dean
Dioxice
Dumas

Table 4. Representative soil features

Surface texture	(1) Channery loam (2) Cobbly loam (3) Stony clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderately slow
Soil depth	10–72 in
Surface fragment cover ≤3"	0–20%
Surface fragment cover >3"	0–30%
Available water capacity (0-40in)	3–12 in
Calcium carbonate equivalent (0-40in)	5–80%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–1
Soil reaction (1:1 water) (0-40in)	6.6–9
Subsurface fragment volume ≤3" (Depth not specified)	5–25%
Subsurface fragment volume >3" (Depth not specified)	2–15%

Ecological dynamics

Text from the Grazing Section that is relevant to plant ecology:

Approximately 80 percent of the total annual yield are from species, which furnish forage for grazing animals. Continuous grazing during the growing season will cause the more desirable forage plants such as little bluestem, big bluestem, sideoats grama, piñon ricegrass, western wheatgrass, and mountain mahogany to decrease. Species most likely to increase are blue grama, oneseed juniper, oak brush, threeawn spp., and ring muhly. As the ecological condition deteriorates, it is accompanied by a sharp increase of oneseed juniper and oak. As further deterioration advances, ground cover is greatly reduced. Oneseed juniper and oak brush may increase to the point where they dominate the site with very little forage production. Late spring and summer rest is especially beneficial to little bluestem, sideoats grama, and big bluestem. Rest during April, May, and June is needed to allow piñon ricegrass, western wheatgrass, and other cool-season grasses to grow and reproduce.

State and transition model

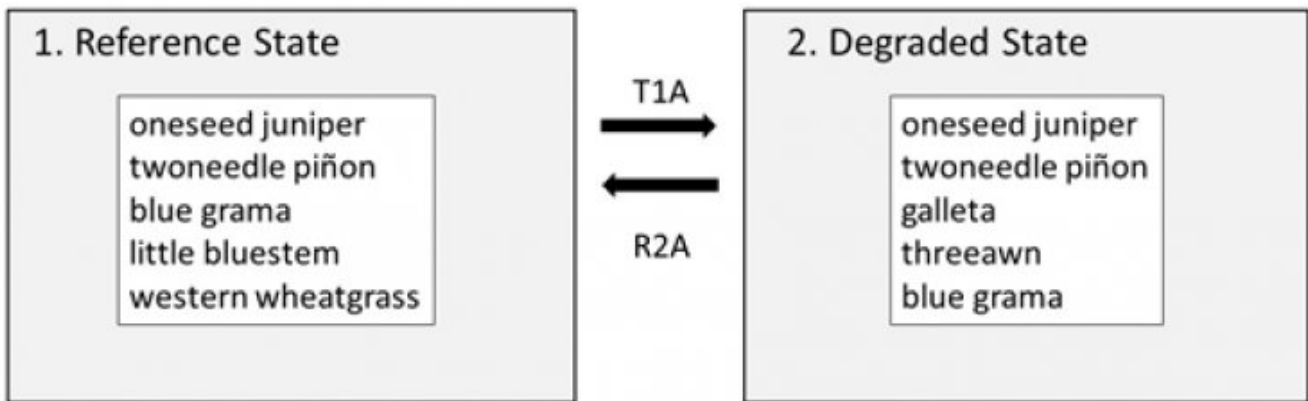


Figure 4. Generalized STM for shallow sites in 70A. For more site-specific information, see the interactive STM. Note that this site also correlates to the Upland Group.

State 1

Reference State

Community 1.1

Reference Plant Community

The site is a grassland with an aspect dominance of piñon-juniper with an understory of grasses, forbs and browse. Approximately 50 percent of the total vegetative production is made up of grasses. Grass species are dominated by warm-season mid-grasses. Woody species make up approximately 35 percent of the vegetative production. A variety of perennial and annual forbs make up approximately 10 percent of the vegetative production. North and east facing slopes typically produce a denser vegetative cover and produce more vegetative growth than the south or west facing slopes.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	210	560	900
Shrub/Vine	130	350	560
Forb	30	80	140
Total	370	990	1600

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	5-10%
Forb foliar cover	20-25%
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	15-20%

Figure 6. Plant community growth curve (percent production by month).
 NM3714, R070AY014NM Hills HCPC. R070AY014NM Hills HCPC 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

Degraded communities are generally dominated by blue grama, oneseed juniper, oak brush, threeawn spp., and ring muhly.

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

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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				160–220	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	160–220	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	160–220	–
2				100–160	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	105–158	–
3				30–50	
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	32–53	–
4				50–100	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	53–105	–
5				20–50	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	21–53	–
6				20–50	
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	21–53	–
7				20–50	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	21–53	–
8				20–50	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	21–53	–
Forb					
9				20–30	
	buckwheat	ERIOG	<i>Eriogonum</i>	21–32	–
10				50–100	
	Forb, annual	2FA	<i>Forb, annual</i>	53–105	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	53–105	–
Shrub/Vine					
11				100–160	
	juniper	JUNIP	<i>Juniperus</i>	105–158	–
12				50–100	
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	53–105	–
13				100–160	
	oak	QUERC	<i>Quercus</i>	105–158	–
14				50–70	
	hairy mountain mahogany	CEMOP	<i>Cercocarpus montanus var. paucidentatus</i>	53–74	–
15				20–50	
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	21–53	–
16				30–50	
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	32–53	–

Animal community

Habitat for Wildlife: This site provides habitats which support a resident animal community that is characterized by mule deer, coyote, eastern cottontail, grasshopper mouse, brush mouse, great horned owl, red-tailed hawk, plain

titmouse, scrub jay, rufous sided towhee, western diamondback rattlesnake, and fence lizard.

There is seasonal use by the blue grouse, turkey, and mountain lion. Band tailed pigeons will flock to these habitats during years of high mast production.

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

Dean----- B

Dioxice----- B

Dumas----- B

Penrose Variet----- D

Recreational uses

The site has good aesthetic appeal and natural beauty. It is fair for screening and fair to good for hiking and picnicking. Poor to fair for camping. Hunting for deer is fair to good.

Wood products

Piñon and juniper furnish some firewood. Juniper can be used as fence posts. A limited number of piñon are used for Christmas trees. All are limited due to slopes.

Other products

Grazing:

This site is best suited to be grazed in the spring, summer and fall. Distribution of domestic livestock is a problem on this site due to the slopes. Cattle, horses and sheep tend to graze flatter slopes leaving the steeper slopes ungrazed. Goats are best suited for this site. A younger age of cattle would better utilize the site than the older cows. Approximately 80 percent of the total annual yield are from species, which furnish forage for grazing animals. These species are a large variety of grasses, forbs and shrubs that provide good nutrition for grazing animals. Continuous grazing during the growing season will cause the more desirable forage plants such as little bluestem, big bluestem, sideoats grama, piñon ricegrass, western wheatgrass, and mountain mahogany to decrease. Species most likely to increase are blue grama, oneseed juniper, oak brush, threeawn spp., and ring muhly. As the ecological condition deteriorates, it is accompanied by a sharp increase of oneseed juniper and oak. As further deterioration advances, ground cover is greatly reduced. Oneseed juniper and oak brush may increase to the point where it is dominating the site with very little forage production. A system of deferred grazing, which varies the time of grazing and rest in a pasture during successive years, is needed to maintain the plant community. Late spring and summer rest is especially beneficial to little bluestem, sideoats grama and big bluestem. Rest during April, May, and June is needed to allow piñon ricegrass, western wheatgrass, and other cool-season grasses to grow and reproduce.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index----- Ac/AUM

100 - 76----- 3.1 – 4.0

75 – 51----- 3.8 – 5.1

50 – 26----- 5.0 – 11.7

25 – 0----- 11.7+

Type locality

Location 1: Colfax County, NM
Location 2: Mora County, NM
Location 3: San Miguel County, NM
Location 4: Union County, NM

Contributors

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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)	
Contact for lead author	
Date	02/26/2024
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:**
