Ecological site R070AY011NM
Cinder

Last updated: 9/12/2023
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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.

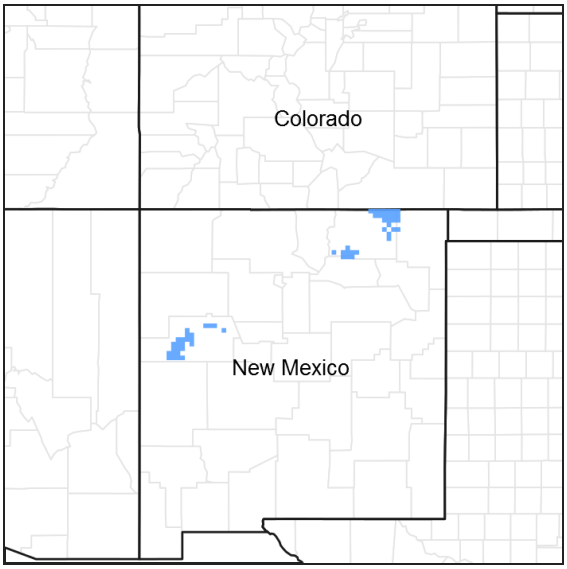

Figure 1. Mapped extent

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 cinder cones or similar volcanic features. Soils are generally low in clay and high in coarse fragments.
This site correlates to the Sandy ecological site group.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Quercus* (2) *Cercocarpus montanus*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Bouteloua gracilis*

Physiographic features

This site occurs on volcanic cones or crater landscapes. They formed in gently sloping to hilly cinder deposits. Slopes range from 0 to 50 percent and are on all aspects. Mean annual precipitation is about 18 to 20 inches. Mean annual temperature is about 41 degrees F. Elevation ranges from 6,900 to 9,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Cinder cone (2) Volcanic cone (3) Volcanic dome
Flooding frequency	None
Ponding frequency	None
Elevation	2,103–2,743 m
Slope	0–50%
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 texture gravelly loam or silt loam. Subsurface texture is gravelly loam or loose cinders. Permeability is rapid. Available water-holding capacity is low. Effective rooting depth is 20 to 40

inches. These soils are droughty. The gravel in these soils is volcanic cinder range from 70 to 90 percent cinders.

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

Characteristic soils:

Bandera

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Very gravelly sandy loam (3) Very gravelly silt loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to rapid
Soil depth	51–183 cm
Surface fragment cover <=3"	15–45%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–1
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	35–60%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

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

Approximately 80 percent of the total annual yield are from species that furnish forage for livestock. Continuous grazing during the growing season will cause the more desirable forage plants such as little bluestem, big bluestem, Arizona fescue, mountain muhly, and mountain mahogany to decrease. Species most likely to invade the site are ring muhly and broom snakeweed. Species most likely to increase are blue grama, threeawn, oak brush, oneseed juniper, and annual forbs. Rest during April, May, and June allows species such as Arizona fescue, green needlegrass, and prairie junegrass to grow and reproduce. Late spring and early summer rest is beneficial to big bluestem and little bluestem.

State and transition model

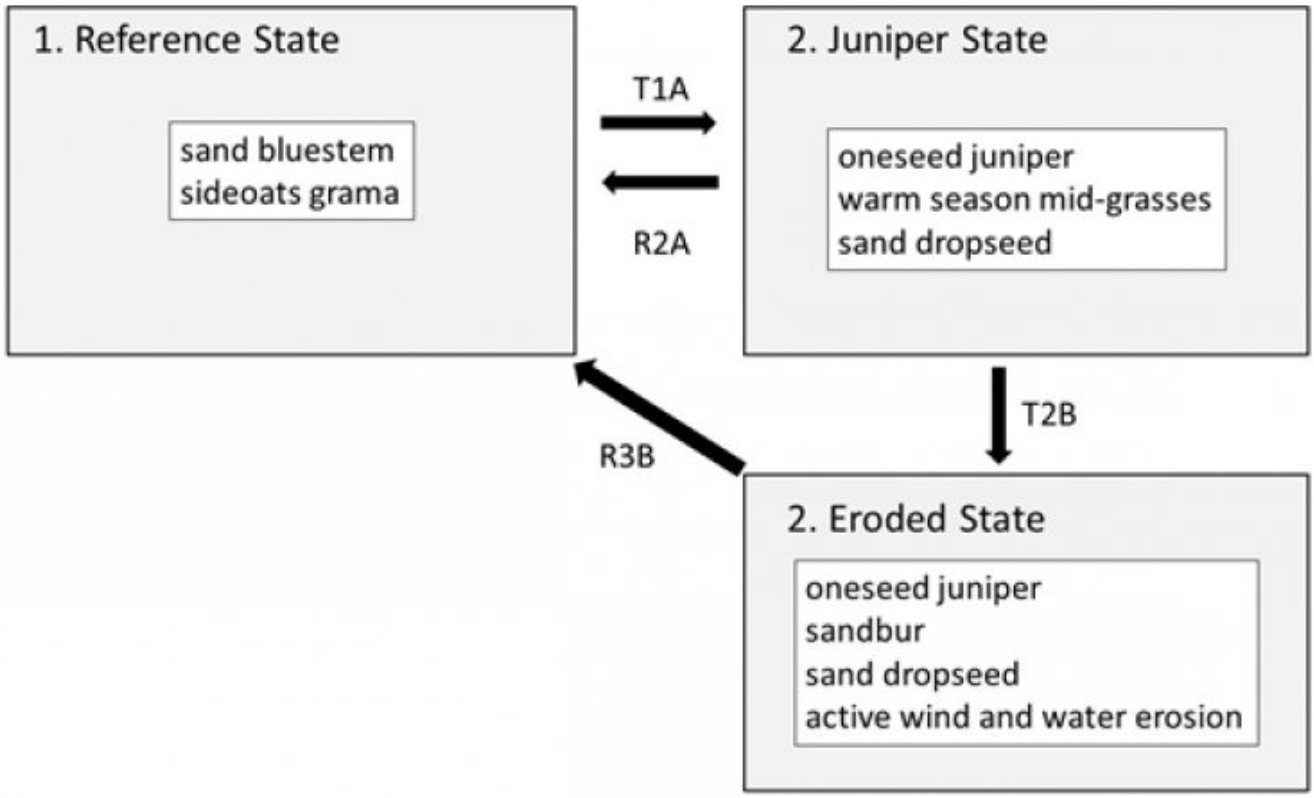

Figure 4. Generalized STM for sandy sites in 70A

State 1
Reference State

Community 1.1
Historic Climax Plant Community

This site produces vegetation dominated by warm-season mid-grasses with a variety of shrubs, forbs and cool-season grasses. This site occurs as the lower portions of volcanic cones and the adjacent fans. The surface cinder acts much like mulch to retain surface moisture. Cinder also heats the soil. During years of favorable winter moisture, this site is the first to green-up in early spring or late winter.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	370	716	1065
Shrub/Vine	67	123	191
Forb	45	78	112
Total	**482**	**917**	**1368**

Table 6. Ground cover

Tree foliar cover	0-5%
Shrub/vine/liana foliar cover	3-5%
Grass/grasslike foliar cover	25-30%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	8-10%

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). NM3711, R070AY011NM Cinder HCPC. R070AY011NM Cinder HCPC Warm-season mid-grass grassland with a variety of shrubs, forbs and cool-season grasses..

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
Juniper

This state contains a significant overstory of oneseed juniper.

State 3
Eroded

This state shows significant evidence of erosion, such as pedestalling and truncated topsoil.

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

Transition T2A
State 2 to 3

Additional season-long grazing, providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization. This leads to pronounced erosion.

Restoration pathway R3A
State 3 to 1

In theory, a very high-energy input--including the addition of topsoil and seeding--could lead to the re-establishment of the reference community.

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				146–191	
	little bluestem	SCSC	*Schizachyrium scoparium*	147–196	–
2				146–191	
	blue grama	BOGR2	*Bouteloua gracilis*	147–196	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	147–196	–
3				101–146	
	sideoats grama	BOCU	*Bouteloua curtipendula*	99–147	–
4				45–101	
	big bluestem	ANGE	*Andropogon gerardii*	49–99	–
5				45–101	
6				45–101	
	mountain muhly	MUMO	*Muhlenbergia montana*	49–99	–
7				29–45	
	common wolfstail	LYPH	*Lycurus phleoides*	29–49	–
8				29–45	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	29–49	–
Forb					
9				22–45	
	hairy alumroot	HEVI2	*Heuchera villosa*	20–49	–
10				22–45	
	globemallow	SPHAE	*Sphaeralcea*	20–49	–
11				22–45	
	Forb, annual	2FA	*Forb, annual*	20–49	–
	Forb, perennial	2FP	*Forb, perennial*	20–49	–
Shrub/Vine					
12				45–101	
	oak	QUERC	*Quercus*	49–99	–
13				34–45	
	hairy mountain mahogany	CEMOP	*Cercocarpus montanus var. paucidentatus*	29–49	–
14				34–45	
	juniper	JUNIP	*Juniperus*	29–49	–
	twoneedle pinyon	PIED	*Pinus edulis*	29–49	–
15				34–45	
	Shrub, deciduous	2SD	*Shrub, deciduous*	29–49	–

Animal community

Habitat for Wildlife:

This site provides habitats which support a resident animal community that is characterized by mule deer, spotted skunk, desert cottontail, rock squirrel, great horned owl, scrub jay, rufous-sided towhee, garter snake, 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
Bandera -------B
Cinders -------B

Recreational uses

This site has good aesthetic appeal because of its association with volcanic cones and the uniqueness within the area in which the site occurs. Its large variety of plants blooms from early spring to fall. It is fair for camping and picnicking. The site provides poor hiking because of small cinder gravel surface. Hunting is poor to fair for deer, rabbits, and upland game birds.

Wood products

This site produces no significant wood production except fuel for campfires.

Other products

Grazing:

This site can be used all season of the year. Because of this site's potential to green up early, it is better suited for early spring grazing when grazing is not in successive years. Site is best suited for cattle and horses. Steer and young heifers could best utilize the site because of the cinder on the soil surface and slope. Approximately 80 percent of the total annual yield are from species that furnish forage for livestock. Continuous grazing during the growing season will cause the more desirable forage plants such as little bluestem, big bluestem, Arizona fescue, mountain muhly and mountain mahogany to decrease. Species most likely to invade the site are ring muhly and broom snakeweed. Species most likely to increase are blue grama, threeawn, oak brush, oneseed juniper, and annual forbs. A system of deferred grazing, which varies the time of grazing and rest in a pasture during successive years, is needed to maintain or improve the plant community. Rest during April, May, and June allows species such as Arizona fescue, green needlegrass, and prairie junegrass to grow and reproduce. Late spring and early summer rest is beneficial to big bluestem and little bluestem.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index ------Ac/AUM
100 - 76 ----------2.5 – 2.9
75 – 51 ----------2.8 – 5.0
50 – 26 ----------4.9 – 9.8
25 – 0 ----------9.8+

Type locality

Location 1: Colfax County, NM
Location 2: 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	05/14/2024
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):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**
