USDA Natural Resources Conservation Service

Ecological site DX035X03F117
Cinder

Last updated: 5/20/2025
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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.

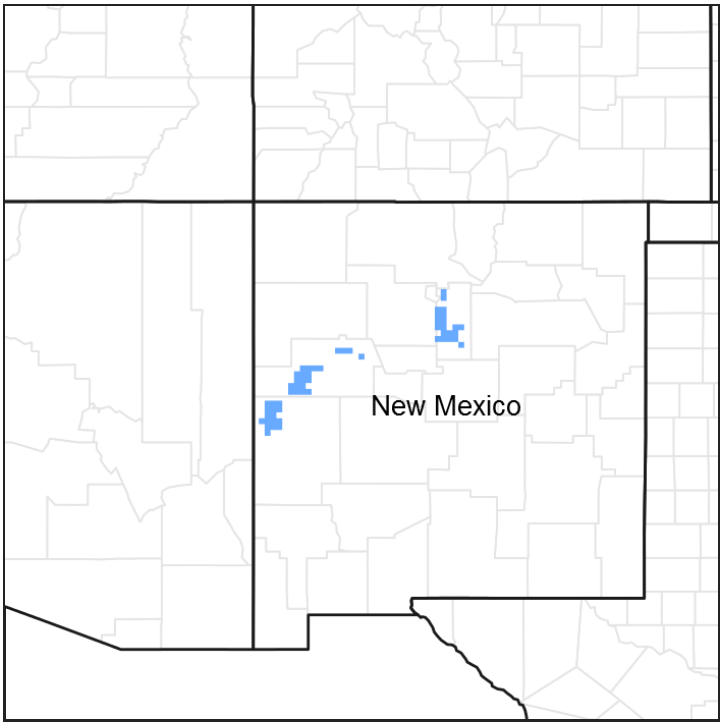

Figure 1. Mapped extent

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 is on nearly level to moderately sloping or rolling uplands found near cones or craters. Slopes average 10 percent or less and do not ordinarily exceed 35 percent. These soils are derived from volcanic cinders. Typically, they have gravelly or very gravelly loam surfaces, but these may also be gravelly or very gravelly sandy loams or sandy clay

loams. They are moderately deep to deep and are well drained.

Table 1. Dominant plant species

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

Legacy ID

R035XA117NM

Physiographic features

This site is on nearly level to moderately sloping or rolling uplands found near cones or craters. Slopes average 10 percent or less and do not ordinarily exceed 35 percent. Elevations vary from about 6,000 to 7,800 feet.

Table 2. Representative physiographic features

Landforms	(1) Cinder cone (2) Volcanic crater
Flooding frequency	None
Ponding frequency	None
Elevation	1,829–2,377 m
Slope	0–35%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

Average annual precipitation varies from about 10 inches to just over 16 inches. Fluctuations ranging from about 5 inches to 25 inches are not uncommon. The overall climate is characterized by cold dry winters in which winter moisture is less than summer. As much as half or more of the annual precipitation can be expected to come during the period of July through September. Thus, fall conditions are often more favorable for good growth of cool-season perennial grasses, shrubs, and forbs than are those of spring.

The average frost-free season is about 120 days and extends from approximately mid-May to early or mid-September. Average annual air temperatures are 50 degrees F or lower and summer maximums rarely exceed 100 degrees F. Winter minimums typically

approach or go below zero. Monthly mean temperatures exceed 70 degrees F for the period of July and August.

Rainfall patterns generally favor warm-season perennial vegetation, while the temperature regime tends to favor cool-season vegetation. This creates a somewhat complex community of plants on a given range site which is quite susceptible to disturbance and is at or near its productive potential only when both natural warm- and cool- season dominants are present.

Table 3. Representative climatic features

Frost-free period (average)	171 days
Freeze-free period (average)	252 days
Precipitation total (average)	406 mm

Influencing water features

This site is not influenced by water from wetlands or streams.

Soil features

These soils are derived from volcanic cinders. Typically, they have gravelly or very gravelly loam surfaces, but these may also be gravelly or very gravelly sandy loams or sandy clay loams. They are moderately deep to deep and are well drained. The subsoils are usually gravelly or very gravelly throughout. Permeability is moderately rapid, and the available water capacity is low to moderate.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Very gravelly sandy loam (3) Gravelly sandy clay loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderately rapid
Soil depth	102 cm
Surface fragment cover <=3"	20–60%
Surface fragment cover >3"	5–15%
Available water capacity (0-101.6cm)	2.54–15.24 cm

Calcium carbonate equivalent (0-101.6cm)	1–20%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–4
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	40–80%
Subsurface fragment volume >3" (Depth not specified)	10–20%

Ecological dynamics

Overview
This site occurs on cinder cones, hills, and plateaus. It occurs as a distinct unit or as part of a complex with Gravelly sites. The historic plant community of the Cinder site is a grassland characterized by both warm and cool season perennial bunchgrasses, scattered shrubs and forbs, and occasionally a few trees. Blue grama is the dominant grass. Widely scattered patches of wolfberry, Apache plume, and four-wing saltbush are common. A few scattered piñon and juniper may also occur on this site. This site is susceptible to encroachment of rabbitbrush. Rabbitbrush may increase on this site in response to fire, overgrazing, and decreased resource competition.

State and transition model

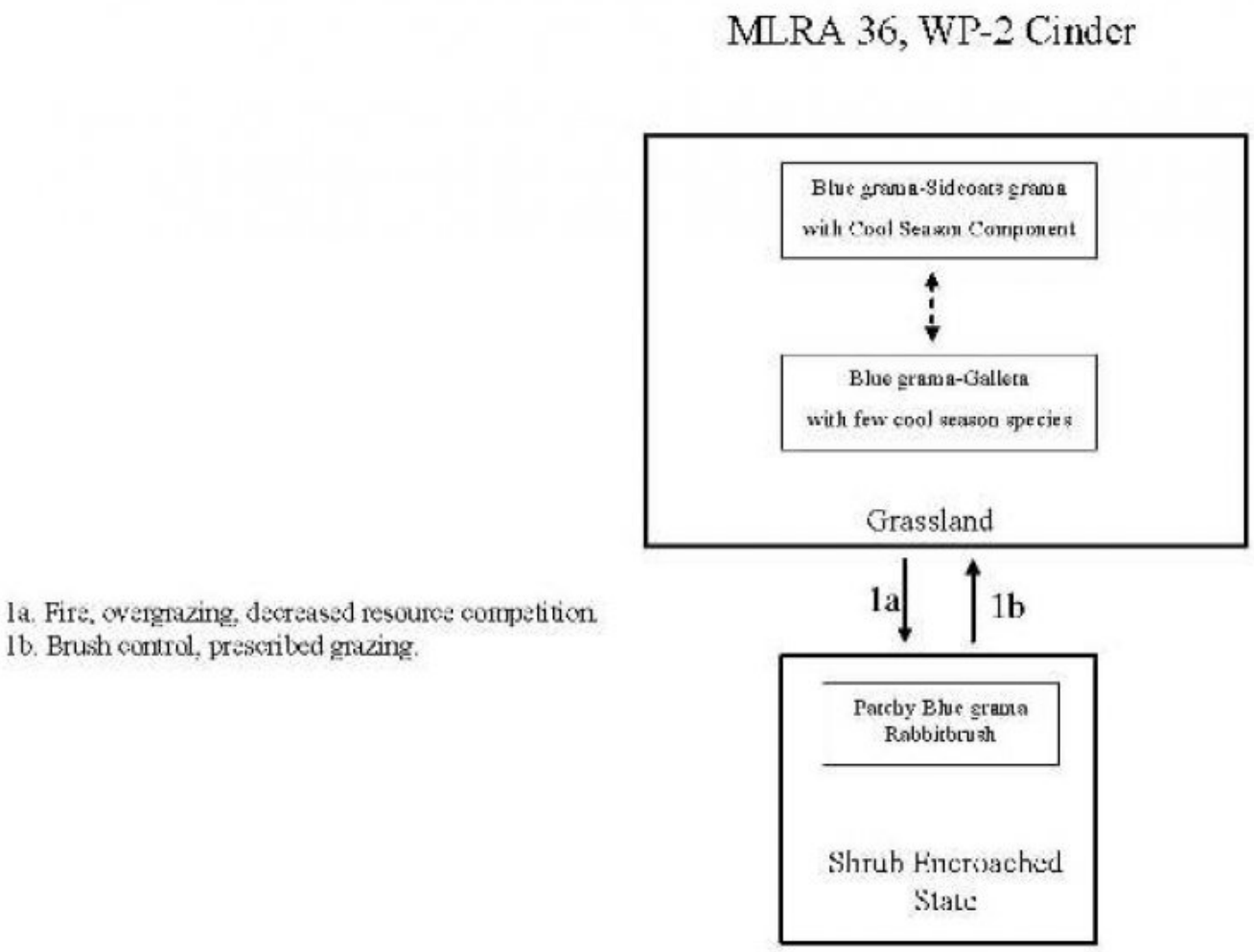

Figure 4. MLRA 36, WP-2 Cinder

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

State Containing the Historic Climax Plant Community Grassland State: The historic plant community is dominated by blue grama, with sideoats grama and galleta occurring as the sub- dominant grasses. New Mexico feathergrass, western wheatgrass, and bottlebrush squirreltail are the most frequently encountered cool-season species. Widely scattered patches of wolfberry, Apache plume, fourwing saltbush, and winterfat are common. Piñon and juniper may also be present. Heavy continuous use by livestock can result in a decrease in cool-season grasses, sideoats grama, spike muhly and winterfat. Blue grama, galleta, ring muhly, and threeawns typically increase in relative cover. Diagnosis: Grass cover is uniform with few large bare areas present. Shrubs are scattered with canopy cover averaging five percent. Evidence of erosion such as pedestalling of grasses, rills and gullies are infrequent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	334	584	834
Forb	31	55	78
Total	**365**	**639**	**912**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	15-20%
Forb foliar cover	2-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-15%
Surface fragments >0.25" and <=3"	20-60%
Surface fragments >3"	5-15%
Bedrock	0%
Water	0%
Bare ground	5-15%

Figure 6. Plant community growth curve (percent production by month). NM0308, R035XA117NM-Cinder-HCPC. WP-2.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	0	0

State 2
Shrub-Encroached

Community 2.1
Shrub-Encroached

Additional States: Shrub Encroached State: This state is characterized by the noticeable increase of rabbitbrush and decreased annual production of grasses. Blue grama is the dominant grass species, and ring muhly, galleta, and dropseeds are typically found at increased densities. Cool season grasses are found in isolated patches or are absent. Annual production of grasses is substantially reduced. Diagnosis: Rabbitbrush is found at increased densities relative to the Grassland state. Grass cover is patchy with large bare

areas present. Low vigor blue grama is the dominant grass. Evidence of erosion such as pedestalling of plants, elongated water flow patterns, litter dams, and rills is common. Gullies may be present, especially on slopes greater than 10 percent. Transition to Shrub Encroached State (1a) Rabbitbrush is a fire adapted species and may increase or quickly occupy burned areas.6 Rabbitbrush can increase after 1-3 years following fire.5 Seed production and seedling survival of rabbitbrush is believed to be sensitive to resource competition.2 During years of limited rainfall, high grass cover may help to suppress shrub seedlings by competing directly for soil moisture. Rabbitbrush is believed to increase under heavy grazing pressure.4 Overgrazing can reduce grass cover and provide competition free areas for the establishment of rabbitbrush seedlings. 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 rabbitbrush seedlings. Transition back to Grassland (2b) Brush control is necessary to initiate the transition back to the grassland state. Chemical control has been shown to be effective in the control of rabbitbrush1,3, but the results may vary widely depending on time and rate of application. Root plowing and other mechanical control methods that sever the plant below the root crown may reduce rabbitbrush densities. Follow up treatment may be necessary. Prescribed grazing will help ensure adequate rest following brush control and will assist in the establishment and maintenance of grass cover.

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				206–241	
	blue grama	BOGR2	*Bouteloua gracilis*	206–241	–
	blue grama	BOGR2	*Bouteloua gracilis*	206–241	–
2				68–103	
	sideoats grama	BOCU	*Bouteloua curtipendula*	68–103	–
3				68–103	
	needle and thread	HECO26	*Hesperostipa comata*	68–103	–
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	68–103	–
	western wheatgrass	PASM	*Pascopyrum smithii*	68–103	–
4				35–68	
	James' galleta	PLJA	*Pleuraphis jamesii*	35–68	–
5				35–68	

	Indian ricegrass	ACHY	*Achnatherum hymenoides*	35–68	–
	squirreltail	ELEL5	*Elymus elymoides*	35–68	–
6				35–103	
	common wolfstail	LYPH	*Lycurus phleoides*	35–103	–
	spike muhly	MUWR	*Muhlenbergia wrightii*	35–103	–
7				7–35	
	threeawn	ARIST	*Aristida*	7–35	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	7–35	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	7–35	–
8				0–20	
	black grama	BOER4	*Bouteloua eriopoda*	0–20	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–20	–
Shrub/Vine					
9				7–35	
	fourwing saltbush	ATCA2	*Atriplex canescens*	7–35	–
	Apache plume	FAPA	*Fallugia paradoxa*	7–35	–
	desert-thorn	LYCIU	*Lycium*	7–35	–
10				7–20	
	winterfat	KRLA2	*Krascheninnikovia lanata*	7–20	–
11				7–20	
	Bigelow sage	ARBI3	*Artemisia bigelovii*	7–20	–
	prairie sagewort	ARFR4	*Artemisia frigida*	7–20	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	7–20	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	7–20	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	7–20	–
Tree					
12				0–20	
	juniper	JUNIP	*Juniperus*	0–20	–
	twoneedle pinyon	PIED	*Pinus edulis*	0–20	–
Forb					

13				7–48	
	Forb, perennial	2FP	*Forb, perennial*	7–48	–
14				7–20	
	Forb, annual	2FA	*Forb, annual*	7–20	–

Animal community

This range site provides habitats which support a resident animal community that is characterized by pronghorn antelope, coyote, black-tailed jackrabbit, Merriam's kangaroo rat, white-throated woodrat, silky pocket mouse, sparrow hawk, chipping sparrow, mourning dove, leopard lizard, short-horned lizard, and prairie rattlesnake. The chestnut-collard longspur winters on this site, and the common raven and prairie falcon hunt over it.

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
Ceniza----------B
Churipa----------B
Montoso----------B

Recreational uses

This site offers fair to good potential for hiking, horseback riding, nature observation, photography, camping, and picnicking. It offers good to excellent potential for pronghorn antelope hunting.

Wood products

This site has little significant value for wood products.

Other products

This site is suitable for grazing by most kinds and classes of livestock in all seasons of the year, although it is more suited to grazing animals (cattle or sheep) than browsers (goats). Continuous year-long grazing by cattle will ordinarily result in a decrease in such species as New Mexico feathergrass, needle-and-thread, western wheatgrass, and bottlebrush squirreltail. Prolonged heavy use will also cause a decline of sideoats grama, winterfat and spike muhly. Blue grama may initially increase to the point that occupies 75 to 80 percent of the species composition. The site, at this point, will also be characterized by increases in ring muhly, threeawns, rabbitbrush, and possibly pinyon and juniper. Production in these instances may be cut substantially.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity----------Index Ac/AUM
100 - 76----------3.5 - 4.6
75 – 51----------4.4 - 6.6
50 – 26----------6.4 - 11.0
25 – 0----------11.0 +

Other references

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

1. Cluff, G.J., B.A. Roundy, R.A. Evans, and J.A. Young. 1983. Herbicidal control of greasewood (Sarcobatus vermiculatus) and salt rabbitbrush (Chrysothamnus nauseosus ssp. consimilis). Weed Science. 31: 275-279.

2. McKell, C. M., and W. W. Chilcote. 1957. Response of Rabbitbrush following removal of competing vegetation. Journal of Range Management. 10: 228-230

3. Whisenant, S.G. 1988. Control of threadleaf rubber rabbitbrush with herbicides. Journal of Range Management. 41: 470-472

4. Whitson, T.D. (ed.). 1999. Weeds of the West. The Western Society of Weed Science, Wyoming. pp 103

5. Wright, H. A. 1972. Shrub response to fire. In: Fire Effects Information System, [Online].

U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/[2004].

6. Young, R. P. 1983. Fire as a vegetation management tool in rangelands of the Intermountain Region. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/[2004].

Contributors

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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	03/13/2026
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:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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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:**
