USDA Natural Resources
Conservation Service

Ecological site R038XB109NM
Malpais

Accessed: 05/13/2025

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.

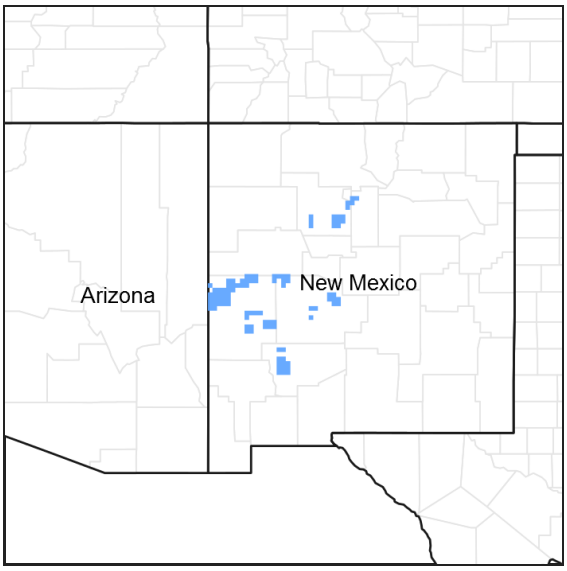


Figure 1. Mapped extent

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

Physiographic features

Topography of this site is nearly level to moderately sloping, with slopes ranging to 15 percent. The terrain may frequently be interrupted by basalt outcrops, rocks, or boulders. It occurs as lava flows, usually across broad areas and over uniform slopes. Low hills, narrow breaks, or knobs may however, break this uniformity in slopes, as may dissecting arroyos, and potholes. Elevation range from about 5,000 to 7,500 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Lava flow (2) Lava plain
Elevation	1,524–2,286 m
Slope	15%

Aspect	Aspect is not a significant factor

Climatic features

Average annual precipitation varies from about 12 inches to just over 16 inches. Substantial fluctuations from year to year are common, ranging from a low of about 6 inches to a high of over 30 inches. Approximately one-half of the annual precipitation comes in the form of rainfall during the months of July, August, and September, although wintertime precipitation in the form of snow, sleet, or rain is sometimes significant. Spring and late fall months are normally dry.

The average frost-free period ranges from about 165 to 190 days and extends from approximately the third or fourth week in April to mid October. Average annual air temperatures are about 56 degrees F. Summer maximums can exceed 100 degrees F and winter minimums on occasion go below zero. Monthly mean temperatures generally exceed 70 degrees F for the period of June through August.

Growing conditions favor warm-season vegetation, although late winter and late summer precipitation is adequate to foster a significant cool-season component in the potential plant community. Occasional wet springs also create good conditions for annual forb production, but frequent winds from the west and southwest are common during this time of year and tend to deplete soil moisture at a critical time for the growth of these plants.

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)	148 days
Freeze-free period (average)	174 days
Precipitation total (average)	406 mm

Influencing water features

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

Soil features

Surface textures vary from fine sandy loams, loams, clay loams and silty clay loams. Rock fragments range from 0 to 35 percent. The soils are very shallow to shallow over basalt and may be calcareous in the surface or subsoils. Subsoils are moderately fine and fine textured. Water permeability is moderate to slow. Depending on depth, available water-holding capacity is very low to low.

Table 4. Representative soil features

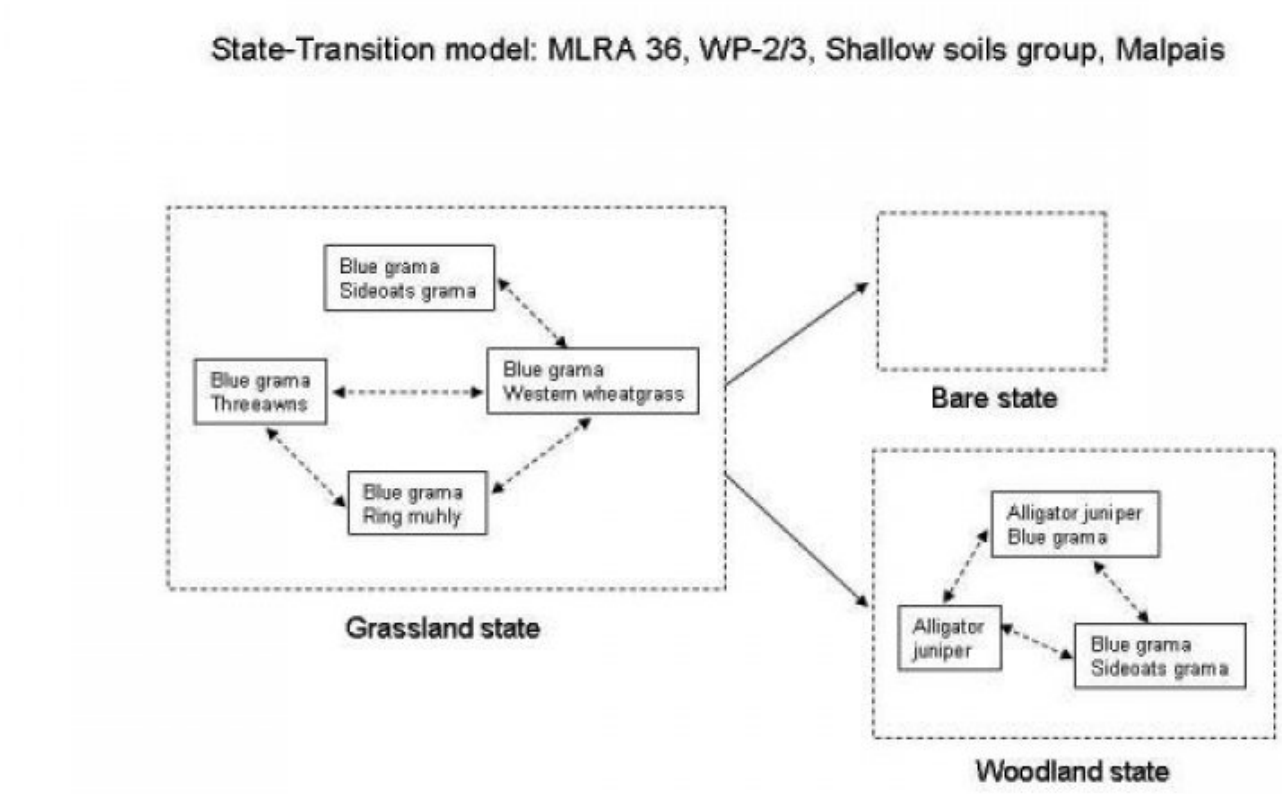
Surface texture	(1) Stony fine sandy loam (2) Cobbly loam (3) Gravelly clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	36–89 cm
Surface fragment cover <=3"	15–35%
Surface fragment cover >3"	15–35%

Available water capacity (0-101.6cm)	0–15.24 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	15–35%
Subsurface fragment volume >3" (Depth not specified)	35–60%

Ecological dynamics

Continuous yearlong grazing may, however, result in a decline or disappearance of cool-season grasses and preferred browse plants. If grazing use is heavy or prolonged, such plants as sideoats grama, little bluestem, spike muhly, and black grama will also decrease. Ordinarily, as retrogression continues, blue grama, tobosa or galleta, curly mesquite, threeawns, and broom snakeweed begin to dominate. Eventually, even blue grama may decline. The site is not highly erodible, and recovery can be affected through good grazing management at a reasonably rapid rate.

State and transition model



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

Perennial grasses dominate this site, characterized by such species as blue grama, sideoats grama, little bluestem, western wheatgrass, spike muhly, and species of Hesperostipa. Shrubs and half-shrubs may include shrub live oak, skunkbush sumac, and winterfat. Wright buckwheat may be the most common native forb.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	381	684	986
Forb	48	86	123
Total	**429**	**770**	**1109**

Table 6. Ground cover

Tree foliar cover	7%
Shrub/vine/liana foliar cover	7%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	14%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	8%

Figure 5. Plant community growth curve (percent production by month). NM0609, R038XB109NM Malpais HCPC. R038XB109NM Malpais HCPC.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	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				171–214	
	blue grama	BOGR2	*Bouteloua gracilis*	171–214	–
2				85–128	
	sideoats grama	BOCU	*Bouteloua curtipendula*	85–128	–
3				85–128	
	spike muhly	MUWR	*Muhlenbergia wrightii*	85–128	–
	western wheatgrass	PASM	*Pascopyrum smithii*	85–128	–
	alkali sacaton	SPAI	*Sporobolus airoides*	85–128	–
4				9–43	

4				9–43	
	black grama	BOER4	*Bouteloua eriopoda*	9–43	–
5				43–128	
	needle and thread	HECO26	*Hesperostipa comata*	43–128	–
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	43–128	–
6				9–43	
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	9–43	–
	little bluestem	SCSC	*Schizachyrium scoparium*	9–43	–
7				9–43	
	James' galleta	PLJA	*Pleuraphis jamesii*	9–43	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	9–43	–
8				26–43	
	curly-mesquite	HIBE	*Hilaria belangeri*	26–43	–
	dropseed	SPORO	*Sporobolus*	26–43	–
9				9–26	
	threeawn	ARIST	*Aristida*	9–26	–
10				9–26	
	squirreltail	ELEL5	*Elymus elymoides*	9–26	–
11				9–26	
	common wolfstail	LYPH	*Lycurus phleoides*	9–26	–
Forb					
12				9–43	
	annual buckwheat	ERAN4	*Eriogonum annuum*	9–43	–
	bastardsage	ERWR	*Eriogonum wrightii*	9–43	–
13				9–43	
	Forb, perennial	2FP	*Forb, perennial*	9–43	–
14				9–26	
	Forb, perennial	2FP	*Forb, perennial*	9–26	–
	Forb, perennial	2FP	*Forb, perennial*	9–26	–
Shrub/Vine					
15				9–26	
	oak	QUERC	*Quercus*	9–26	–
17				9–26	
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	9–26	–
	Apache plume	FAPA	*Fallugia paradoxa*	9–26	–
18				26–68	
	winterfat	KRLA2	*Krascheninnikovia lanata*	26–68	–
19				9–26	
	skunkbush sumac	RHTR	*Rhus trilobata*	9–26	–
20				0–9	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–9	–
Tree					
16				9–52	

	juniper	JUNIP	*Juniperus*	9–52	–
	twoneedle pinyon	PIED	*Pinus edulis*	9–52	–

Animal community

Habitat for Wildlife:
This site provides habitat which can support a resident animal community characterized by mule deer, rock squirrel, brush mouse, Stephen's woodrat, gray fox, bobcat, scaled quail, ladderbacked woodpecker, scrub jay, common bushtit, rock wren, brown towhee, rufous-crowned sparrow, chipping sparrow, ash-throated flycatcher, short-horned lizard, collared lizard, Eastern fence lizard, tree lizard, red-spotted toad, and black-tailed rattlesnake.

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
Apache----------D
Cabezon----------D
Flaco----------C
Modyon----------C
Prieta----------D
Rudd----------D
Thunderbird----------D
Viuda----------D

Recreational uses

This site offers recreation potential for hiking, picnicking, camping, nature observation and photography, bird watching, and hunting for mule deer, mourning dove, and quail. When favorable growing-season moisture conditions occur, a colorful display of wildflowers may be seen.

Wood products

This site has little or no significant value for wood products.

Other products

Grazing:
This site is suitable for grazing in all seasons of the year. It is best adapted for cattle and horses, but can also be utilized by sheep and goats. Continuous yearlong grazing may, however, result in a decline or disappearance of cool-season grasses and preferred browse plants. If grazing use is heavy or prolonged, such plants as sideoats grama, little bluestem, spike muhly, and black grama will also decrease. Ordinarily, as retrogression continues, blue grama, tobosa or galleta, curly mesquite, threeawns, and broom snakeweed begin to dominate. Eventually, even blue grama may decline. The site is not highly erodible, and recovery can be affected through good grazing management at a reasonably rapid rate.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index----------Ac/AUM
100 - 76----------3.0 – 4.2
75 – 51----------4.0 – 6.5
50 – 26----------6.0 – 10.0
25 – 0----------10.0+

Type locality

Location 1: Catron County, NM
Location 2: McKinley County, NM
Location 3: Valencia County, NM

Other references

Data collection for this site was done in conjunction with the progressive soil surveys within the New Mexico and Arizona Plateaus and Mesas 36 Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: McKinley, Cibola, Sandoval.

Characteristic Soils Are:
Apache, Prieta, Berto

Other Soils included are:
Cabezon, Flaco, Modyon, Rudd, Thunderbird, Viuda

Contributors

Don Sylvester
Elizabeth Wright
John Tunberg

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:**