

Ecological site R038XB103NM 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.

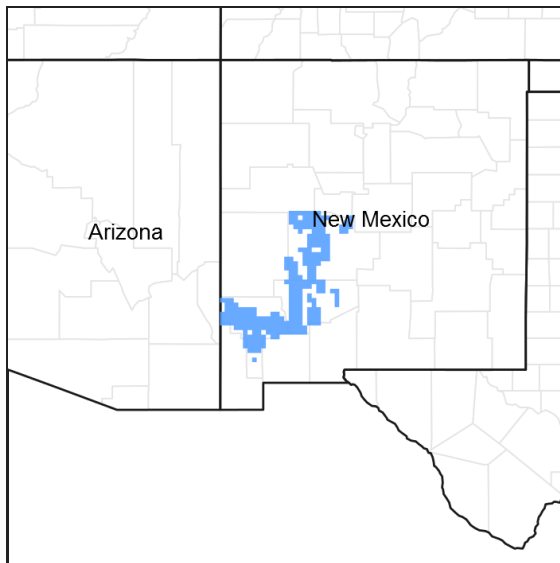


Figure 1. Mapped extent

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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is characterized by rolling to steep hills and mountain footslopes. Slopes range from a low of 15 percent to an extreme high of 75 percent, and exposure or direction of slope is variable. Elevation range from about 5,000 to 7,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Hill
Elevation	1,524–2,134 m
Slope	15–75%
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 perennial 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)	187 days
Freeze-free period (average)	211 days
Precipitation total (average)	406 mm

Influencing water features

Soil features

Soils characterizing this site are typically shallow, stony and/or cobbly with loams, clay loams, and sandy loams over bedrock. Included are occasional areas or pockets of deeper soils that are stony. They have water intake rates that are moderate and permeability that is moderately slow to moderately rapid. They occur on slopes of 15 percent or more.

Table 4. Representative soil features

Surface texture	(1) Stony loam (2) Gravelly (3) Cobbly
Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Very slow to moderately rapid
Soil depth	10–183 cm
Surface fragment cover ≤3"	15–60%
Surface fragment cover >3"	15–60%
Available water capacity (0-101.6cm)	2.54–7.62 cm
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	5.6–8.4

Subsurface fragment volume <=3" (Depth not specified)	3–57%
Subsurface fragment volume >3" (Depth not specified)	0–35%

Ecological dynamics

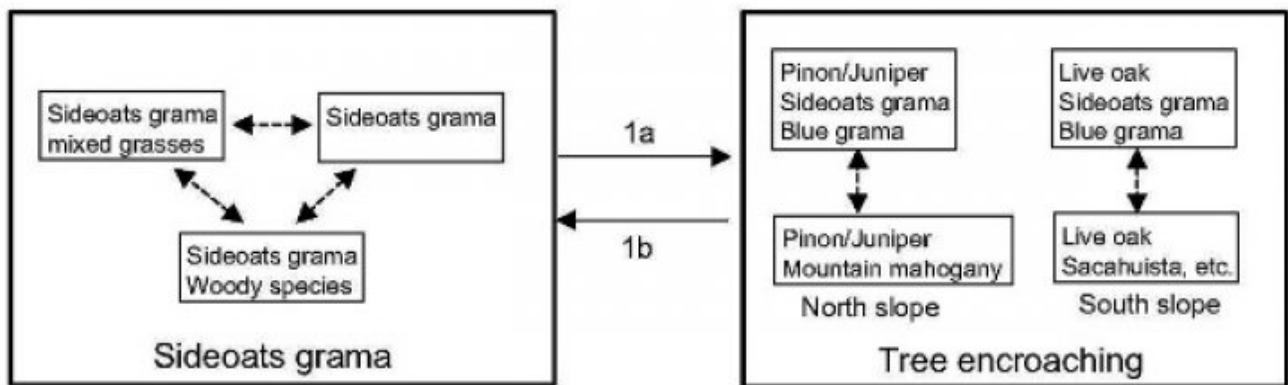
Overview

The hills site often intergrades with breaks sites and may border loamy sites. The historic plant community type is dominated by sideoats grama (*Bouteloua curtipendula*). Other grasses, including blue grama (*Bouteloua gracilis*) and black grama (*Bouteloua eriopoda*) may be subordinates depending upon aspect and hillslope position. Shrubs and trees, including one-seed juniper (*Juniperus monosperma*) and shrub oak (*Quercus* spp.) are more common on north-facing slopes. It unclear why trees such as juniper and piñon pine (*Pinus edulis*) become dominant at the expense of grasses in some cases. Regional increases in the relative amount of winter rainfall, decreases in fire frequency, or grazing may facilitate woody plant establishment, and subsequent erosion or competition may inhibit the recolonization of grasses.

No systematic studies of communities, states or transitions have been performed in the hills site.

State and transition model

State-Transition model: MLRA 36, WP-3, Low soil-depth group: Hills



State 1

Historic Climax Plant Community

Community 1.1

Historic Climax Plant Community

State Containing the Historic Climax Plant Community Sideoats grama: The expression of the historic community type depends upon aspect, slope position, and location within the subresource area. On south-facing slopes, black grama is more common as a co-dominant with sideoats grama. Black grama is also more common on the east side of WP-3 near the border with SD-2. On north-facing slopes or steep slopes where seeds are trapped and water infiltration and retention is increased by rock cover, sideoats grama is highly dominant and little bluestem

(*Schizachyrium scoparium*), blue grama and hairy grama (*Bouteloua hirsuta*) are subordinates. Tobosa (*Pleuraphis mutica*) tends to occur at hill bases where run-on water is received. Woody plants and succulents, including sacahuista (*Nolina* spp.), one-seed juniper, alligator juniper (*Juniperus deppeana*), and mountain mahogany (*Cercocarpus montanus*) are present and may be more common on north-facing slopes and hilltops. Variation in plant community composition may occur in response to drought (e.g. reduction in woody plants) or grazing. Diagnosis: Sideoats grama is dominant in most patches and perennial grass cover between trees and shrubs is more or less continuous. Evidence of erosion is infrequent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	452	736	1020
Forb	52	84	117
Total	504	820	1137

Table 6. Ground cover

Tree foliar cover	8%
Shrub/vine/liana foliar cover	7%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	18%
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). NM0603, R038XB103NM Hills HCPC. R038XB103NM Hills HCPC Mixture of plant communities dictated by exposure with north facing slopes have more trees and shrubs and south facing slopes are more grassland..

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

Transition to tree-encoaching state

Community 2.1

Transition to tree-encoaching state

Additional States: Transition to tree-encoaching state (1a): It is unclear why woody plants become dominant, although it is likely that the subsequent decline in grasses is due to competition for water and nutrients and from erosional soil loss between woody plants. The formation of bare ground patches due to grazing, decreases in fire frequency, and increases in winter precipitation may be responsible either independently or in concert. The presence of grassland stands that are unburned and in which piñon and juniper have not invaded suggests that fire is not the sole limitation of tree encroachment. Key indicators of approach to transition: Increases in bare ground, decreases in litter cover and grass cover, increased frequency of tree seedlings (threshold may have been crossed), decreased fire frequency. Tree-encoaching: In this state, grass cover is reduced, shrubs and trees are dominant, and bare ground cover is high. Erosion rates may be relatively high. Grazing or summer drought may

reduce grass cover within this state, but it can recover to subdominant status. On north-facing slopes, piñon and juniper tend to become dominants in this state, whereas south-facing slopes may be dominated by live oak and sacahuista. Mountain mahogany is an important subordinate on hilltops and north-facing slopes in this state. Blue grama is often the dominant grass. Diagnosis: Oak, juniper, or piñon are common and bare patches are associated with trees and shrub clumps but also exist in interspaces where erosion has occurred. Bare ground may be interconnected such that runoff is not intercepted by grasses.

State 3

Transition to sideoats state

Community 3.1

Transition to sideoats state

Transition to sideoats state (1b): Tree and shrub removal may release grasses from competition. Deferment of grazing may be used to allow grasses to recover and subsequent increases in fire frequency may be used to inhibit tree germination. Information sources and theoretical background: Communities, states, and transitions are based upon information in the ecological site description and observations by Gene Adkins, NRCS.

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				158–211	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	158–211	–
2				105–158	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	105–158	–
3				10–31	
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	10–31	–
4				53–105	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	53–105	–
5				53–105	
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	53–105	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	53–105	–
	green sprangletop	LEDU	<i>Leptochloa dubia</i>	53–105	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	53–105	–
6				53–105	
	bullgrass	MUEM	<i>Muhlenbergia emersleyi</i>	53–105	–
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	53–105	–
	spike muhly	MUWR	<i>Muhlenbergia wrightii</i>	53–105	–
7				10–31	
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–31	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	10–31	–
8				10–31	
	threeawn	ARIST	<i>Aristida</i>	10–31	–
9				53–105	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	53–105	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	53–105	–

	teatnergrass				
10				31–53	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	31–53	–
Forb					
11				31–53	
	buckwheat	ERIOG	<i>Eriogonum</i>	31–53	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	31–53	–
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus var. flaccidus</i>	31–53	–
12				10–33	
	Forb, annual	2FA	<i>Forb, annual</i>	10–33	–
	Forb, annual	2FA	<i>Forb, annual</i>	10–33	–
13				10–53	
	Forb, perennial	2FP	<i>Forb, perennial</i>	10–53	–
Shrub/Vine					
14				31–84	
	sacahuista	NOMI	<i>Nolina microcarpa</i>	31–84	–
	oak	QUERC	<i>Quercus</i>	31–84	–
15				53–84	
	hairy mountain mahogany	CEMOP	<i>Cercocarpus montanus var. paucidentatus</i>	53–84	–
	Wright's milkpea	GAWR	<i>Galactia wrightii</i>	53–84	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	53–84	–
16				10–53	
	featherplume	DAFO	<i>Dalea formosa</i>	10–53	–
	rubber rabbitbrush	ERNAN5	<i>Ericameria nauseosa ssp. nauseosa var. nauseosa</i>	10–53	–
	Apache plume	FAPA	<i>Fallugia paradoxa</i>	10–53	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	10–53	–
18				10–31	
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	10–31	–
Tree					
17				53–84	
	juniper	JUNIP	<i>Juniperus</i>	53–84	–

Animal community

Habitat for Wildlife:

This site provides habitat which can support a resident animal community characterized by mule deer, desert cottontail, rock squirrel, rock pocket mouse, brush mouse, white-throated woodrat, gray fox, bobcat, scrub jay, red-shafted flicker, cliff swallow, Bewick's wren, blue-grey gnatcatcher, rufous-crowned sparrow, scaled quail, mourning dove, red-spotted toad, collared lizard, tree lizard, short-horned lizard, alligator lizard, rock rattlesnake, black-tailed rattlesnake, and mountain patchnosed snake.

Where rock ledges and cliffs are present, prairie falcon, great horned owl, and golden eagle hunt over the site. Where the site is adjacent to ponderosa pine or mixed conifer areas, elk may range into this site to feed.

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

Abrazo-----D

Cascajo-----A

Chiricahua-----D

Encierro-----D

Gaddes-----C

Lithic Ustorthents-----D

Luzena-----D

Muzzler-----D

Oro Grande-----D

Puertecito-----D

Santa Fe-----D

Santana-----D

Recreational uses

This site offers recreation potential for hiking, rock climbing, horseback riding, nature observation, photography, bird watching, and hunting for mule deer, quail and mourning dove.

During certain seasons, when favorable soil moisture conditions exist, the site displays a colorful array of wildflowers.

Wood products

This site has a limited potential for firewood and fence-post production where sufficient juniper is present and where steepness of slope does not make harvesting prohibitive.

Other products

Grazing:

This site is suitable for grazing in all seasons of the year, although most of the forage is produced during the summer months. It is adapted for cattle, sheep, goats, and horses, generally without regard to class of animal or season of use. Continuous yearlong grazing may, however, result in a decline or disappearance of cool-season grasses and preferred browse plants, especially if grazing use is prolonged and heavy. Because of the presence of significant amounts of both woody and herbaceous plants, the site is particularly suited to grazing by more than one species of animal (such as goats and cattle, sheep and cattle, and/or wildlife) to maintain a healthy balance of woody and herbaceous plants. Serious deterioration in the plant community may be characterized by heavy stands of juniper and oak brush, and the site is rarely suited to mechanical brush control or seeding.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM

100 - 76-----3.4 – 4.6

75 – 51-----4.3 – 6.8

50 – 26-----6.5 – 11.5

25 – 0-----11.5+

Type locality

Location 1: Grant County, NM

Location 2: Catron County, NM

Location 3: Hidalgo County, NM
Location 4: Sierra County, NM
Location 5: Socorro 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: Socorro, Sierra, Grant, Catron.

Characteristic Soils Are:
Luzena

Other Soils included are:
Abrazo, Cascajo, Chiricahua, Daze, Encierro Gaddes, Lithic Ustorthents, Luzena, Muzzler Oro Grande, Puertecito, Santa Fe, Santana Sedillo

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	
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:**
