

Ecological site R042BE060NM

Mesa Breaks, Cool Desert Grassland

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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 occurs on mesa side slopes and along low hills, benches, and breaks dissected by narrow draws. It is characterized by a complex of soil types and miscellaneous land types including rock outcrop, badland, and riverwash. Due to exposure and soils, some areas are potentially very productive, while other areas are not. Slopes range from 10 to 65 percent; exposures are variable.

Table 2. Representative physiographic features

Landforms	(1) Escarpment (2) Scarp slope
Flooding frequency	None
Ponding frequency	None
Elevation	1,372–1,676 m
Slope	10–65%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

This site has an arid climate with distinct seasonal temperature variations and large annual and diurnal temperature changes characteristic of a continental climate.

Precipitation averages 8 to 10 inches annually. Deviations of 4 inches or more from the average are quite common. Fifty percent of the precipitation is received from July to November, which is the predominant growing season of native plants. Summer precipitation is characterized by high-intensity, short-duration rainstorms. Winter precipitation averages less than one half inch per month, usually in the form of rain. There are occasional snowstorms of short duration.

Temperatures vary from a mean monthly average of 77 F in July to 34 F in January, with a maximum of 104 F and a minimum of -10 F. The average last killing frost in spring is April 15, and the average first killing frost in fall is

October 28. Frost-free season averages 185 days. Temperatures are conducive to native grass and forb growth from March through November.

Spring winds of 15 to 40 miles per hour are common from February to June. These winds increase transpiration rates of native plants and rapidly dry the surface soil. Small soil particles are often displaced by the wind near the soil surface, often resulting in structural damage to native plants, especially young seedlings.

Climate data was obtained from <http://www.wrcc.sage.dri.edu/summary/climsmnm.html> 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)	165 days
Freeze-free period (average)	213 days
Precipitation total (average)	254 mm

Influencing water features

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

Soil features

Soils are shallow to deep. Surface textures are very cobbly loam, gravelly sandy loam, cobbly sandy loam, cobbly clay loam or gravelly fine sandy loam. Subsoil textures are very cobbly loam, very gravelly sandy loam, very cobbly sandy loam, cobbly clay loam, very gravelly loam or very gravelly fine sandy loam. Substratum textures are very cobbly loam, very gravelly sandy loam, extremely cobbly sandy loam, cobbly clay loam, very gravelly loam or very gravelly fine sandy loam

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

Characteristic soils:

Akela

Nickel

Lithic Torriorthents

Torriorthents

Torriorthids

(note: the Nickel soil will not be used after an update to the survey).

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Very gravelly fine sandy loam (3) Extremely cobbly loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to slow
Soil depth	10–183 cm
Surface fragment cover ≤3"	15–35%
Surface fragment cover >3"	1–5%
Available water capacity (0-101.6cm)	2.54–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	2–15%

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)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	25–60%
Subsurface fragment volume >3" (Depth not specified)	1–10%

Ecological dynamics

The climax vegetation on this site is diverse due to a wide range in edaphic and physiographic features. Typically the potential plant community is a shrub-grassland complex; scattered trees occur on north and east exposures.

Other grasses that could appear on this site include: plains lovegrass, sandhill muhly, threeawn spp., bottlebrush squirreltail, cane bluestem, and vine mesquite.

State and transition model

Ecosystem states

1. Historic Climax Plant Community

State 1 submodel, plant communities

1.1. Historic Climax Plant Community

State 1

Historic Climax Plant Community

Community 1.1

Historic Climax Plant Community

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Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	168	315	463
Shrub/Vine	34	63	93
Forb	22	43	62
Total	224	421	618

Figure 5. Plant community growth curve (percent production by month).
 NM2400, R042XA060NM-Mesa Breaks-Warm Season-HCPC. SD-1 HCPC
 Warm Season Plant Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

Figure 6. Plant community growth curve (percent production by month).
 NM2401, R042XA060NM-Mesa Breaks-Cool Season-HCPC. SD-1 HCPC Cool
 Season Plant Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	15	20	20	2	5	10	15	13	0	0

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Warm Season			63–105	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	63–105	–
2	Warm Season			21–63	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	21–63	–
3	Warm Season			21–63	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	21–63	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	21–63	–
4	Warm Season			12–21	
	New Mexico muhly	MUPA2	<i>Muhlenbergia pauciflora</i>	12–21	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	12–21	–
	curlyleaf muhly	MUSE	<i>Muhlenbergia setifolia</i>	12–21	–
5	Cool Season			12–21	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	12–21	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	12–21	–
6	Warm Season			43–63	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	43–63	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	43–63	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	43–63	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	43–63	–
	gyp dropseed	SPNE	<i>Sporobolus nealleyi</i>	43–63	–
	tridens	TRIDE	<i>Tridens</i>	43–63	–
Shrub/Vine					

7	Shrub			12-29	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	12-29	-
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	12-29	-
	Sonoran scrub oak	QUTU2	<i>Quercus turbinella</i>	12-29	-
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	12-29	-
8	Shrub			12-21	
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	12-21	-
	prairie clover	DALEA	<i>Dalea</i>	12-21	-
	mormon tea	EPVI	<i>Ephedra viridis</i>	12-21	-
	mariola	PAIN2	<i>Parthenium incanum</i>	12-21	-
9	Shrub			12-21	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	12-21	-
	sacahuista	NOMI	<i>Nolina microcarpa</i>	12-21	-
	pricklypear	OPUNT	<i>Opuntia</i>	12-21	-
	yucca	YUCCA	<i>Yucca</i>	12-21	-
Forb					
10	Forb			21-63	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	21-63	-
	desert marigold	BAMU	<i>Baileya multiradiata</i>	21-63	-
	buckwheat	ERIOG	<i>Eriogonum</i>	21-63	-
	bladderpod	LESQU	<i>Lesquerella</i>	21-63	-
	pricklyleaf dogweed	THAC	<i>Thymophylla acerosa</i>	21-63	-
	woody crinklemat	TICAC	<i>Tiquilia canescens var. canescens</i>	21-63	-
	hairy crinklemat	TIHI	<i>Tiquilia hispidissima</i>	21-63	-

Animal community

This site provides habitats which support a resident animal community that is characterized by mule deer, coyote, desert cottontail, Texas antelope squirrel, Botta's pocket gopher, brown towhee, scaled quail, roadrunner, cactus wren, collared lizard, and western ribbon snake.

This site provides nesting opportunities for mockingbird, western kingbird, and Swainson's hawk.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series Hydrologic Group
Nickel D
Akela B
Orthents B

Recreational uses

This site is well suited to hunting, hiking, horseback riding, nature observation, and photography. The natural beauty of this site is a result of the diversity in vegetation, landscapes, and soil colors.

Wood products

Wood products, including fuelwood, fence posts, and landscape trees are produced on areas within the site. These are not, however, produced in significant amounts.

Other products

Approximately 85 percent of the vegetative production on this site is suitable as forage for domestic livestock and wildlife. Grazing distribution may be a problem; more level areas on the site receive more grazing pressure than the steeper areas. Construction of livestock waterings, saltings, cross fencing, and trails may improve livestock distribution.

Inadequate management of the site leads to repetitive grazing of the most desirable plant species and reduces the vigor and productivity of these plants. The result is a deterioration in the potential plant community indicated by a decrease in black grama, blue grama, sideoats grama, bush muhly, New Mexico muhly, plains lovegrass, New Mexico feathergrass, and fourwing saltbush. Plant species that increase include galleta, hairy grama, tridens, ring muhly, dropseeds, mariola, cactus, pinyon, and juniper. A planned grazing system with periodic deferment is best to maintain the desirable balance between plant species and to maintain the natural productivity and plant vigor.

In addition to domestic livestock, this site is used by deer, pronghorn, small mammals, and birds.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index-----Ac/AUM

100 - 76-----5.7 – 7.6

75 – 51-----7.0 – 11.4

50 – 26-----10.8 – 22.9

25 – 0-----22.9+

Other references

Other References:

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Area 42, of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: Valencia and Bernalillo.

Characteristic Soils Are:

Orthids – Rock outcrop

Akela

Nickel

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:**
-