

Ecological site DX035X03A123

Limestone Hills

Accessed: 05/17/2024

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.

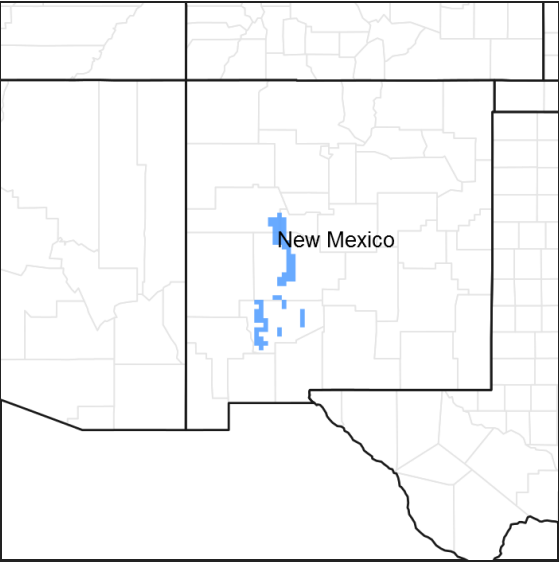


Figure 1. Mapped extent

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       | (1) <i>Juniperus</i>   |
| Shrub      | (1) <i>Krascheninnikovia</i><br>(2) <i>Quercus gambelii</i>          |
| Herbaceous | (1) <i>Hesperostipa neomexicana</i><br>(2) <i>Bouteloua eriopoda</i> |

Legacy ID

R035XG123NM

Physiographic features

This site is characterized by rolling to steep hills and mountain foot slopes. Slopes average 25 percent or more but range from 15 to 75 percent. Exposure or direction of slope is variable. Limestone outcrops, exposed ledges and occasional boulders are not unusual. Elevations range from about 5,000 to 7,800 feet.

Table 2. Representative physiographic features

|                    |  |
|--------------------|--|
| Landforms          | (1) Hill<br>(2) Cuesta<br>(3) Mountain slope |
| Flooding frequency | None   |
| Ponding frequency  | None   |
| Elevation          | 1,372–2,438 m                                |
| Slope              | 15–75%                                       |
| 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 6 inches to 30 inches are not uncommon. 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 frequently dry.

The average frost-free period ranges from about 100 to 175 days and in some areas, extends from approximately mid-April to early or mid-October. 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. Although, spring and fall precipitation is not always adequate for optimum cool-season plant growth. 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

Soils characterizing this site are typically shallow over limestone, although pockets of deeper soils also exist. There may be loams, clay loams, or sandy loams, and are frequently stony, gravelly, or cobbly. Permeability is moderate to moderately rapid, but the available water capacity may be low due to the shallow nature of the soil. Characteristic soils are:

Deama very gravelly loam, stony loam, 15 percent + slopes

Deama stony, very fine sandy loam

**Table 4. Representative soil features**

|                      |   |
|----------------------|---|
| Surface texture      | (1) Gravelly loam<br>(2) Stony clay loam<br>(3) Cobbly sandy loam |
| Family particle size | (1) Loamy   |

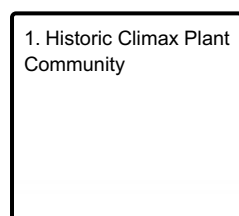
|  |  |
|--|--|
| Drainage class   | Well drained to somewhat excessively drained |
| Permeability class                                       | Moderate to moderately rapid                 |
| Soil depth   | 13–51 cm                                     |
| Surface fragment cover <=3"                              | 10–20%                                       |
| Surface fragment cover >3"                               | 5–10%  |
| Available water capacity<br>(0-101.6cm)                  | 2.54 cm                                      |
| Calcium carbonate equivalent<br>(0-101.6cm)              | 5–40%  |
| Electrical conductivity<br>(0-101.6cm)                   | 0–8 mmhos/cm                                 |
| Soil reaction (1:1 water)<br>(0-101.6cm)                 | 7.4–9  |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 16–38%                                       |
| Subsurface fragment volume >3"<br>(Depth not specified)  | 1–3%   |

## Ecological dynamics

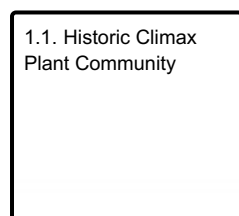
Deterioration of the potential plant community due to inadequately managed grazing is usually characterized by a decline in New Mexico feathergrass, black grama, sideoats grama, mountain mahogany, little bluestem, and winterfat. As these plants decline, they are replaced by juniper, oakbrush, broom snakeweed, and lesser value grasses such as galleta and threeawns. Because mechanical seeding and brush control are rarely justifiable on this site, the mixed use of both browsing and grazing kinds of livestock is often the best means of maintaining a healthy balance between woody and herbaceous vegetation.

## State and transition model

### Ecosystem states



### State 1 submodel, plant communities



## State 1 Historic Climax Plant Community

### Community 1.1 Historic Climax Plant Community

Plant Community Narrative: The potential plant community of this site has a mixed grassland, shrub, half-shrub aspect with only occasional tree-type junipers or pinyon pines present. Mid- and short-grasses dominate, with shrubs and half-shrubs following. Forbs are a minor component, but a variety does occur, and they are evenly

distributed over the site. Cool-season grasses and shrubs are more prevalent on north- and east- facing slopes, while warm-season short-grasses and half-shrubs prevail on south- and west-facing slopes. This potential plant community is relatively high producing and affords good forage and browse for both livestock and wildlife. At higher elevations (usually above 6500 feet), black grama is not often found in amounts exceeding 10 percent even in the potential plant community. In these instances, the mountain or curlyleaf muhly and western wheatgrass grouping may occur in amounts up to 20 percent, New Mexico feathergrass may go as high as 35 percent and blue grama may reach 15 percent.

Table 5. Annual production by plant type

| Plant Type      | Low<br>(Kg/Hectare) | Representative Value<br>(Kg/Hectare) | High<br>(Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 297                 | 504                                  | 717                  |
| Forb            | 28                  | 50                                   | 73                   |
| Shrub/Vine      | 11                  | 28                                   | 67                   |
| Tree            | 11                  | 28                                   | 67                   |
| <b>Total</b>    | <b>347</b>          | <b>610</b>                           | <b>924</b>           |

Table 6. Ground cover

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

Figure 5. Plant community growth curve (percent production by month). NM0314, R035XG123NM-Limestone Hills-HCPC. WP-2 Mixed warm / cool season grassland w/ shrubs and half-shrubs and forb components..

| 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 (%) |
|------------------------|-------------------------|--------|---------------------------------|--------------------------------|------------------|
| <b>Grass/Grasslike</b> |                         |        |                                 |                                |                  |
| 1                      |                         |        |                                 | 135–235                        |                  |
|                        | New Mexico feathergrass | HENE5  | <i>Hesperostipa neomexicana</i> | 135–235                        | –                |
| 2                      |                         |        |                                 | 22–135                         |                  |
|                        | black grama             | BOER4  | <i>Bouteloua eriopoda</i>       | 22–135                         | –                |
| 3                      |                         |        |                                 | 34–67                          |                  |
|                        | blue grama              | BOGR2  | <i>Bouteloua gracilis</i>       | 34–67                          | –                |
| 4                      |                         |        |                                 | 34–101                         |                  |
|                        | sideoats grama          | BOCU   | <i>Bouteloua curtipendula</i>   | 34–101                         | –                |
|                        | little bluestem         | SCSC   | <i>Schizachyrium scoparium</i>  | 34–101                         | –                |
| 5                      |                         |        |                                 | 34–101                         |                  |
|                        | prairie Junegrass       | KOMA   | <i>Koeleria macrantha</i>       | 34–101                         | –                |
|                        | common wolfstail        | LYPH   | <i>Lycurus phleoides</i>        | 34–101                         | –                |
|                        | mountain muhly          | MUMO   | <i>Muhlenbergia montana</i>     | 34–101                         | –                |
|                        | curlyleaf muhly         | MUSE   | <i>Muhlenbergia setifolia</i>   | 34–101                         | –                |
|                        | spike muhly             | MUWR   | <i>Muhlenbergia wrightii</i>    | 34–101                         | –                |
|                        | western wheatgrass      | PASM   | <i>Pascopyrum smithii</i>       | 34–101                         | –                |
|                        | pinyon ricegrass        | PIFI   | <i>Piptochaetium fimbriatum</i> | 34–101                         | –                |
| 6                      |                         |        |                                 | 7–34                           |                  |
|                        | threeawn                | ARIST  | <i>Aristida</i>                 | 7–34                           | –                |
|                        | James' galleta          | PLJA   | <i>Pleuraphis jamesii</i>       | 7–34                           | –                |
|                        | slim tridens            | TRMU   | <i>Tridens muticus</i>          | 7–34                           | –                |
| <b>Tree</b>            |                         |        |                                 |                                |                  |
| 8                      |                         |        |                                 | 20–54                          |                  |
|                        | juniper                 | JUNIP  | <i>Juniperus</i>                | 20–54                          | –                |
| 12                     |                         |        |                                 | 7–20                           |                  |
|                        | twoneedle pinyon        | PIED   | <i>Pinus edulis</i>             | 7–20                           | –                |
| <b>Shrub/Vine</b>      |                         |        |                                 |                                |                  |
| 9                      |                         |        |                                 | 20–54                          |                  |
|                        | winterfat               | KRLA2  | <i>Krascheninnikovia lanata</i> | 20–54                          | –                |
| 10                     |                         |        |                                 | 7–34                           |                  |
|                        | Fendler's ceanothus     | CEFE   | <i>Ceanothus fendleri</i>       | 7–34                           | –                |
|                        | mountain mahogany       | CERCO  | <i>Cercocarpus</i>              | 7–34                           | –                |
|                        | oak                     | QUERC  | <i>Quercus</i>                  | 7–34                           | –                |
|                        | skunkbush sumac         | RHTR   | <i>Rhus trilobata</i>           | 7–34                           | –                |
| <b>Forb</b>            |                         |        |                                 |                                |                  |
| 14                     |                         |        |                                 | 20–54                          |                  |
|                        | Forb, perennial         | 2FP    | <i>Forb, perennial</i>          | 20–54                          | –                |
| 15                     |                         |        |                                 | 7–34                           |                  |
|                        | Forb, annual            | 2FA    | <i>Forb, annual</i>             | 7–34                           | –                |

## Animal community

This range site provides habitats which support a resident animal community that is characterized by mule deer, gray fox, bobcat, desert cottontail, rock squirrel, white-throated woodrat, brush mouse, ferruginous hawk, harlequin quail, red-shafted flicker, scrub jay, common raven, bridled titmouse, common bushtit, rufous-sided towhee, chipping sparrow, red-spotted toad, collared lizard, desert short-horned lizard, mountain patch-nose snake, and black-tailed rattlesnake.

Where cliffs and ledges are found associated with the site, golden eagle, great horned owl, prairie falcon, white-throated swift, and cliff swallow nest or hunt over the site. Mourning dove and black-throated sparrow nest on the site. Where it occurs adjacent to ponderosa pine forests, elk may range in to feed. In high mass-production years, Merriam's turkey and band-tailed pigeon feed and western bluebird winters. Mountain lions occasionally hunt on this site.

## 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

Deama-----C

Desario-----D

Espadon-----C

## Recreational uses

This site offers good potential for hiking, horseback riding, hunting, nature observation, and photography. It has low to moderate potential for improved camping and picnicking sites, depending on how steep the topography is. It provides natural beauty typical of the mountain foothills of the area in which it is found.

## Wood products

This site has a limited potential for wood products that is restricted almost entirely to fence post and firewood production.

## Other products

This site is well suited for grazing by multiple kinds and classes of livestock. Where slopes are steep, however, accessibility may become limiting, and stocking rates need to be properly adjusted. Deterioration of the potential plant community due to inadequately managed grazing is usually characterized by a decline in New Mexico feathergrass, black grama, sideoats grama, mountain mahogany, little bluestem, and winterfat. As these plants decline, they are replaced by juniper, oakbrush, broom snakeweed, and lesser value grasses such as galleta and threeawns. Because mechanical seeding and brush control are rarely justifiable on this site, the mixed use of both browsing and grazing kinds of livestock is often the best means of maintaining a healthy balance between woody and herbaceous vegetation.

## Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index-----Ac/AUM

100 - 76-----3.8 - 5.0

75 - 51-----4.7 - 6.8

50 - 26-----6.5 - 13.0

25 - 0-----13.0 +

## 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.

## 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:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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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):**
- 
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:**
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17. **Perennial plant reproductive capability:**

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