# Ecological site R070AY002NM
# Clayey Upland

Last updated: 9/12/2023
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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.

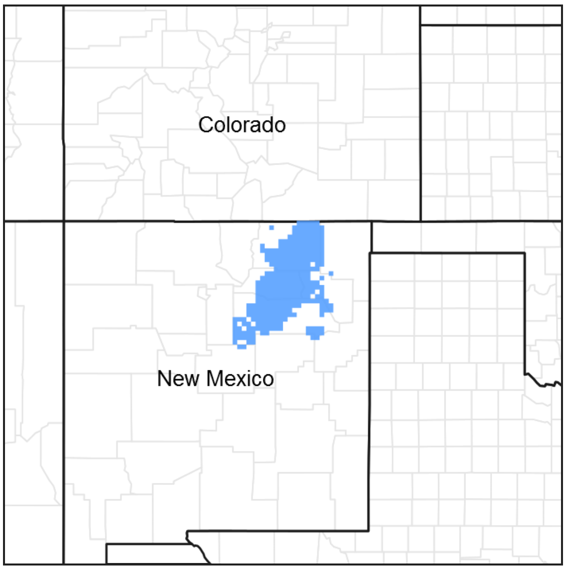


**Figure 1. Mapped extent**

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 applies to upland soils in MLRA 70A that have high-clay surface textures, are greater than 20 inches to bedrock, and lack high salinity.
This site correlates to the Upland ecological site group.

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | Not specified |
| Herbaceous | (1) *Bouteloua gracilis*<br>(2) *Pascopyrum smithii* |

## Physiographic features

This site occurs on upland fans, plains, hillslopes and some depressions. They formed in residuum derived from calcareous, moderately saline, and gypsiferous clayey shale, sandstone. Slopes are 0 to 9 percent and average 5 percent. Directions and degree of slope varies and are important. The mean annual precipitation is ranges from 12 to 16 inches. The average annual temperature ranges from 47 to 53 degrees F. Elevation ranges from 5,000 to 7,500 feet above sea level.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Plain<br>(2) Alluvial fan<br>(3) Fan remnant |
| Flooding duration | Very brief (4 to 48 hours) to brief (2 to 7 days) |
| Flooding frequency | None to very rare |
| Ponding frequency | None |
| Elevation | 1,524–2,134 m |
| Slope | 0–9% |
| Aspect | Aspect is not a significant factor |

## Climatic features

The climate of this area can be classified as “semi-arid continental”. Precipitation averages 14 to 16 inches. Seventy seven percent of the year’s moisture normally falls during the period of May through October. Practically all of it is brought by brief afternoon and evening thunderstorms. In July and August, normally the wettest months of the year, one can expect about one day in five when rainfall exceeds one-tenth inch. Early spring precipitation in May benefits the cool-season plants. Winter precipitation, supplying 24 percent of the year’s moisture, normally has no more than two days a month with as much as one-tenth inch of moisture. Much of the winter precipitation falls as snow.

Air temperatures vary from a monthly mean of 20 degrees F in January to 69 degrees F in July. Daily high temperatures average in the 80’s and low 90’s during the summer. Winter low temperatures fall below the freezing mark much of the time from November through March with minimum temperatures approaching 25 degrees F below zero. Dates of the last killing frost may vary from May 9th through May 17th, and the first killing frost from September 27th to October 8th. The frost-free season ranges from 141 days to 153 days from early May to early October.

Wind velocities for the area average 10 to 12 miles per hour and prevail from the south and southwest. Generally, March is the windiest month. Strong winds during the spring cause rapid drying of the soil surface.

Nearby mountains to the west intercept much of the precipitation from the Pacific storms coming through this area during the winter. About 70 percent of the 14 to 16 inches of annual precipitation falls in the form of rainfall during the frost-free season. About 40 percent of the annual precipitation benefits cool-season plants, 50 percent benefits warm-season plants and 10 percent falls during the season of plant dormancy. Relative humidity is moderately low. The sun shines approximately 75 percent of the time.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50 percent 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) | 149 days |
| Freeze-free period (average) | 171 days |
| Precipitation total (average) | 406 mm |

## Influencing water features

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

## Soil features

Soils are moderately deep to deep. Surface textures are silty clay loam, clay loam, and clay. Subsoil and substratum are clay loams, silty clay loams, silty clay and clay. These soils have moderately slow to very slow permeability. Available water-holding capacity is high. Infiltration is slow. Bedrock is at a depth between 20 and 60

inches.
Where good cover and adequate plant residue are lacking, the soils of this site usually develop a nearly impervious, dispersed surface condition, which decreases their low infiltration rate.

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

Characteristic Soils:
Colmor
La Brier
Remunda
Litle
Vermejo
Swastika

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Silty clay loam<br>(2) Clay loam<br>(3) Clay |
| Family particle size | (1) Clayey |
| Drainage class | Moderately well drained to well drained |
| Permeability class | Very slow to slow |
| Soil depth | 61–152 cm |
| Surface fragment cover <=3" | 0–5% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 15.24–30.48 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–30% |
| Electrical conductivity (0-101.6cm) | 0–8 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–4 |
| Soil reaction (1:1 water) (0-101.6cm) | 7–9 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–9% |
| Subsurface fragment volume >3" (Depth not specified) | 0% |

## Ecological dynamics

Text from the Grazing Section that is relevant to plant ecology:

Approximately 95 percent of the annual yield are from species that furnish forage for grazing animals. Continuous grazing during the growing season will cause the more desirable forage plants such as western wheatgrass, vine-mesquite, sideoats grama and fourwing saltbush to decrease. The species most likely to invade this site is sleepygrass. Species most likely to increase are blue grama, alkali sacaton, buffalograss, creeping muhly, ring muhly and broom snakeweed. Cholla cactus may also increase. As the ecological condition deteriorates, it is accompanied by a sharp increase in blue grama. Continuous heavy grazing will cause blue grama to form a low, dense turf, which is low in productivity. The plant community may be dominated either by blue grama/galleta and alkali sacaton/galleta. Continuous heavy grazing will result in a loss of vegetative cover causing a large area of denuded soil and the productivity of this site is greatly reduced. Most of the mid-grasses will disappear as deterioration advances. In some areas there may be large patches of sleepygrass and a variety of annual and perennial forbs. Spring rest from April through June is needed for western wheatgrass to grow and reproduce. This allows alkali sacaton sufficient time to green up before grazing it intensively.

## State and transition model

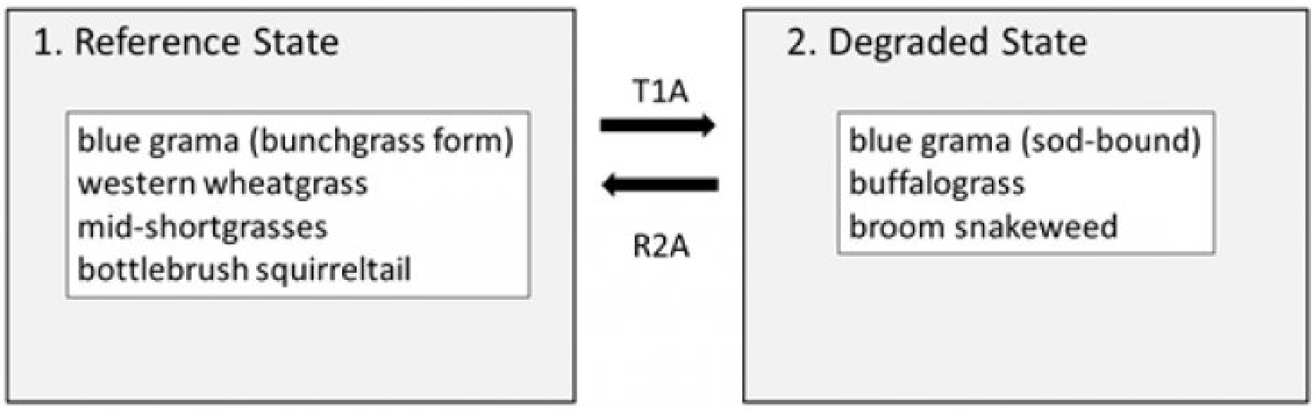


**Figure 4. Generalized STM for upland sites in 70A**

## State 1
## Reference State

## Community 1.1
## Reference Plant Community

This site is grassland dotted with occasional shrubs. Mid-grasses are dominant with short-grasses which can take advantage of the soils with high water-holding capacities. Shrubs and half-shrubs are sparsely scattered. Few woody plants are indigenous to this site. Forbs are a minor component of the potential plant community.

**Forest understory.** Other grasses that could appear include:plains muhly, threeawn spp., and bottlebrush squirreltail.

Other shrubs that could appear include: broom snakeweed, fringed sagewort, cholla cactus, and plains pricklypear cactus.

Other forbs that could appear include: gumweed and Wright eriogonum.

**Table 5. Annual production by plant type**

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Grass/Grasslike | 370 | 740 | 1121 |
| Shrub/Vine | 34 | 67 | 112 |
| Forb | 11 | 22 | 45 |
| **Total** | **415** | **829** | **1278** |

**Table 6. Ground cover**

| | |
|---|---|
| Tree foliar cover | 0% |
| Shrub/vine/liana foliar cover | 3-5% |
| Grass/grasslike foliar cover | 30-35% |
| Forb foliar cover | 0% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 15-20% |
| Surface fragments >0.25" and <=3" | 0% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 40-45% |

**Figure 6. Plant community growth curve (percent production by month). NM3702, R070AY002NM Clayey Upland HCPC. R070AY002NM Clayey Upland HCPC Mid-grassland with scattered shrubs and a minor forb component..**

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

## State 2
## Degraded

This state is often dominated by blue grama, and typically contains large patches of sleepygrass. Other common species are alkali sacaton, buffalograss, creeping muhly, ring muhly, broom snakeweed, and cholla.

## Transition T1A
## State 1 to 2

Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization

## Restoration pathway R2A
## State 2 to 1

Restoration pathway resulting from the implementation of prescribed grazing.

### Conservation practices

| |
|---|
| Grazing Management Plan - Applied |

## 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 | | | | 224–269 | |
| | blue grama | BOGR2 | *Bouteloua gracilis* | 224–269 | – |
| 2 | | | | 179–224 | |
| | western wheatgrass | PASM | *Pascopyrum smithii* | 179–224 | – |
| 3 | | | | 179–224 | |
| | alkali sacaton | SPAI | *Sporobolus airoides* | 179–224 | – |
| 4 | | | | 90–135 | |
| | James' galleta | PLJA | *Pleuraphis jamesii* | 90–135 | – |
| 5 | | | | 45–90 | |
| | vine mesquite | PAOB | *Panicum obtusum* | 45–90 | – |
| 6 | | | | 11–45 | |
| | sideoats grama | BOCU | *Bouteloua curtipendula* | 9–45 | – |
| 7 | | | | 11–45 | |
| | buffalograss | BODA2 | *Bouteloua dactyloides* | 9–45 | – |
| 8 | | | | 11–45 | |
| | New Jersey muhly | MUTO | *Muhlenbergia torreyana* | 9–45 | – |
| **Forb** | | | | | |
| 9 | | | | 11–22 | |
| | ragweed | AMBRO | *Ambrosia* | 9–27 | – |
| 10 | | | | 11–22 | |
| | Forb, perennial | 2FP | *Forb, perennial* | 9–27 | – |
| 11 | | | | 11–22 | |
| | Forb, annual | 2FA | *Forb, annual* | 9–27 | – |
| **Shrub/Vine** | | | | | |
| 12 | | | | 22–56 | |
| | fourwing saltbush | ATCA2 | *Atriplex canescens* | 18–54 | – |
| | pale desert-thorn | LYPA | *Lycium pallidum* | 18–54 | – |
| 13 | | | | 11–22 | |
| | winterfat | KRLA2 | *Krascheninnikovia lanata* | 9–27 | – |

## Animal community

Habitat for Wildlife:

This site provides habitats which support a resident animal community that is characterized by pronghorn antelope, coyote, black-tailed jackrabbit, black-tailed prairie dog, thirteen-lined ground squirrel, marsh hawk, horned lark, meadowlark, scaled quail, bullsnake, Great Plains skunk, and prairie 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
Carnero----------- C
Colmor------------ B
Litle------------- D
Petri------------- C
Remunda----------- C
Swastika---------- C
Torreon----------- C
Vermejo----------- D

## Recreational uses

This site has fair aesthetic appeal because of the open space. This site provides poor camping, hiking and picnicking. Hunting is fair for rabbits and upland game birds. It provides limited use as big game winter range if the site is associated closely with breaks in the physiographic features of the landscape.

## Wood products

This site has no significant value for wood products.

## Other products

Grazing:

This site can be used any season of the year, however, to utilize the alkali sacaton, grazing should be intensified before the plants mature. Cows and horses are best suited for this site because of the coarse forage produced by alkali sacaton. Approximately 95 percent of the annual yield are from species that furnish forage for grazing animals. Continuous grazing during the growing season will cause the more desirable forage plants such as western wheatgrass, vine mesquite, sideoats grama, and fourwing saltbush to decrease. The species most likely to invade this site is sleepygrass. Species most likely to increase are blue grama, alkali sacaton, buffalograss, creeping muhly, ring muhly, and broom snakeweed. Cholla cactus may also increase. As the ecological condition deteriorates, it is accompanied by a sharp increase in blue grama. Continuous heavy grazing will cause blue grama to form a low, dense turf, which is low in productivity. The plant community may be dominated either by blue grama/galleta and alkali sacaton/galleta. Continuous heavy grazing will result in a loss of vegetative cover causing a large area of denuded soil and the productivity of this site is greatly reduced. Most of the mid-grasses will disappear as deterioration advances. In some areas there may be large patches of sleepygrass and a variety of annual and perennial forbs. A system of deferred grazing, which varies the time of grazing and rest in a pasture during consecutive years, is needed to maintain or improve the plant community. Spring rest from April through June is needed for western wheatgrass to grow and reproduce. This allows alkali sacaton sufficient time to green up before grazing it intensively.

## Other information

Other Information:
Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index------- Ac/AUM
100 - 76--------------- 2.3 – 3.2
75 – 51---------------- 3.1 – 4.4
50 – 26---------------- 4.3 – 8.0
25 – 0----------------- 8.0+

## Contributors

Christine Bishop
Don Sylvester
Elizabeth Wright
John Tunberg

## Approval

Kendra Moseley, 9/12/2023

## 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) | Kenneth Alcon |
| Contact for lead author | Area Rangeland Management Specialist<br>Las Vegas Service Center<br>1927A 7th Street<br>Las Vegas, NM 87701<br>Telephone: (505) 425-3594<br>Fax: (505) 425-1430 |
| Date | 04/26/2005 |
| Approved by | Kendra Moseley |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:** None

2. **Presence of water flow patterns:** Typically none, if present (steeper slopes following intense storm events) short and not connected.

3. **Number and height of erosional pedestals or terracettes:** None

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 15-25 percent or less bare ground with bare patches generally less than 5 inches in diameter. Extended drought can cause bare ground to increase and bare patches are more evident.

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Minimal and short small fine litter movement is more prevalent with any increase of slope or extreme storm events.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Stability class rating anticipated to be 5-6 in interspaces at soil surface. These values need verification at reference site.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Average SOM is 1-5 percent. (Litle) A1-0 to 6 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10 YR 4/2) moist; weak very fine granular structure; soft, very friable, sticky and plastic; many very fine and fine roots; strongly effervescent; 5 percent calcium carbonate equivalent; moderately alkaline; clear smooth boundary.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Diverse grass, forb, shrub functional/structural groups and diverse root structure/patterns reduces raindrop impact slows overland flow providing increased time for infiltration to occur. Extended drought reduces short and mid bunchgrasses causing decreased infiltration and increased 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):** None

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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: Warm-season short bunchgrasses

    Sub-dominant: Cool-season mid rhizomatous=Warm-season bunchgrass>Warm-season mid rhizomatous>Warm-season stoloniferous>shrub

    Other: Warm-season forbs>Cool-season forbs> annual native grasses

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Typically minimal. Expect short/mid bunchgrasses mortality/decadence during or following drought.

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14. **Average percent litter cover (%) and depth ( in):** Litter cover during and following extended drought ranges from 10-20 percent.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** (Low Production 400 pounds per acre) (Average RV Production 800 pounds per acre) (High Production 1,200 pounds per acre) Production can be reduced following extended drought or in the first growing season following wildfire.

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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:** Invasive plants should not occur in reference plant community. However, cheatgrass, Russian thistle, kochia, and other non-native annuals may invade following extended drought if a seed source is available. Oneseed juniper may encroach from adjacent sites with lack of fire.

17. **Perennial plant reproductive capability:** All plants should be vigorous, healthy and reproductive depending on disturbances i.e. drought. Plants should have numerous seed heads, vegetative tillers etc. The only limitations are weather, wildfire, and natural disease that may temporarily reduce reproductive capability.