USDA Natural Resources Conservation Service

# Ecological site R042BB006NM
# Gyp Upland, Desert Shrub

Accessed: 05/21/2024

## 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.

## Associated sites

| | |
|---|---|
| R042BB014NM | **Loamy, Desert Shrub**<br>This site often integrades with Loamy sites depending upon amount of gypsum present or depth to gypsic horizon. |
| R042BB036NM | **Salt Flats, Desert Shrub**<br>This site often integrades with Salt Flats depending upon amount of salinity present. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | Not specified |
| Herbaceous | Not specified |

## Physiographic features

This site usually occurs on alluvial fans, basins, valley floors, adjacent terraces or bajadas. They formed in loamy, calcareous, and gypsiferous sediments. Slopes range from 1 to 15 percent, but average 6 to 7 percent. Elevations range from 3,800 to 4,500 feet above sea level.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Valley side<br>(2) Plain<br>(3) Terrace |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 1,158–1,372 m |
| Slope | 1–9% |
| Water table depth | 193 cm |
| Aspect | Aspect is not a significant factor |

## Climatic features

The frost-free season ranges from 183 to 205 days between early April and late October. The optimum growing season of the major native warm season plants coincides with the summer rains during June, July, August, and September. However, plants can make some growth at any time during the frost free period when moisture is available and minimum daily temperatures stay above 51 degrees F. Vegetation on this site will be limited to plants which can take advantage of moisture at the time it falls, since the soil profiles have large amounts of available water for short periods of time and then rapidly dry. The majority of precipitation comes in the form of high intensity, short duration thunderstorms. Little or no available moisture can be stored in the soil profiles of this site. Strong winds from the southwest blow during January through June, which accelerate soil drying within the plant root zone and further, discourage cool season plant growth or occupancy of the site.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 205 days |
| Freeze-free period (average) | 227 days |
| Precipitation total (average) | 305 mm |

## Influencing water features

This site is not influenced by water from wetlands or streams.

## Soil features

Soils are very shallow or shallow. Surface textures are loam and fine sandy loam. The underlying material is a dense layers of soft or cemented gypsum material and gypsiferous earth at depths less than 8 inches may occur. The gypsum amounts range from 50 to 70 percent with 7 to 30 percent carbonates. These soils are droughty.

Areas of gypsum materials commonly outcrop to the surface as inclusions of raw gypsumland, which are void of vegetation and not part of the ecological site. In the lower part of the profile the semi indurated gypsum and caliche.

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

Characteristic soils;
Cottonwood
Holloman
McCarran
Yesum
Alamogordo

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Gypsiferous sandy loam<br>(2) Gypsiferous fine sandy loam<br>(3) Gypsiferous loam |
| Family particle size | (1) Loamy |
| Drainage class | Well drained to moderately well drained |
| Permeability class | Moderately slow to moderate |
| Soil depth | 64–183 cm |
| Surface fragment cover <=3" | 0–5% |
| Surface fragment cover >3" | 0–1% |
| Available water capacity (0-101.6cm) | 10.16–20.32 cm |
| Calcium carbonate equivalent (0-101.6cm) | 7–30% |

| | |
|---|---|
| Electrical conductivity (0-101.6cm) | 2–16 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–4 |
| Soil reaction (1:1 water) (0-101.6cm) | 7.4–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–5% |
| Subsurface fragment volume >3" (Depth not specified) | 0% |

## Ecological dynamics

Overview:
The site has a droughty appearance because of the soils inability to support a dense stand of vegetation. If unprotected by plant cover or organic residue, the soil becomes easily wind blown and water eroded.

The vegetation of this site often intergrades with that of Loamy sites, depending on the amounts of gypsum, soil texture, and depths of gypsic horizons. Low-lying areas where run-in water occurs behave like draws. Areas where gypsum outcrops are exposed harbor little vegetation. Gyp Uplands may intergrade with the Salt Flats site depending on salinity levels. Thus, the vegetation of this site is very patchy, variable, and difficult to characterize. The historic plant community types that are likely to be associated with the gyp uplands site include 1) an alkali sacaton (*Sporobolus airoides*) and black grama (*Bouteloua eriopoda*) or blue grama (*B. gracilis*)-dominated community associated with soils having relatively deep (> 10 “) gypsic horizons and 2) a gyp grama (*Bouteloua breviseta*) and gyp dropseed (*Sporobolus nealleyi*)-dominated community on soils with shallow (< 10”) gypsic horizons. Tobosa (*Pleuraphis mutica*), burrograss (*Scleropogon brevifolius*), and/or saltbush (*Atriplex canescens*) may also dominate depending on texture, land-use history, or other features. The subshrub Coldenia (Coldenia spp) increasingly dominates sites with very shallow gypsic horizons as grasses decline. Gyp upland sites are susceptible to erosion when vegetation cover is reduced due to drought and overgrazing. Mesquite (*Prosopis glandulosa*) may invade soils with deeper gypsic horizons within the site that are dominated by tobosa or burrograss. Erosion of A horizons bring gypsic horizons closer to the surface and can shift community composition to dominance by gyp dropseed, coldenia, and bare soil.

## State and transition model

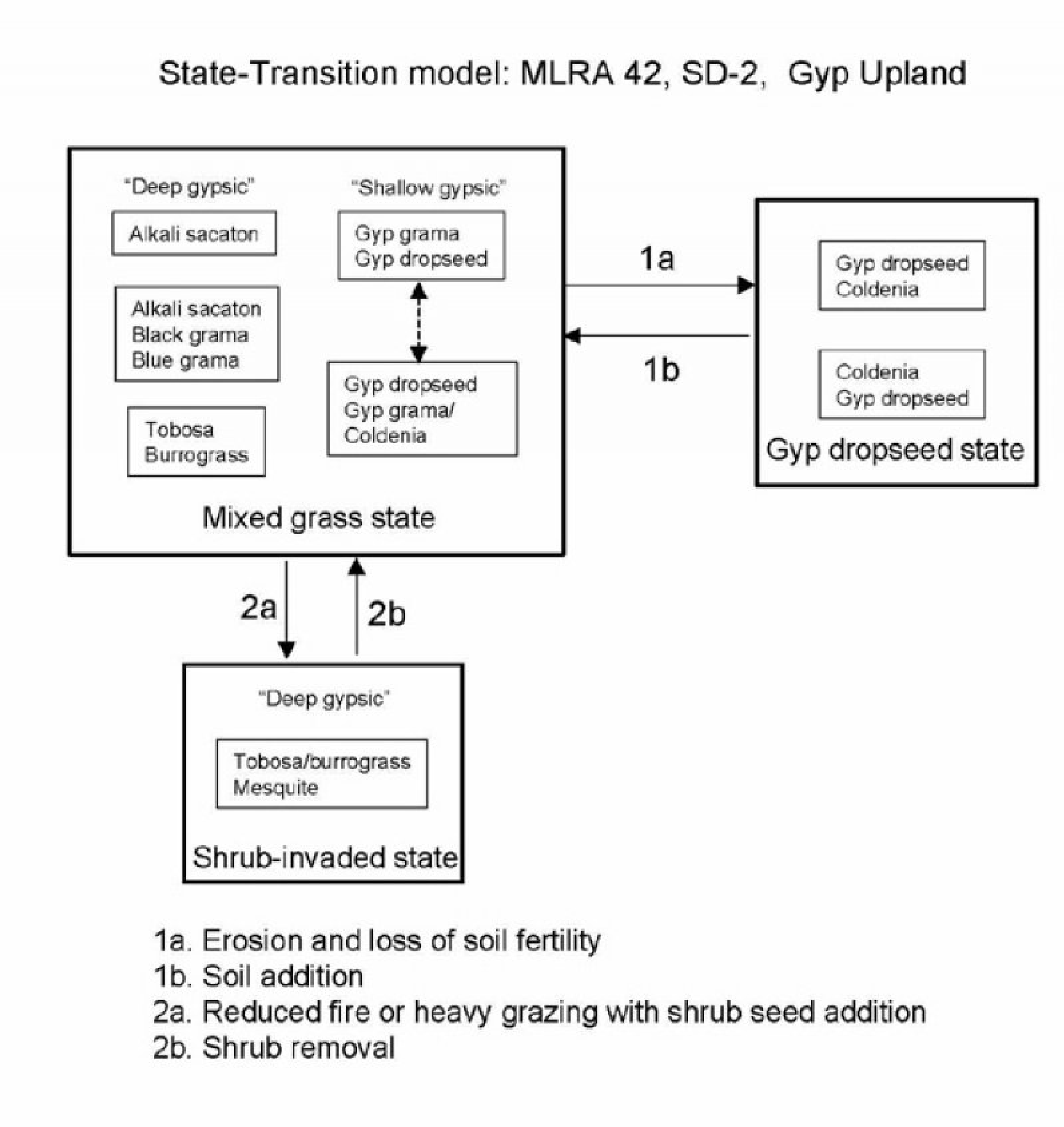


**Figure 4. State-Transition model: MLRA 42, SD-2, Gyp Upland1**

## State 1
## Historic Climax Plant Community

### Community 1.1
### Historic Climax Plant Community

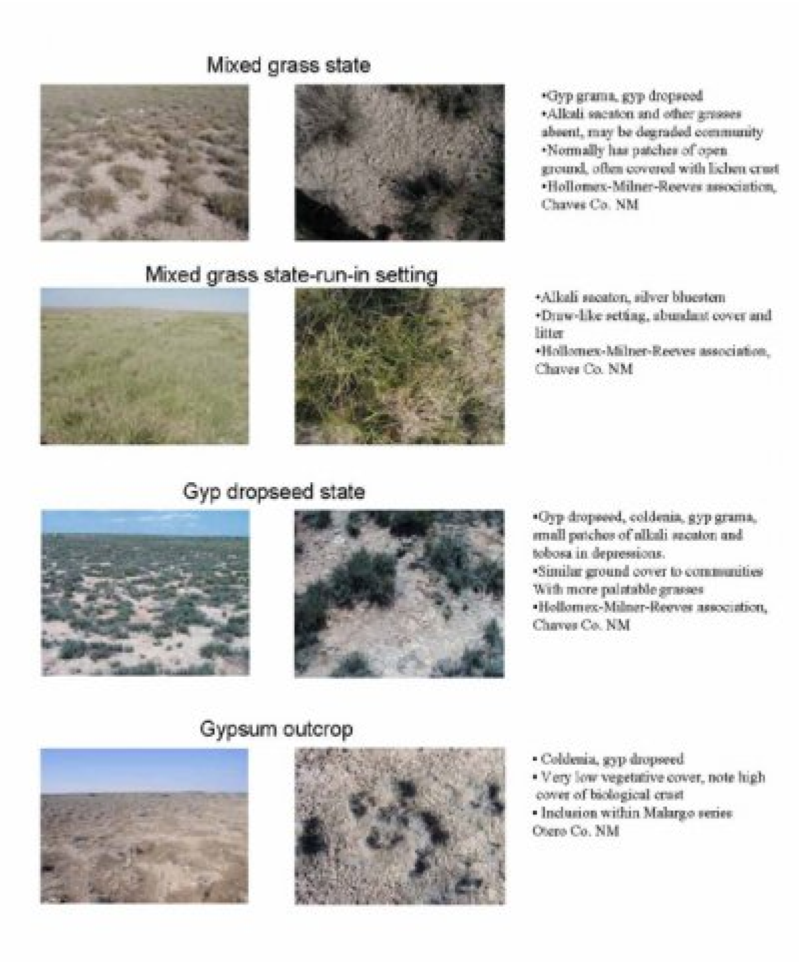


**Figure 5. Mixed Grass**

State Containing Historic Climax Plant Community Mixed grassland State: Alkali sacaton, black grama, and blue grama (only in SD-3) dominate soils that have relatively deep gypsic horizons that are deeper than 10” (e.g. Reeves series). Saltbush may be an abundant shrub. Alkali sacaton cover may be continuous in run-in settings surrounded by sparsely vegetated areas (alkali sacaton community). On fine-silty or fine loamy calcareous gypsid soils (e.g. Milner or Reeves series), tobosa or burrograss may be dominant. Dominance by burrograss or tobosa might represent grazing-induced retrogression from an alkali sacaton-grama community type on these soils, but this has not been confirmed. In some cases, saltbush may be extremely dominant, (e.g. Malargo series) but it is not clear why. Gyp grama, black grama, and gyp dropseed dominate soils with shallow gypsic horizons and gyp dropseed, mormon tea (Ephedra spp.), and coldenia tend to dominate where the gypsic horizon is shallowest (< 3”). These communities exhibit low production, perhaps due to the comparatively shallow infiltration in gypsic soil and other chemical properties (Campbell and Campbell 1938). Outcrops of gypsum, often revealing a whitish floury mass at the surface, may be devoid of vegetation. Heavy grazing may reduce grama grasses and increase the dominance of gyp dropseed and coldenia, but it is important to recognize that these plants may dominate some patches without heavy grazing. Soil degradation due to surface compaction and reduced infiltration may be important on this site and result in reduced grass cover. Slight variations in the depth to the gypsic horizon, whether human induced or not, exert a powerful control on plant community composition. Where gypsic horizons are deep, soil texture or soil chemistry may govern composition. Diagnosis: Soils with deeper gypsic horizons should have continuous grass cover with a high representation of alkali sacaton and black grama. Shallower soils should have gyp grama and black grama but gyp outcrops will be dominated by gyp dropseeds or coldenia. Depending upon the depths to a gypsic horizon, large (< 1 m) bare patches may be common but they should not be common where the depth to gypsic horizon is greater than 5”. This site has a grassland aspect with patches of bare or lichen covered soil surface exposed between patches of vegetation. The potential plant community is dominated by alkali sacaton, short and mid grass perennials and forbs, with half shrubs and shrubs sparsely and evenly distributed. Additional States and Transition Pathways: Transition to gyp dropseed state (1a): Reduced grass cover caused by poor grazing management and/or drought may result in erosion of surface horizons. As the depth to the gypsic horizon decreases, plant communities will become increasingly dominated by gyp dropseed and/or coldenia. Mechanical disturbance of the soil surface and soil degradation may contribute to this effect. Key indicators of approach to transition: Increased bare ground, pedestalling, water flow patterns, blowouts, and eventually the loss of the A horizon. Transition to shrub-invaded state (2a): Reduced grass cover in deep gypsic soils may result in mesquite invasion. Key indicators of approach to transition: Increasing bare ground, presence of mesquite seedlings.

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

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Grass/Grasslike | 336 | 527 | 717 |
| Forb | 50 | 80 | 108 |
| Shrub/Vine | 34 | 53 | 72 |
| **Total** | **420** | **660** | **897** |

**Table 6. Ground cover**

| | |
|---|---|
| Tree foliar cover | 0% |
| Shrub/vine/liana foliar cover | 0% |
| Grass/grasslike foliar cover | 25% |
| Forb foliar cover | 0% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 16% |
| Surface fragments >0.25" and <=3" | 0% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 57% |

**Figure 7. Plant community growth curve (percent production by month). NM2501, R042XB006NM-Gyp Upland-Warm Season Plant-HCPC. SD-2 Warm Season Plant Community.**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 5 | 10 | 10 | 25 | 30 | 15 | 5 | 0 | 0 |

## State 2
## Gyp Dropseed

## State 3
## Shrub-Invaded

## 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 | **Warm Season** | | | 298–362 | |
| | alkali sacaton | SPAI | *Sporobolus airoides* | 298–362 | – |
| 2 | **Warm Season** | | | 33–99 | |
| | black grama | BOER4 | *Bouteloua eriopoda* | 33–99 | – |
| 3 | **Warm Season** | | | 7–66 | |
| | gypsum grama | BOBR | *Bouteloua breviseta* | 7–66 | – |

| | | | | | |
|---|---|---|---|---|---|
| 4 | **Warm Season** | | | 20–99 | |
| | bush muhly | MUPO2 | *Muhlenbergia porteri* | 20–99 | – |
| | plains bristlegrass | SEVU2 | *Setaria vulpiseta* | 20–99 | – |
| 5 | **Warm Season** | | | 7–20 | |
| | gyp dropseed | SPNE | *Sporobolus nealleyi* | 7–20 | – |
| 6 | **Warm Season** | | | 7–20 | |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 7–20 | – |
| 7 | **Warm Season** | | | 7–20 | |
| | blue grama | BOGR2 | *Bouteloua gracilis* | 7–20 | – |
| 8 | | | | 20–99 | |
| | threeawn | ARIST | *Aristida* | 20–99 | – |
| | low woollygrass | DAPU7 | *Dasyochloa pulchella* | 20–99 | – |
| | ear muhly | MUAR | *Muhlenbergia arenacea* | 20–99 | – |
| | burrograss | SCBR2 | *Scleropogon brevifolius* | 20–99 | – |
| **Shrub/Vine** | | | | | |
| 9 | **Shrub** | | | 20–46 | |
| | fourwing saltbush | ATCA2 | *Atriplex canescens* | 20–46 | – |
| | jointfir | EPHED | *Ephedra* | 20–46 | – |
| | littleleaf sumac | RHMI3 | *Rhus microphylla* | 20–46 | – |
| 10 | **Shrub** | | | 7–20 | |
| | javelina bush | COER5 | *Condalia ericoides* | 7–20 | – |
| | knifeleaf condalia | COSP3 | *Condalia spathulata* | 7–20 | – |
| | crown of thorns | KOSP | *Koeberlinia spinosa* | 7–20 | – |
| 11 | **Cactus** | | | 7–20 | |
| | pricklypear | OPUNT | *Opuntia* | 7–20 | – |
| | yucca | YUCCA | *Yucca* | 7–20 | – |
| **Forb** | | | | | |
| 12 | **Forb** | | | 33–66 | |
| | snakewood | CONDA | *Condalia* | 33–66 | – |
| 13 | **Forb** | | | 7–99 | |
| | Forb, annual | 2FA | *Forb, annual* | 7–99 | – |
| | desert unicorn-plant | PRAL4 | *Proboscidea althaeifolia* | 7–99 | – |
| | whitestem paperflower | PSCO2 | *Psilostrophe cooperi* | 7–99 | – |
| | threadleaf ragwort | SEFLF | *Senecio flaccidus var. flaccidus* | 7–99 | – |
| | Hopi tea greenthread | THME | *Thelesperma megapotamicum* | 7–99 | – |
| | daisy | CHRYS2 | *Chrysanthemum* | 7–99 | – |
| | golden tickseed | COTI3 | *Coreopsis tinctoria* | 7–99 | – |
| | leatherweed | CRPOP | *Croton pottsii var. pottsii* | 7–99 | – |
| | Seven River Hills buckwheat | ERGY | *Eriogonum gypsophilum* | 7–99 | – |
| | blazingstar | MENTZ | *Mentzelia* | 7–99 | – |
| | fiddleleaf | NAMA4 | *Nama* | 7–99 | – |
| | whitest evening primrose | OEAL | *Oenothera albicaulis* | 7–99 | – |

| | | | | | |
|---|---|---|---|---|---|
| | beardtongue | PENST | *Penstemon* | 7–99 | – |
| | Texan phacelia | PHINT | *Phacelia integrifolia var. texana* | 7–99 | – |
| | white milkwort | POAL4 | *Polygala alba* | 7–20 | – |
| | trailing windmills | ALIN | *Allionia incarnata* | 7–20 | – |

## Animal community

This site provides habitats which support a resident animal community that is characterized by coyote, hooded skunk, desert cottontail, whitethroated woodrat, sparrow hawk, cactus wren, scaled quail, logggerhead shrike, mourning dove, Texas horned lizard, lesser earless lizard, and western diamondback rattlesnake. Fourwing saltbush, littleleaf sumac, spiny allthorn, common javilinabush, and knifeleaf condalia provide protective cover for scaled quail. Seed, green herbage and fruit from a variety of grasses, forbs and shrubs provide food for a number of birds and mamals, including scaled and Gambel's quail, mourning dove and prairie dogs. The fruit of tesajo cactus is relished by quail.

## 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
Cottonwood---------C
Holloman-----------C
McCarran-----------C
Yesum--------------B
Alamogordo---------B

## Recreational uses

This site offers recreation potential for hiking, horseback riding, rock, gem, and mineral collecting, nature observation and photography, and quail, dove, and predator hunting. During years of abundant moisture, a colorful array of wildflowers can be observed from spring through fall.

## Wood products

This site provides little or no wood products other than curiosities and small furniture which can be made from the roots and stems of mesquite where it has invaded the site. The woody pods of devils claw are also used in curiosities.

## Other products

This site is suitable for grazing during all seasons of the year. Care must be taken to leave enough vegetation cover for soil protection during windy and rainy periods or severe soil erosion will result. About 300 pounds per acre of total vegetation and litter is minimal for soil protection. This site is best suited and most efficiently utilized by cattle. It can also be utilized by small numbers of goats and sheep in combination with cattle where control or protection from predators can be provided.

## Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index -----Ac/AUM
100 - 76-------------- 5.5 – 8.0

75 – 51-------------- 7.5 – 11.0
50 – 26-------------- 11.0 – 15.0
25 – 0--------------- 25.0 +

### Type locality

| Location 1: Eddy County, NM | |
|---|---|
| Township/Range/Section | T26S R24E S27 |

### 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 Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Sierra County Dona Ana County Grant County Hidalgo County Luna County Otero County Eddy County.

Characteristic soils are:
Cottonwood loam, very shallow, less than 8 inches thick
Holloman loam, very shallow, less than 8 inches thick
McCarran loam, very shallow, less than 8 inches thick
Yesum fine sandy loam, less than 8 inches thick
Alamogordo fine sandy loam, less than 8 inches thick

### 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):**

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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:**

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17. **Perennial plant reproductive capability:**

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