

# Ecological site R030XB044NV COBBLY CLAYPAN 5-7 P.Z.

Last updated: 2/18/2025  
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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.

## Ecological site concept

This site occurs on sideslopes of hills, mountains, and upper fan remnants. Slopes range from 0 to 75 percent, but slope gradients of 8 to 15 percent are typical. Elevations are 2500 to 4500 feet. The soils typically have a surface cover of rock fragments greater than 60 percent with cobble-sized fragments comprising at least 90 percent of the total rock cover. This site is under the group concept of R030XB188CA.

## Associated sites

|             |             |
|-------------|-------------|
| R030XA073NV | LIMY 3-5 PZ |
|-------------|-------------|

## Similar sites

|             |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| R030XB043NV | <b>CLAYPAN 5-7 P.Z.</b><br>Less productive site; less than 35% surface rock fragments  |
| R030XB039NV | <b>LIMY FAN 5-7 P.Z.</b><br>Occurs on inset fans; less than 35% surface rock fragments |
| R030XB075NV | <b>GRAVELLY FAN 5-7 P.Z.</b><br>MESP2 codominant shrub                                 |

Table 1. Dominant plant species

|            |                              |
|------------|------------------------------|
| Tree       | Not specified                |
| Shrub      | (1) <i>Ambrosia dumosa</i>   |
| Herbaceous | (1) <i>Pleuraphis rigida</i> |

## Physiographic features

This site occurs on sideslopes of hills, mountains, and upper fan remnants. Slopes range from 0 to 75 percent, but slope gradients of 8 to 15 percent are typical. Elevations are 2500 to 4500 feet.

**Table 2. Representative physiographic features**

|           |                                             |
|-----------|---------------------------------------------|
| Landforms | (1) Hill<br>(2) Mountain<br>(3) Fan remnant |
| Elevation | 760 – 1,370 m                               |
| Slope     | 0 – 80 %                                    |
| Aspect    | Aspect is not a significant factor          |

### Climatic features

The climate of the Mojave Desert has extreme fluctuations of daily temperatures, strong seasonal winds, and clear skies. The climate is arid and is characterized with cool, moist winters and hot, dry summers. Most of the rainfall falls between November and April. Summer convection storms from July to September may contribute up to 25 percent of the annual precipitation. Average annual precipitation is 5 to 7 inches. Mean annual air temperature is 56 to 63 degrees F. The average growing season is about 180 to 240 days.

**Table 3 Representative climatic features**

|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 240 days |
| Freeze-free period (average)  |          |
| Precipitation total (average) | 180 mm   |

### Influencing water features

There are no influencing water features associated with this site.

### Soil features

The soils associated with this site are typically moderately deep to very deep. These soils are formed in alluvium from mixed parent material and are well drained. The soils typically have a surface cover of rock fragments greater than 60 percent with cobble-sized fragments comprising at least 90 percent of the total rock cover. The water infiltration is moderately slow to moderately rapid and runoff is low to very high. The soil series associated with this site include: Bitterspring, Highland, and Lanip.

**Table 4. Representative soil features**

|                 |                                                                               |
|-----------------|-------------------------------------------------------------------------------|
| Surface texture | (1) Extremely gravelly loam<br>(2) Very cobbly loam<br>(3) Very gravelly loam |
|-----------------|-------------------------------------------------------------------------------|

|                                                          |                                     |
|----------------------------------------------------------|-------------------------------------|
| Family particle size                                     | (1) Loamy                           |
| Drainage class                                           | Well drained                        |
| Permeability class                                       | Moderately slow to moderately rapid |
| Soil depth                                               | 60 – 210 cm                         |
| Surface fragment cover <=3"                              | 10 – 70 %                           |
| Surface fragment cover >3"                               | 0 – 20 %                            |
| Available water capacity<br>(0-101.6cm)                  | 4.57 – 13.72 cm                     |
| Calcium carbonate equivalent<br>(0-101.6cm)              | 0 – 30 %                            |
| Electrical conductivity<br>(0-101.6cm)                   | 0 – 40 mmhos/cm                     |
| Sodium adsorption ratio<br>(0-101.6cm)                   | 0 – 10                              |
| Soil reaction (1:1 water)<br>(0-101.6cm)                 | 7.4 – 10                            |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 10 – 60 %                           |
| Subsurface fragment volume >3"<br>(Depth not specified)  | 0 – 30 %                            |

### Ecological dynamics

The potential natural vegetation is dominated by perennial grasses. The geographical location of this site positively contributes to run-in moisture. The argillic and calcic horizons found in the soil lead to increased water holding capacity, making this site more productive than the surrounding areas. Half of the annual precipitation comes in the summer, increasing production and the presence of warm season

grasses. The dominant grasses on this ecological site are large bunchgrasses which provide valuable organic matter. Litter and old shoots are incorporated into the soil increasing the organic matter and therefore the nutrient availability compared to other desert soils. Run-in moisture is positively influenced by the abundance of vegetation on the landscape, providing more places for infiltration. Elevated levels of soil organic matter and infiltration help make this site more resilient, than the surrounding area, following a disturbance.

Grasses and shrubs of this ecological site are considered to be palatable to wildlife making it valuable habitat. Perennial grass species found on this ecological site include a combination of cool and warm season species. Big galleta, Indian ricegrass, desert needlegrass (*Achnatherum speciosum*), fluffgrass (*Dasyochloa pulchella*), and threeawn (*Aristida* spp.) are the most common. The relative species diversity of this site makes it more resilient. Species richness contributes to overall increased ecological stability. The ecological functions of different species overlap, so that even if a species is removed, ecological function will persist due to the compensation by other species with similar function (Peterson et al. 1998).

The relatively high yield of annual biomass makes this site susceptible to high intensity wildfire. Damage to big galleta from fire varies. If big galleta is dry, damage may be severe. However, when plants are green, fire will tend to be less severe and damage may be minimal, with big galleta recovering quickly. Fire top-kills bush muhly. A nonrhizomatous species, bush muhly regenerates following fire from soil-stored seed. Burning causes at least short-term decline of bush muhly. Recovery time is thought to vary considerably and is probably dependent on postfire weather and competition. When ungrazed, bush muhly's dense growth may contribute to fire spread. It may be most susceptible to fire damage when growing beneath shrubs because of increased fuels and higher temperatures as shrubs burn. Creosotebush is poorly adapted to fire because of its limited sprouting ability. Creosotebush survives some fires that burn patchily or are of low severity. Fire generally kills white bursage.

Following low intensity wildfire the perennial grasses on this ecological site may increase in abundance, while shrubs will be temporally absent from the plant community. In the occurrence of repeated large scale fires, perennial grasses and shrubs will decrease in abundance and non-native annuals will increase. Even under a shorter fire return interval the perennial bunchgrass of this community are able to persist in small quantities, preventing conversion to annual grassland. The ability of these species to reproduce by tiller and seeds, allows them to persist in the presence of increased fire or prolonged drought .This ecological site is also susceptible to anthropogenic disturbances resulting in soil compaction. This negatively affects reproduction and vigor of native plant species, reduces infiltration and soil stability.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

| Group           | Common Name                 | Symbol | Scientific Name               | Annual Production () | Foliar Cover (%) |
|-----------------|-----------------------------|--------|-------------------------------|----------------------|------------------|
| Grass/Grasslike |                             |        |                               |                      |                  |
| 1               | Primary Perennial Grasses   |        |                               | 641-925              |                  |
|                 | big galleta                 | PLRI3  | <i>Pleuraphis rigida</i>      | 616-801              | –                |
|                 | bush muhly                  | MUPO2  | <i>Muhlenbergia porteri</i>   | 25-123               | –                |
| 2               | Secondary Perennial Grasses |        |                               | 25-123               |                  |
|                 | Indian ricegrass            | ACHY   | <i>Achnatherum hymenoides</i> | 7-37                 | –                |
|                 | desert needlegrass          | ACSP12 | <i>Achnatherum speciosum</i>  | 7-37                 | –                |
|                 | threeawn                    | ARIST  | <i>Aristida</i>               | 7-37                 | –                |
|                 | slim tridens                | TRMU   | <i>Tridens muticus</i>        | 7-37                 | –                |
| 3               | Annual Grasses              |        |                               | 1-37                 |                  |
| Forb            |                             |        |                               |                      |                  |
| 4               | Primary Perennial Forbs     |        |                               | 25-99                |                  |
|                 | desert globemallow          | SPAM2  | <i>Sphaeralcea ambigua</i>    | 25-99                | –                |
| 5               | Secondary Perennial Forbs   |        |                               | 25-99                |                  |
|                 | desert marigold             | BAMU   | <i>Baileya multiradiata</i>   | 7-25                 | –                |
| 6               | Annual Forbs                |        |                               | 1-123                |                  |
| Shrub/Vine      |                             |        |                               |                      |                  |
| 7               | Primary Shrubs              |        |                               | 87-308               |                  |
|                 | burrobush                   | AMDU2  | <i>Ambrosia dumosa</i>        | 62-185               | –                |

|   |                          |       |                                                      |       |   |
|---|--------------------------|-------|------------------------------------------------------|-------|---|
|   | creosote bush            | LATR2 | <i>Larrea tridentata</i>                             | 1-62  | – |
| 8 | <b>Secondary Shrubs</b>  |       |                                                      | 25-99 |   |
|   | Virgin River brittlebush | ENVI  | <i>Encelia virginensis</i>                           | 12-37 | – |
|   | Nevada jointfir          | EPNE  | <i>Ephedra nevadensis</i>                            | 12-37 | – |
|   | Eastern Mojave buckwheat | ERFAP | <i>Eriogonum fasciculatum</i> var. <i>polifolium</i> | 12-37 | – |
|   | water jacket             | LYAN  | <i>Lycium andersonii</i>                             | 12-37 | – |
|   | Mojave woodyaster        | XYTO2 | <i>Xylorhiza tortifolia</i>                          | 12-37 | – |
|   | Schott's yucca           | YUSC  | <i>Yucca ×schottii</i>                               | 12-37 | – |

Table 6. Community 2.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 7. Community 2.2 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 8. Community 2.3 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 9. Community 2.4 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

## Animal community

Livestock Interpretations: This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass and palatable shrub production. Big galleta is considered a valuable forage plant for cattle and domestic sheep. Its coarse, rigid culms make it relatively resistant to heavy grazing and trampling. Bush muhly is readily eaten by livestock throughout the year when available; however, it is usually not abundant enough to provide much forage. It is grazed heavily in winter when other species become scarce. Because of its branching habit, it is extremely susceptible to heavy grazing. Bush muhly is damaged when continuously grazed to a stubble height of less than 4 inches (10 cm). White bursage is an important browse species. Browsing pressure on white bursage is particularly heavy during years of low precipitation, when production of winter annuals is low. White bursage is of intermediate forage value. It is fair to good forage for horses and fair to poor for cattle and sheep. However, because there is often little other forage where white bursage grows, it is often highly valuable to browsing animals. Many animals bed in or under creosotebush. Domestic sheep dig shallow beds under creosotebush because it provides the only shade in the desert scrub community. Creosotebush is unpalatable to livestock. Consumption of creosotebush may be fatal to sheep. Range ratany is an important forage species for all classes of livestock. Palatability of range ratany is rated fair to good for cattle and sheep. Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate that is fine tuned by the client by adaptive management through the year and from year to year. Wildlife Interpretations: In southern Nevada, big galleta is heavily utilized by bighorn sheep and in some blackbrush communities it is referred to as preferred habitat. Mule deer utilize trace amounts of big galleta. The palatability of bush muhly for wildlife species is rated fair to poor. White bursage is an important browse species for wildlife. Many small mammals browse creosotebush or consume its seeds. Desert reptiles and amphibians use creosotebush as a food source and perch site and hibernate or estivate in burrows under creosotebush, avoiding predators and excessive daytime temperatures. Range ratany is an important forage species for deer. Mule deer browse range ratany year-long with seasonal peaks. Mule deer peak use is from February to April and from August to October.

## Hydrological functions

Runoff is low to very high. Permeability is moderately slow to moderately rapid.

## Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. This site is used for hiking and has potential for upland and big game hunting.

## Other products

White bursage is a host for sandfood, a parasitic plant with a sweet, succulent, subterranean flowerstalk. Sandfood was a valuable food supply for Native Americans. Creosotebush has been highly valued for its medicinal properties by desert peoples. It has been used to treat at least 14 illnesses. Twigs and leaves may be boiled as tea, steamed, pounded into a powder, pressed into a poultice, or heated into an infusion.

### Other information

Big galleta's clumped growth form stabilizes blowing sand. White bursage may be used to revegetate disturbed sites in southwestern deserts. Creosotebush may be used to rehabilitate disturbed environments in southwestern deserts. Once established, creosotebush may improve sites for annuals that grow under its canopy by trapping fine soil, organic matter, and symbiont propagules. It may also increase water infiltration and storage.

### Other references

Fire Effects Information System (Online; <http://www.fs.fed.us/database/feis/plants/>).

Peterson, G. C., R. Allen, and C.S. Holling. 1998. Ecological Resilience, Biodiversity, and Scale. *Ecosystems* 1:6-18.

USDA-NRCS Plants Database (Online; <http://www.plants.usda.gov>).

### Contributors

GKB

### Approval

Kendra Moseley, 2/18/2025

### 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)                    | GK BRACKLEY                           |
| Contact for lead author                     | State Rangeland Management Specialist |
| Date                                        | 04/13/2010                            |
| Approved by                                 |                                       |
| Approval date                               |                                       |
| Composition (Indicators 10 and 12) based on | Annual Production                     |

### Indicators

1. Number and extent of rills: Rills are none to rare. Rock fragments armor the soil surface.

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2. Presence of water flow patterns: Water flow patterns none to rare in areas recently subject to intense summer rainfall and on steeper slopes.

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3. Number and height of erosional pedestals or terracettes: Pedestals are rare with occurrence typically limited to areas within water flow patterns.

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4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): Bare Ground to 60%; surface rock fragments to 85%; shrub canopy to 15%; basal area for perennial herbaceous plants (15%).

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

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

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7. Amount of litter movement (describe size and distance expected to travel): Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during catastrophic events.

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8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Soil stability values should be 2 to 4 on most soil textures found on this site. (To be field tested.)

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9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Surface structure is typically moderate thin to moderate thick platy. Soil surface colors are light and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent. (lab characterization data)

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10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Sparse shrub canopy and associated litter break raindrop impact.

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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. Platy or massive sub-surface horizons, subsoil argillic or calcic horizons are not to be interpreted as compacted layers.

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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: Reference Plant Community: Deep-rooted, warm-season, bunchgrasses (big galleta) >> Mojave Desert shrubs**

**Sub-dominant: perennial forbs > annual forbs > deep-rooted, cool-season, bunchgrasses > annual grasses**

**Other:**

**Additional:**

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- 13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**  
Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 25% of total woody canopy; mature bunchgrasses commonly ( $\pm 25\%$ ) have dead centers.
- 

- 14. Average percent litter cover (%) and depth (in):** Between plant interspaces 10-20% and depth ( $\pm \frac{1}{4}$ -inch).
- 

- 15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**  
For normal or average growing season  $\pm 1100$ lbs/ac.
- 

- 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: Invaders on this site include red brome, filaree, and Mediterranean grass.**
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- 17. Perennial plant reproductive capability:** All functional groups should reproduce in above average growing season years.
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