

# Ecological site R030XA012CA

## Calcareous Loam

### 5-7

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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.

#### MLRA notes

Major Land Resource Area (MLRA): 030X–Mojave Basin and Range

The Mojave Desert Major Land Resource Area (MLRA 30) is found in southern California, southern Nevada, the extreme southwest corner of Utah and northwestern Arizona within the Basin and Range Province of the Intermontane Plateaus. The Mojave Desert is a transitional area between hot deserts and cold deserts where close proximity of these desert types exert enough influence on each other to distinguish these desert types from the hot and cold deserts beyond the Mojave. Kottek et. al 2006 defines hot deserts as areas where mean annual air temperatures are above 64 F (18 C) and cold deserts as areas where mean annual air temperatures are below 64 F (18 C). Steep elevation gradients within the Mojave create islands of low elevation hot desert areas surrounded by islands of high elevation cold desert areas. The Mojave Desert receives less than 10 inches of mean annual precipitation. Mojave Desert low elevation areas are often hyper-arid while high elevation cold deserts are often semi-arid with the majority of the Mojave being an arid climate. Hyper-arid areas receive less than 4 inches of mean annual precipitation and semi-arid areas receive more than 8 inches of precipitation (Salem 1989). The western Mojave receives very little precipitation during the summer months while the eastern Mojave experiences some summer monsoonal activity. In summary, the Mojave is a land of extremes. Elevation gradients contribute to extremely hot and dry summers and cold moist winters where temperature highs and lows can fluctuate greatly between day and night, from day to day and from winter to summer. Precipitation falls more consistently at higher elevations while lower elevations can experience long intervals without any precipitation. Lower elevations also experience a low frequency of precipitation events so that the majority of annual precipitation may come in only a couple precipitation events during the whole year. Hot desert areas influence cold desert areas by increasing the extreme highs and shortening the length of below freezing events. Cold desert areas influence hot desert areas by increasing the extreme lows and increasing the length of below freezing events. Average precipitation and temperature values contribute little understanding to the extremes which govern wildland plant communities across the Mojave. Arid Western Mojave Land Resource Unit (XA)

#### LRU notes

The Mojave Desert is currently divided into 4 Land Resource Units (LRUs). This ecological site is within the arid portions of the Mojave where precipitation primarily occurs during the winter months (Hereford et. al 2004). The lack of summer precipitation as well as cooler temperatures allows cool season species to occupy sites at lower elevations than they do in the Eastern Mojave. For example, sandberg bluegrass, winterfat and spiny hopsage are common at lower elevations in the Western Mojave than they are in the Eastern Mojave. Warm season species like big galleta rarely occur in the Western Mojave. The Arid Western Mojave LRU is designated by the 'XA' symbol within the ecological site ID and is roughly equivalent to Western Mojave Basins and Western Mojave Low Ranges and Arid Footslopes of EPA Level IV Ecoregions. Elevations range from 1650 to 4300 feet and precipitation is between 4 to 8 inches per year. The Arid Western Mojave LRU is distinguished from the Arid Eastern Mojave (XB) by the lack of summer precipitation which excludes many warm season plant species from occurring in this LRU. Vegetation includes creosote bush, rabbitbrush, shadscale saltbush, spiny hopsage, winterfat, Nevada jointfir, and Joshua tree. At the upper elevations of the LRU, plant production and diversity are greater and blackbrush is a common dominant shrub. The Arid Western Mojave LRU generally lacks the diversity of yucca, cacti and warm season species found in the Arid Eastern Mojave.

#### Classification relationships

NDDB/Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California - Mojave Creosote Bush Scrub.; J.O. Sawyer and T. Keeler-Wolf. 1995. Manual of California Vegetation - Creosote Bush Series.

#### Ecological site concept

The Calcareous Loam ecological site is found within the fan piedmont between 1650 - 3000 feet (500 - 915 m) elevation on soils with carbonates disseminated within the top 10 inches (25 cm) of the soil surface. The central concept for this ecological site is in the Soil Survey of Edwards Air Force Base, California, Parts of Kern, Los Angeles, and San Bernardino Counties on the Lavic component within the Lavic-Norob complex, 2 to 9 percent slopes map unit (map unit symbol 124).

#### Associated sites

|                    |                                                       |
|--------------------|-------------------------------------------------------|
| <b>R030XA009CA</b> | <b>Alkali Flat 5-7</b><br><br>Alkali Flat 5-7         |
| <b>R030XA010CA</b> | <b>Calcareous Hill 3-5</b><br><br>Calcareous Hill 3-5 |

#### Similar sites

|                    |                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------|
| <b>R030XA010CA</b> | <b>Calcareous Hill 3-5</b><br><br>A lower producing site that occurs on sideslopes of hills. |
| <b>R030XA020CA</b> | <b>Arid Fans 5-7</b><br><br>Shadscale minor occurrence; more productive site                 |

**Table 1. Dominant plant species**

|            |                                                            |
|------------|------------------------------------------------------------|
| Tree       | Not specified                                              |
| Shrub      | (1) <i>Larrea tridentata</i><br>(2) <i>Ambrosia dumosa</i> |
| Herbaceous | (1) <i>Atriplex confertifolia</i>                          |

#### Physiographic features

This site occurs on fan piedmonts and alluvial plains. Elevations are 1650 to 3000 feet. Slopes range from 2 to 9 percent.

**Table 2. Representative physiographic features**

|           |                                    |
|-----------|------------------------------------|
| Landforms | (1) Fan piedmont                   |
| Elevation | 500 – 910 m                        |
| Slope     | 0 – 10 %                           |
| Aspect    | Aspect is not a significant factor |

## Climatic features

The climate on this site is characterized by cool, relatively dry winters (30 to 60 degrees F) and hot, dry summers (70 to 100 degrees F). The average annual precipitation ranges from 3 to 7 inches with most falling as rain from November to March. Mean annual air temperature is 60 to 64 degrees F.

The average frost free period is 200 to 250 days.

Table 3 Representative climatic features

|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 250 days |
| Freeze-free period (average)  | 220 days |
| Precipitation total (average) | 180 mm   |

## Influencing water features

The plant community for this site is not influenced by water from a wetland or stream.

## Soil features

The soils that characterize this site are deep and moderately well drained. They are formed in mixed alluvium. Surface textures are loamy sands, sandy loams and loamy fine sands, underlain by hard, calcareous, loam, sandy loam horizons with concretions within the upper 10 inches of the soil surface and deeper, or a 12 inch lime cemented duripan. Available water capacity is very low to moderate and the hazard of water erosion is slight. Wind erosion hazard is moderate to severe. Effective rooting depth is 8 to 20 inches or more. Water tables are greater than 60 inches.

Table 4. Representative soil features

|                                         |                                         |
|-----------------------------------------|-----------------------------------------|
| Surface texture                         | (1) Sandy loam<br>(2) Loamy sand        |
| Family particle size                    | (1) Loamy                               |
| Drainage class                          | Moderately well drained to well drained |
| Permeability class                      | Moderate to moderately rapid            |
| Soil depth                              | 40 – 150 cm                             |
| Surface fragment cover <=3"             | 80 %                                    |
| Available water capacity<br>(0-101.6cm) | 0.2 – 0.33 cm                           |

|                                                          |                 |
|----------------------------------------------------------|-----------------|
| Calcium carbonate equivalent<br>(0-101.6cm)              | 20 – 30 %       |
| Electrical conductivity<br>(0-101.6cm)                   | 0 – 10 mmhos/cm |
| Sodium adsorption ratio<br>(0-101.6cm)                   | 0 – 10          |
| Soil reaction (1:1 water)<br>(0-101.6cm)                 | 7.8 – 10        |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 10 %            |

## Ecological dynamics

This is a very stable plant community so long as the site is undisturbed. Destructive impacts such as land clearing may reduce cover of the perennial shrubs and grasses. Species density and diversity will also decrease. With a loss of perennial cover, non-native annual forbs and grasses such as red-stem filaree, red brome and Schismus will readily invade this site. Fire Effects - Desert communities are usually unaffected by fire due to low fuel loads. A year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the ecosystem is extreme. Due to the harsh environment recovery is slow. Shadscale, white bursage and creosotebush possess limited sprouting ability, thus can be killed by fire. Desert needlegrass has persistent dead leaf bases, which makes it susceptible to burning. A rapid, cool fire may top-kill desert needlegrass, but may not burn into the root crown allowing for resprouting.

As ecological condition deteriorates, shadscale and creosotebush become more dominant as the perennial grasses decline. The short-lived perennials such as white bursage and rayless goldenhead also increase. Destructive impacts such as land clearing can also reduce long-lived creosotebush. Species likely to invade this site are non-native annual forbs and grasses such as filaree, bromes and schismus.

## 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 (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 6. Community 1.2 plant community composition

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

Table 7. Community 2.1 plant community composition

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

Table 8. Community 2.2 plant community composition

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

## Animal community

Wildlife Interpretations: This site provides habitat for small mammals such as kangaroo rats and antelope ground squirrels. Game and fur mammals include coyotes and black-tailed jackrabbits. Raptors, ravens, roadrunners and songbirds also frequent this site. Common reptiles include side-blotched lizards and western whiptails. These soils provide suitable habitat for burrowing reptiles such as the desert tortoise where soil depths are greater than 10 inches. Wildlife Habitat: Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Habitat-destructive military maneuvers and vehicle activity off designated roads are incompatible with desert tortoise recovery. Access to non-essential roads and trails should be closed. These and other disturbed areas should be restored to pre-disturbance conditions. Water developments would also increase the species diversity of this site. Grazing Interpretations: This site is suitable for limited spring grazing by sheep and also cattle where water is available. During favorable years, annual forbs and grasses provide additional forage. General guide to initial stocking rate: Before making specific recommendations, an on-site evaluation must be made. Pounds/acre air dry Normal years 200

## Hydrological functions

Runoff is very low to medium. Hydrologic soil group B - soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well-drained soils with moderately fine to moderately coarse textures. Hydrologic soil group D - soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high watertable, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good - >70% ground cover (includes litter, grass and brush overstory); fair - 30 to 70% ground cover; poor - 30% ground cover. Soil Series: Lavic Hydrologic Group: B Hydrologic Conditions and Runoff Curves: Good 68; Fair 72; Poor 77 Soil Series: Muroc Hydrologic Group: D Hydrologic Conditions and Runoff Curves: Good 84; Fair 86; Poor 88

## Recreational uses

This site has value for open space, especially for off-road vehicle enthusiasts. Flowering wildflowers and desert tortoise may also attract visitors.

## Other information

Revegetation/Restoration: Species recommended for revegetation of disturbed areas include white bursage, creosotebush, shadscale and winterfat. Transplants are more effective than direct seeding. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall is sparse. Summer annuals and non-native species should be removed from around transplants and protection from rodents is recommended. Military Operations - Land clearing or other disturbances that destroys the vegetation and soil structure can result in increased erosion, soil blowing and barren areas. Off-road vehicles should be limited to existing roads and trails. Native species indigenous to this site are recommended for any revegetation efforts.

## Inventory data references

Sampling technique \_9\_ NV-ECS-1 \_1\_ SCS-Range 417 \_\_\_\_ Other

## Type locality

|                                       |                                                                                   |
|---------------------------------------|-----------------------------------------------------------------------------------|
| Location 1: San Bernardino County, CA |                                                                                   |
| Township/Range/Section                | T10N R6W S20                                                                      |
| General legal description             | South of Kramer Junction, Edwards Air Force Base, San Bernardino Co., California. |

## Other references

Hereford, R., R.H. Webb and C. I. Longpre. 2004. Precipitation history of the Mojave Desert region, 1893-2001 (No. 117-03).

Hickman, J.C. (ed) 1995. The Jepson Manual - Higher Plants of California.

Kottek, M., Grieser, J., Beck, C., Rudolf, B., & Rubel, F. (2006). World map of the Köppen-Geiger climate classification updated. Meteorologische Zeitschrift, 15(3), 259-263.

Contributors

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Approval

Kendra Moseley, 10/21/2024

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                                        | 09/15/2026        |
| 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:

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7. Amount of litter movement (describe size and distance expected to travel):

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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):

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9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):

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10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and 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):

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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:

Sub-dominant:

Other:

Additional:

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13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

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14. Average percent litter cover (%) and depth ( in):

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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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