USDA Natural Resources
Conservation Service

Ecological site R030XA050CA
Volcanic Slope 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.

Ecological site concept

The Volcanic Hill ecological site is found among the mountains and hills landscape on extrusive igneous material such as basalt and rhyolite between 1600 and 3000 feet elevation. Soils are loamy and moderately deep to very deep with a very shallow to shallow argillic horizon. Fragments over 10 inches in diameter cover less than 20% of the soil surface.

Please refer to group concept R030XA045CA to view the provisional STM.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex polycarpa*
Herbaceous	(1) *Poa secunda*

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	488–914 m
Slope	30–60%
Water table depth	152 cm

Climatic features

Table 3. Representative climatic features

Frost-free period (average)	270 days
Freeze-free period (average)	300 days
Precipitation total (average)	178 mm

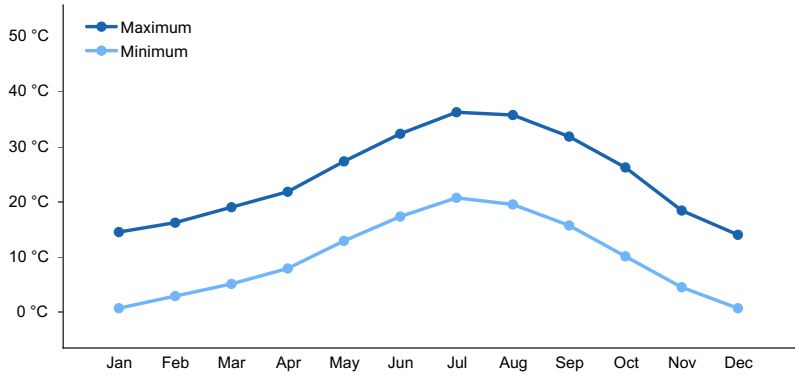


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

Soil features

Table 4. Representative soil features

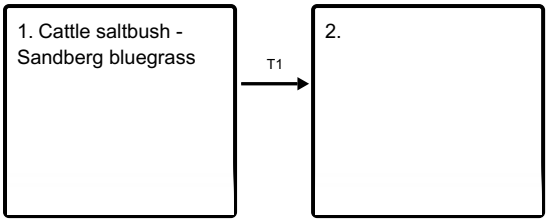
Surface texture	(1) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow
Soil depth	86–112 cm
Surface fragment cover <=3"	50–75%
Surface fragment cover >3"	5–15%
Available water capacity (0-101.6cm)	3.81–19.81 cm
Calcium carbonate equivalent (0-101.6cm)	0–1%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.2–7.8
Subsurface fragment volume <=3" (Depth not specified)	5–30%
Subsurface fragment volume >3" (Depth not specified)	0–40%

Ecological dynamics

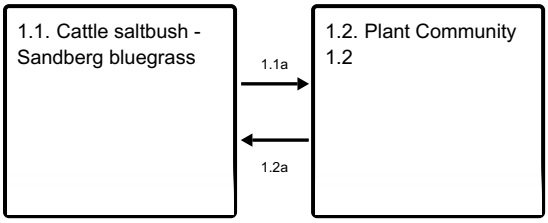
Please refer to group concept R030XA045CA to view the provisional STM.

State and transition model

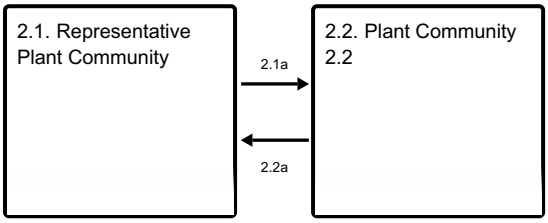
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Cattle saltbush - Sandberg bluegrass

Community 1.1
Cattle saltbush - Sandberg bluegrass

The major species in this plant community are cattle saltbush (*Atriplex polycarpa*) and Sandberg bluegrass (*Poa secunda*). Burrobrush (*Hymenoclea salsola*) is also a common species. Several plant species are present throughout the ecological site but are more common in localized areas. These include Mexican bladdersage (*Salazaria mexicana*), white burrobush (*Ambrosia dumosa*), and winterfat (*Krascheninnikovia lanata*). Other minor species include Nevada jointfir (*Ephedra nevadensis*), California buckwheat (*Eriogonum fasciculatum*), spiny hopsage (*Grayia spinosa*), creosote bush (*Larrea tridentata*), water jacket (*Lycium andersonii*), and longspine horsebrush (*Tetradymia axillaris*). This community has a predominantly one-tier structure. The tope vegetation canopy typically covers litter or gravel. Lower tiers of grasses and other shrubs are scattered. In a below average rainfall year, approximately 30 to 60 percent of the ground surface had native perennial vegetation cover. Contributions of native annual species were minimal but may be more so during average or above average rainfall years.

Table 5. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	35-55%
Grass/grasslike foliar cover	5-10%
Forb foliar cover	1-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-10%
Surface fragments >0.25" and <=3"	25-50%
Surface fragments >3"	1-20%
Bedrock	0%

Water	0%
Bare ground	1-5%

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	1-5%
Grass/grasslike basal cover	1-3%
Forb basal cover	1-2%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-35%
Surface fragments >0.25" and <=3"	50-70%
Surface fragments >3"	1-5%
Bedrock	0%
Water	0%
Bare ground	1-7%

Community 1.2
Plant Community 1.2

This plant community is characteristic of an early seral, post- disturbance plant community. Initially, this plant community phase is heavily dominated by herbaceous vegetation. Perennial grasses provide favorable sites for the establishment of shrub seedlings. This plant community is considered at risk of invasion by non-native annuals. Non-natives take advantage of increased availability of critical resources following a fire or other disturbance.

Pathway 1.1a
Community 1.1 to 1.2

Wildfire, disease, prolonged drought, insect attack or any other type of incomplete vegetation removal.

Pathway 1.2a
Community 1.2 to 1.1

Absence from disturbance and natural regeneration over time.

State 2

Community 2.1
Representative Plant Community

This plant community is similar to the reference plant community with a trace of non-natives in the understory. Ecological function has been not compromised at this time. Ecological resilience is reduced by the presence of non-native species and this plant community phase will respond differently following a disturbance when compared to non-invaded plant communities.

Community 2.2
Plant Community 2.2

This plant community is characteristic of a post-disturbance plant community. It is initially dominated by herbaceous vegetation, woody perennials are increasing.

Pathway 2.1a
Community 2.1 to 2.2

Frequent and repeated surface disturbances, wildfire, disease, insect attack, or any other type of incomplete vegetation removal.

Pathway 2.2a
Community 2.2 to 2.1

Absence from disturbance and natural regeneration over time.

Transition T1
State 1 to 2

Introduction of non-native species due to a combination of factors including; surface disturbance, changes in the kinds of animals and their grazing patterns, drought, changes in fire history or any other type of vegetation removal.

Additional community tables

Animal community

Cattle saltbush (*Atriplex polycarpa*) and Sandberg bluegrass (*Poa secunda*) are important forage species for wildlife. The shrubs on this ecosite also provide cover for many animals.

Cattle saltbush and Sandberg bluegrass are also valuable as livestock forage (Sampson and Jesperson 1963). However, use of this ecological site for that purpose would be limited by the steep, rocky slopes on which it is found.

Recreational uses

This ecological site is located in an off-highway vehicle recreation area. Parts of this ecological site are located in close proximity to areas where travel is not restricted to established trails. Such activity may aid the transport of invasive species seeds to this community.

Inventory data references

3 Line-point intercept transects (2007)

Annual production was not sampled due to a poor growing season in 2007. Total production estimated with assistance from Leon J. Lato, Soil Scientist (Las Vegas, NV).

Other references

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Contributors

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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)	
Contact for lead author	
Date	05/13/2025
Approved by	Kendra Moseley
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):**

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):**

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:**
