Ecological site R030XA051CA
Steep Granitic Hills 5-7 p.z.

Last updated: 2/18/2025
Accessed: 05/10/2025

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 ecological site occurs on hills and mountains. Slopes range between 30 and 60 percent. The soils on this ecological site are derived from granitic residuum and colluvium. The soils are very shallow to highly weathered bedrock.

Please refer to group concept R030XA036CA to view the provisional STM.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex canescens* (2) *Salazaria mexicana*
Herbaceous	Not specified

Physiographic features

This ecological site occurs on hills and mountains. Slopes range between 30 and 60 percent.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	2,600–4,130 ft
Slope	30–60%
Water table depth	60 in
Aspect	Aspect is not a significant factor

Climatic features

The Mojave Desert experiences clear, dry conditions for a majority of the year. Winter temperatures are mild, summer temperatures are hot, and seasonal and diurnal temperature fluctuations are large. Monthly minimum temperature averages range from 30 to 80 degrees F (-1 to 27 degrees C). Monthly maximum temperature averages range from 60 to 110 degrees F (16 to 43 degrees C) (CSU 2002).

Average annual rainfall is between 2 and 8 inches (50 to 205 millimeters) (USDA 2006). Snowfall is more common at elevations above 4000 feet (1220 meters), but it may not occur every year (WRCC 2002). The Mojave Desert

receives precipitation from two sources. Precipitation falls primarily in the winter as a result of storms originating in the northern Pacific Ocean. The Sierra Nevada and Transverse Ranges create a rain shadow effect, causing little precipitation to reach the Mojave Desert. Sporadic rainfall occurs during the summer as a result of convection storms formed when moisture from the Gulf of Mexico or Gulf of California moves into the region. Summer rainfall is more common and has a greater influence on soil moisture in the eastern Mojave Desert.

Windy conditions are also common in the Mojave Desert, particularly in the west and central Mojave Desert. Spring is typically the windiest season, with winds averaging 10-15 miles per hour (WRCC 2002). Winds in excess of 25 miles per hour and gusts in excess of 50 miles per hour are not uncommon (CSU 2002).

Although half of the Jawbone-Butterbredt ACEC Soil Survey is in the Mojave Desert (MLRA 30), the western and northwestern areas of the survey transition into the Southern Nevada Basin and Range (MLRA 29). As the Mojave Desert transitions into the Southern Nevada Basin and Range, the temperature range generally becomes cooler (WRCC 2002). Precipitation as rain and as snow also increases (USDA 2006). This survey area has a wide range of precipitation due to its location. Where the Mojave Desert influences are stronger, average annual precipitation ranges from 5 to 7 inches (127 to 178 millimeters). Where the Southern Nevada Basin and Range influences are stronger, average annual precipitation commonly ranges from 7 to 9 inches (178 to 229 millimeters), and may range up to 12 inches (305 millimeters) annually (WRCC 2002). At elevations above 4000 feet (1370 meters), average annual snowfall may reach 20 inches (WRCC 2002).

The data from the following climate stations were used to describe the climate in the Jawbone-Butterbredt ACEC Soil Survey (station number in parentheses):
Cantil, CA (041488)
Inyokern, CA (044278)
Mojave, CA (045756)
Tehachapi, CA (048826)

"Maximum monthly precipitation" represents average monthly precipitation.

Table 3. Representative climatic features

Frost-free period (average)	270 days
Freeze-free period (average)	300 days
Precipitation total (average)	7 in

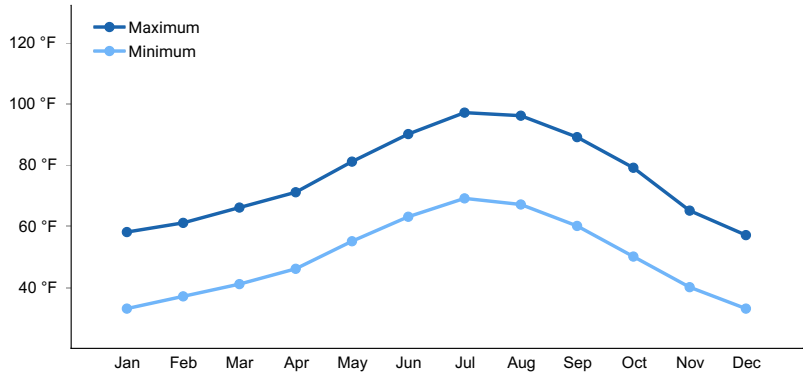

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

Soil features

The soils on this ecological site are derived from granitic residuum and colluvium. The soils are very shallow to highly weathered bedrock. Soil textures are loamy sands in the surface horizon and extremely cobbly sandy loams in the subsurface. Permeability is moderate, and runoff is very high. Available water capacity is very low.

Soils classify as follows:
Typic Torriorthents – Loamy-skeletal, mixed, superactive, nonacid, thermic shallow Typic Torriorthents
Lithic Torripsamments
Lithic Haplargids – Loamy-skeletal, mixed, superactive, thermic Lithic Haplargids

Soil survey area – Map unit symbol – Component
CA682 – 3280 – Typic Torriorthents (major)
CA682 – 3280 – Lithic Torripsamments
CA682 – 3430 – Lithic Haplargids

Table 4. Representative soil features

Surface texture	(1) Loamy sand
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained
Permeability class	Moderate
Soil depth	3–8 in
Surface fragment cover <=3"	65–85%
Surface fragment cover >3"	0–20%
Available water capacity (0-40in)	0.3–0.6 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	7.2–7.4
Subsurface fragment volume <=3" (Depth not specified)	35–50%
Subsurface fragment volume >3" (Depth not specified)	0–40%

Ecological dynamics

Please refer to group concept R030XA036CA to view the provisional STM.

This ecological site is characterized by a patchy distribution of the major species, fourwing saltbush (*Atriplex canescens*) and Mexican bladdersage (*Salazaria mexicana*). In these patches, cover of one species is noticeably greater than the other, and the distribution of patches is affected by the disturbances to the site. Fourwing saltbush is a relatively long-lived shrub, is widely distributed in North America, and has a wide tolerance of different growing conditions. It is often a component of late seral communities, but it is also found on disturbed sites (Webb et. al. 1987). It is also used to revegetate disturbed sites (Howard 2003). Mexican bladdersage is commonly found in drainageways and other disturbed areas (Hickman 1993, Wells 1961). In this ecosite this species is frequently found on steeper slopes where runoff may be similar to that of a drainageway and where soils are less stable. It is common in early and mid-seral communities (Webb et al. 1987), but can also be found in late seral communities (Tesky 1994).

California buckwheat (*Eriogonum fasciculatum*) is another common shrub and is relatively evenly distributed throughout the ecosite. California buckwheat (*Eriogonum fasciculatum*) is also adapted to a wide range of environmental conditions. It is typically more common in early and mid-seral communities. The shallow roots of California buckwheat may help it tolerate the shallow soils on this ecological site (Kummerow et. al. 1977).

This ecological site is subject to invasion by non-native species as a result of the disturbance that occurs by water and soil movement. Where it is present, red brome (*Bromus rubens*) accounts for approximately 25 percent of the vegetation cover, and is present both as a canopy and understory species. An increase in invasive species cover may lead to increased risk of wildfire on this ecological site by creating a more continuous, easily ignitable fuel source. In turn, higher fire frequencies will encourage the spread of invasive species.

State and transition model

Ecosystem states

1. Fourwing saltbush - Mexican bladdersage

State 1 submodel, plant communities

1.1. Fourwing saltbush - Mexican bladdersage

State 1
Fourwing saltbush - Mexican bladdersage

Community 1.1
Fourwing saltbush - Mexican bladdersage

The interpretive plant community is the reference plant community prior to European colonization. The major species in this community are fourwing saltbush (*Atriplex canescens*), Mexican bladdersage (*Salazaria mexicana*), and California buckwheat (*Eriogonum fasciculatum*). Fourwing saltbush and Mexican bladdersage are distributed in patches is where cover of one noticeably greater than cover of the other. California buckwheat is relatively evenly distributed throughout the ecosite. Minor species on this ecological site include spiny hopsage (*Grayia spinosa*), narrowleaf goldenbush (*Ericameria linearifolia*), desert needlegrass (Achnatherum speciousum), peach thorn (*Lycium cooperi*), burrobrush (*Hymenoclea salsola*), and blackbrush (*Coleogyne ramosissima*). The plant community has a predominantly one-tier structure. The top vegetation canopy typically covers litter or gravel. Lower tiers of grasses or other shrubs are scattered. Sandberg bluegrass (*Poa secunda*) is a common low tier species. In a below average rainfall year, approximately 33 percent of the ground surface had a native perennial canopy, and 12 percent had an annual species canopy. In above average rainfall years, annual species may form a more significant cover component.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	85	127	170
Grass/Grasslike	10	15	20
Forb	5	8	10
Total	**100**	**150**	**200**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	30-40%
Grass/grasslike foliar cover	1-5%

Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-15%
Surface fragments >0.25" and <=3"	25-35%
Surface fragments >3"	2-10%
Bedrock	0%
Water	0%
Bare ground	1-3%

Table 7. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	3-5%
Grass/grasslike basal cover	1-3%
Forb basal cover	1-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-15%
Surface fragments >0.25" and <=3"	60-75%
Surface fragments >3"	5-15%
Bedrock	0%
Water	0%
Bare ground	1-3%

Additional community tables

Animal community

Fourwing saltbush and California buckwheat are important food sources for wildlife. Vegetation provides cover for small animals. Management of this ecological site for recreation or livestock use is highly limited due to the steep slopes on which it occurs.

Hydrological functions

This ecological site has high runoff due to steep slopes and shallow soils. This influences the types of plants present in this ecosite.

Recreational uses

This ecological site is located in an off-highway vehicle recreation area. Travel in the vicinity of this ecological site is limited to existing trails.

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

California State University (CSU) Desert Studies Center. 2002. Desert Climate. CSU Desert Studies Center, Soda Springs, CA. Online. http://biology.fullerton.edu/facilities/dsc/zz_climate.html. Accessed 28 November 2006.

Hickman, J.C. (ed.). 1993. The Jepson Manual: Higher Plants of California. Berkeley, CA: University of California Press. 1400pp.

Howard, Janet L. 2003. *Atriplex canescens*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2006 November 15].

Kummerow, J., D. Krause, and W. Jow. 1977. Root systems of chaparral shrubs. Oecologia 29: 163-177.

Tesky, Julie L. 1994. *Salazaria mexicana*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2006 December 14].

United States Department of Agriculture (USDA), Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Webb, R.H., J.W. Steiger, and R.M. Turner. 1987. Dynamics of Mojave Desert shrub assemblages in the Panamint Mountains, California. Ecology 68(3): 478-490.

Wells, P.V. 1961. Succession in desert vegetation on the streets of a Nevada ghost town. Science 134: 670-671.

Western Regional Climate Center (WRCC). 2002. Western U.S. Climate Historical Summaries [Online]. Desert Research Institute, Reno, NV. Online. http://www.wrcc.dri.edu/Climsum.html. Accessed 28 November 2006.

Contributors

Allison Tokunaga

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	05/10/2025
Approved by	Kendra Moseley
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):**

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:**

17. **Perennial plant reproductive capability:**