# Ecological site R030XA048CA
# Shallow Fans 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 Shallow Fans ecological site is found on fan remnants, eroded fan remnants, and pediments among the upper fan piedmont between 3000 - 4000 feet (915 - 1200 m) elevation. Soils formed in alluvium derived from granodiorite and are shallow or shallow to an argillic horizon with a coarse-loamy particle size. The central concept for this ecological site is within the Soil Survey of Mojave Desert Area, Northwest Part, California (CA682) on the 70% Dovecanyon component in the Dovecanyon-Cutterbank association, 4 to 50 percent slopes map unit.

This is a group concept and provisional STM that also covers the following ecological site: R030XA044CA.

## Associated sites

| | |
|---|---|
| R030XA020CA | **Arid Fans 5-7**<br>R030XA020CA Limy 5-7 |
| R030XA046CA | **Steep Granitic Slope 5-7" p.z.**<br>R030XA046CA Steep Granitic Slope 5-7 |
| R030XA047CA | **Shallow Granitic Slope 5-7" p.z.**<br>R030XA047CA Shallow Granitic Slope 5-7 |
| R030XA051CA | **Steep Granitic Hills 5-7 p.z.**<br>R030XA051CA Steep Granitic Hills 5-7 |
| R030XA054NV | **Limy Hill 5-7 P.Z.**<br>R030XA054NV Limy Hill 5-7 |

## Similar sites

| | |
|---|---|
| R030XA047CA | **Shallow Granitic Slope 5-7" p.z.**<br>R030XA047CA Shallow Granitic Slope 5-7 |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Coleogyne ramosissima*<br>(2) *Larrea tridentata* |
| Herbaceous | (1) *Poa secunda* |

## Physiographic features

This ecological site occurs on summits and backslopes of eroded fan remnants and pediments. Slopes are generally between 2 and 30 percent slope.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Fan remnant<br>(2) Eroded fan remnant<br>(3) Pediment |
| Flooding frequency | None |
| Ponding frequency | None |

| | |
|---|---|
| Elevation | 899–1,219 m |
| Slope | 2–30% |
| Water table depth | 203 cm |
| 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 2002b). 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 2002b). 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 2002b). 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 2002b). At elevations above 4000 feet (1370 meters), average annual snowfall may reach 20 inches (WRCC 2002b).

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) | 300 days |
| Freeze-free period (average) | 315 days |
| Precipitation total (average) | 178 mm |

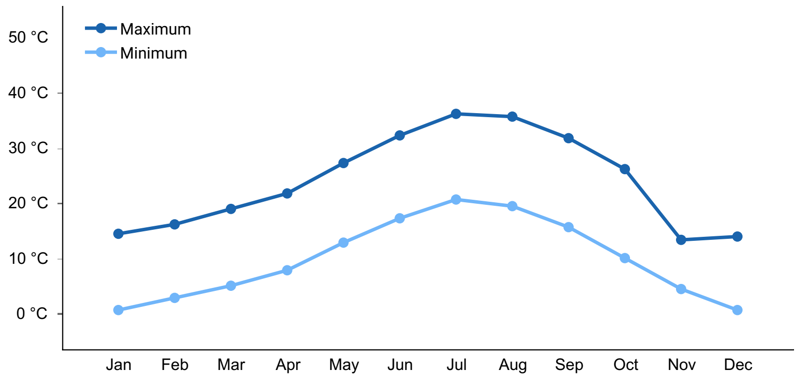



**Figure 1. Monthly average minimum and maximum temperature**

## Influencing water features

## Soil features

This ecological is found on both very deep (>60 inches) alluvial granitic soils and on shallow to weathered granitic bedrock residual and colluvial soils. The alluvial soils (Dovecanyon series) have a well-developed argillic horizon that begins at a shallow depth. The available water capacity of these soils is low to moderate due to the presence of the argillic horizon. Alluvial soils have coarse-loamy textures and may be gravelly, have moderate permeability, and are well drained.

Shallow soils have very low available water capacity, but weathered granitic material contains numerous small cracks that increase its available water capacity to plant roots. Shallow residual soils are typically sandy throughout, have moderately rapid permeability, and are somewhat excessively drained.

This ecological site is found on soils that classify as follows:
Jawbone -- Mixed, thermic, shallow Typic Torripsamments
Dovecanyon -- Coarse-loamy, mixed, superactive, thermic Typic Haplargids

Soil survey area - Map unit symbol - Component
CA682 – 3250 – Jawbone, cool
CA682 – 3251 – Jawbone, warm (major)
CA682 – 3251 – Jawbone (major)
CA682 – 3251 – Dovecanyon, cool
CA682 – 3280 – Typic Haplocambids
CA682 – 3301 – Dovecanyon, cool
CA682 – 4160 – Dovecanyon (major)
CA682 – 4160 – Typic Haplargids
CA682 – 4161 – Dovecanyon (major)
CA682 – 4161 – Typic Haplargids
CA682 – 4170 – Dovecanyon (major)
CA682 – 4170 – Typic Torriorthents
CA682 – 4171 – Dovecanyon, cool

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Loamy sand |
| Family particle size | (1) Loamy |
| Drainage class | Well drained to somewhat excessively drained |
| Permeability class | Moderate to moderately rapid |
| Soil depth | 13–152 cm |
| Surface fragment cover <=3" | 30–60% |

| | |
|---|---|
| Surface fragment cover >3" | 0–10% |
| Available water capacity (0-101.6cm) | 0.76–15.75 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) | 6.6–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–25% |
| Subsurface fragment volume >3" (Depth not specified) | 0% |

## Ecological dynamics

This ecological site is located in a transition zone between the Mojave Desert and the Southern Nevada Basin and Range major land resource areas (MLRA 30 and MLRA 29, respectively). The dominant species are blackbrush (*Coleogyne ramosissima*), creosote bush (*Larrea tridentata*), and white bursage (*Ambrosia dumosa*). Blackbrush is commonly found in cooler environments, such as at higher elevations and in areas more affected by the climate of MLRA 29. Creosote bush and white bursage are commonly found in warmer environments. These species form two plant communities within this ecosite. The most widespread community is dominated by blackbrush and creosote bush, with little to no white bursage present. A less extensive plant community within this ecosite is dominated by blackbrush and white bursage (*Ambrosia dumosa*), with little to no creosote bush present. The plant community dominated by blackbrush and white bursage is found closer to the MLRA 29 "line" which is mainly at the upper elevations of this ecological site.

The dominant species on this ecological site are late seral species. Blackbrush is shallow-rooting, slow-growing species commonly found on stable soils and on soils shallow to weathered bedrock. The stable soils typically have an argillic horizon at shallow depth. At this depth and with its higher available water capacity, an argillic horizon may aid blackbrush survival by supplying more water to blackbrush’s shallow roots. The presence of blackbrush on shallow granitic soils may also be a function of water availability. Due to the way in which granite weathers, the higher available water capacity of the bedrock and the ability of blackbrush to access the water through numerous cracks may be important for supporting the community. It is thought to be a paleoendemic species, once having a wider range but now limited to its present extent by environmental conditions (Stebbins and Major 1965). It has infrequent germination events and low seedling survival (Anderson 2001).

Creosote bush (*Larrea tridentata*) is a long-lived species that reproduces largely by cloning (Marshall 1995). It is slow to establish from seed due to infrequent masting and germination (Barbour 1968). Creosote bush has a deep, expansive root system that can extract water from a large volume of soil. In addition, it is highly effective at extracting water at very low water potentials. White bursage is a drought-deciduous species often found with late seral species such as blackbrush and creosote bush, but its seeding ability allows it to colonize disturbed sites (Marshall 1994).

The successional status of the dominant species suggests that disturbances to this area are not common and/or are not intense. Flooding and ponding on this ecosite are unlikely. Wildfire has historically been a rare occurrence in the desert, but its effects may be severe. Widely spaced shrubs and discontinuous fuels prevented fires from spreading easily. Spread of invasive annual species in the Mojave Desert creates a more continuous and easily ignitable fuel bed, particularly after heavy rains, and increases the fire frequency and the size of the area disturbed (Clarke 2006, Howard 2006). Invasive annual plants such as red brome (*Bromus rubens*) often re-colonize these disturbed sites (Brooks et al. 2003). Red brome is currently present in small amounts on this ecosite. Its spread would increase the risk and frequency of fire on this ecosite. Non-native forbs such as redstem filaree (*Erodium cicutarium*) are also present and can produce a large amount of biomass on this ecosite.

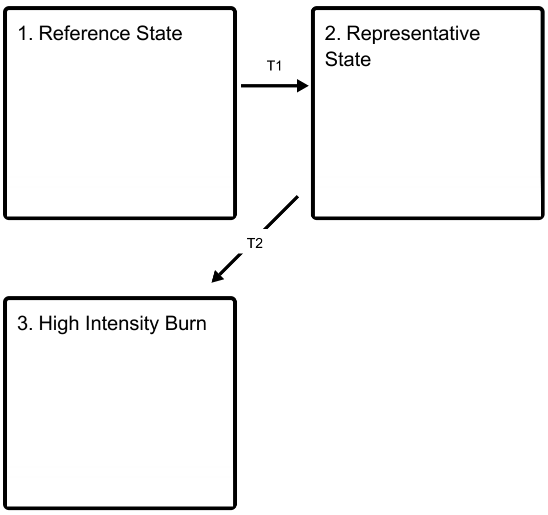
Blackbrush communities are likely to be significantly altered by fire or other widespread disturbance. The ability of blackbrush to recolonize a disturbed site is severely limited by infrequent seedling establishment and an inability of existing plants to resprout following a disturbance. Fires in blackbrush communities were often stand-replacing (Brooks et al. 2003), but historical fire return intervals of more than 100 years allowed for slow re-establishment (Anderson 2001). Burning or scorching often causes high mortality in creosote bush, but creosote bush has some ability to resprout following removal of aboveground stems if the root crown is not killed (Marshall 1995). White bursage is generally killed by disturbance. Its ability to resprout is low, but it can re-establish on a site if a seed source is available (Marshall 1994).

Early and mid-successional shrubs are present in small amounts and would become more common if this ecosite were disturbed. These include spiny hopsage (*Grayia spinosa*), Cooper’s goldenbush (*Ericameria cooperi*), burrobrush (*Hymenoclea salsola*), and California buckwheat (*Eriogonum fasciculatum*). These species are adapted to a wide range of environmental conditions. Ample seed production, easy seed dispersal, and rapid growth help these species establish on disturbed areas. Perennial grasses such as Sandberg bluegrass (*Poa secunda*) also have the ability to resprout following a disturbance. Reduced competition from late seral species for light, water, and nutrients facilitates plant growth.

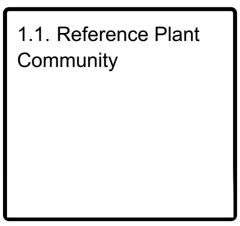
Several forb species are present in one community but not the other. The two communities were sampled in different years. The difference in species composition may be a reflection of factors such as interannual variability in the precipitation and temperature that allowed some species to grow better than others in that year. Production by and percent cover of annual herbaceous species relative to perennial species may also differ as a result of this variability. In years of above-average rainfall, annual herbaceous species may contribute relatively more to production and cover than in drier years. In below-average rainfall years, many annual species will not grow, and perennial species will contribute more to production and to cover.

## State and transition model

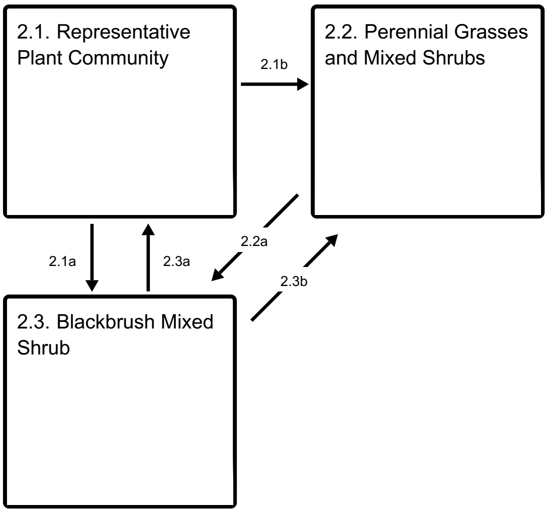
**Ecosystem states**



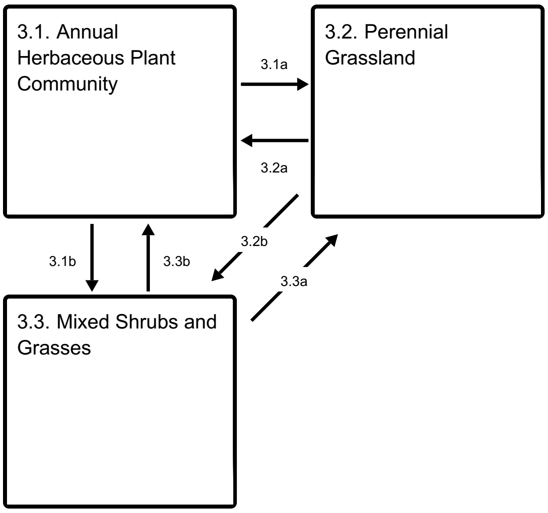

**State 1 submodel, plant communities**



**State 2 submodel, plant communities**




**State 3 submodel, plant communities**




## State 1
## Reference State

The Reference State is characterized by a blackbrush mixed shrub community. This ecological site is at the lower and warmer elevations of blackbrush habitat. Once blackbrush is removed from this plant community it is replaced by other shrubs and unlikely for blackbrush to return.

## Community 1.1
## Reference Plant Community

The blackbrush-creosote bush (*Coleogyne ramosissima*-*Larrea tridentata*) community reflects a transition from hot desert to cold desert. Blackbrush is more common on cooler and shallower soils (Anderson 2001), whereas creosote bush is often on warmer and deeper soils (Rundel and Gibson 1996). Creosote bush becomes less dominant as elevation increases. Other species present in small amounts include Sandberg bluegrass (*Poa secunda*), Cooper's goldenbush (*Ericameria cooperi*), California buckwheat (*Eriogonum fasciculatum*), and white bursage (*Ambrosia dumosa*). The potential plant community is 90% shrubs, 5% perennial grasses, and 5% annual forbs.

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

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Shrub/Vine | 294 | 485 | 564 |
| Grass/Grasslike | 12 | 34 | 56 |
| Forb | 30 | 41 | 53 |
| **Total** | **336** | **560** | **673** |

**Table 6. Ground cover**

| | |
|---|---|
| Tree foliar cover | 0% |
| Shrub/vine/liana foliar cover | 40-45% |
| Grass/grasslike foliar cover | 2-3% |
| Forb foliar cover | 5-7% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 0% |
| Surface fragments >0.25" and <=3" | 0% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 0% |

**Table 7. Soil surface cover**

| | |
|---|---|
| Tree basal cover | 0% |
| Shrub/vine/liana basal cover | 15-20% |
| Grass/grasslike basal cover | 1-2% |
| Forb basal cover | 1-2% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 15-20% |
| Surface fragments >0.25" and <=3" | 2-3% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 0% |

**Table 8. Canopy structure (% cover)**

| Height Above Ground (M) | Tree | Shrub/Vine | Grass/ Grasslike | Forb |
|---|---|---|---|---|
| <0.15 | – | – | – | 3-5% |
| >0.15 <= 0.3 | – | – | – | 0-2% |
| >0.3 <= 0.6 | – | 3-5% | 2-3% | – |
| >0.6 <= 1.4 | – | 20-25% | – | – |
| >1.4 <= 4 | – | 15-20% | – | – |
| >4 <= 12 | – | – | – | – |
| >12 <= 24 | – | – | – | – |
| >24 <= 37 | – | – | – | – |
| >37 | – | – | – | – |

## State 2
## Representative State

Introduced annuals such as red brome, schismus and redstem stork's bill have invaded the reference plant community and have become a dominant component of the herbaceous cover. This invasion of non-natives is attributed to a combination of factors including surface disturbances, changes in the kinds of animals and their grazing patterns, drought, and changes in fire history. Following wet years, dried non-natives annuals can provide enough fuel to carry wildfires where large, intense wildfires historically have been infrequent.

## Community 2.1
## Representative Plant Community

Compositionally this plant community is similar to the Reference State with the presence of non-native species in the understory.

## Community 2.2
## Perennial Grasses and Mixed Shrubs

This plant community is characterized by increased annual, perennial, native and non-native grasses. Few surviving shrubs will remain on the site. This plant community is identified as “at-risk”. Continued heavy disturbance or repeated fire will exclude shrubs and change the ecological dynamics of the site.

**Table 9. Annual production by plant type**

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Shrub/Vine | 152 | 229 | 344 |
| Grass/Grasslike | 38 | 57 | 85 |
| Forb | 34 | 50 | 75 |
| **Total** | **224** | **336** | **504** |

**Table 10. Ground cover**

| | |
|---|---|
| Tree foliar cover | 0% |
| Shrub/vine/liana foliar cover | 25-30% |
| Grass/grasslike foliar cover | 7-10% |
| Forb foliar cover | 2-3% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |

| | |
|---|---|
| Litter | 0% |
| Surface fragments >0.25" and <=3" | 0% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 0% |

**Table 11. Soil surface cover**

| | |
|---|---|
| Tree basal cover | 0% |
| Shrub/vine/liana basal cover | 15-20% |
| Grass/grasslike basal cover | 5-7% |
| Forb basal cover | 1-2% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 1-2% |
| Surface fragments >0.25" and <=3" | 0% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 0% |

**Table 12. Canopy structure (% cover)**

| Height Above Ground (M) | Tree | Shrub/Vine | Grass/ Grasslike | Forb |
|---|---|---|---|---|
| <0.15 | – | – | – | 2-3% |
| >0.15 <= 0.3 | – | – | 5-7% | – |
| >0.3 <= 0.6 | – | 15-20% | – | – |
| >0.6 <= 1.4 | – | 10-15% | – | – |
| >1.4 <= 4 | – | – | – | – |
| >4 <= 12 | – | – | – | – |
| >12 <= 24 | – | – | – | – |
| >24 <= 37 | – | – | – | – |
| >37 | – | – | – | – |

## Community 2.3 Blackbrush Mixed Shrub

Shrubs have begun to regenerate. Woody species with high seed production and early establishment will be the first to return. Once large shrubs are established and begin to produce shade it will favor the establishment of additional native perennials.

## Pathway 2.1b Community 2.1 to 2.2

Disturbance removes shrubs and favors an increase of herbaceous vegetation and non-native species.

## Pathway 2.1a
## Community 2.1 to 2.3

Disturbance removes long lived shrubs which are replaced by short lived shrubs.

## Pathway 2.2a
## Community 2.2 to 2.3

Absent disturbance, woody species begin to regenerate. Fast growing, short-lived woody species with high reproductive ability such as snakeweed, brittlebush and Eastern Mojave buckwheat will increase and become nurse plants for other species. Blackbrush will begin to reestablish provided favorable climatic conditions and available seed source.

## Pathway 2.3a
## Community 2.3 to 2.1

Many years without fire, minimal disturbance, the presence of a blackbrush seed source, ideal climatic conditions and multiple recruitment pulses blackbrush seedlings will establish and recruit into the stand.

## Pathway 2.3b
## Community 2.3 to 2.2

Low intensity disturbance or some other form of shrub removal may promote perennial grasses.

## State 3
## High Intensity Burn

This state is characterized by the inability of blackbrush to return to site following a fire, due to insufficient climatic conditions and the lack of an available seed source. In the absence of ideal conditions blackbrush will not return to the site. Species will consist of fire tolerant shrubs with high growth rates and high reproductive capacities.

## Community 3.1
## Annual Herbaceous Plant Community

This plant community is characterized by dominance of grasses; annual, perennial, native and non-native. Few surviving shrubs remain on the site. Non-native annuals provide a significant amount of herbaceous biomass.

## Community 3.2
## Perennial Grassland

This plant community is dominated by perennial grasses. Shrubs able to sprout from the root crown following fire, are scattered throughout. Other herbaceous plants, including non-native annuals, are common and wide spread.

## Community 3.3
## Mixed Shrubs and Grasses

This plant community is dominated by a variety of shrubs that were present in smaller quantities in the Reference State. Blackbrush continues to be excluded from this site due to the lack of seed source and ideal conditions required for recruitment and establishment.

## Pathway 3.1a
## Community 3.1 to 3.2

Without disturbance pioneering perennial grasses become established over time.

## Pathway 3.1b

### Community 3.1 to 3.3

Time without disturbance pioneering shrubs germinate and establish from an offsite seed source and sprouting shrubs begin to reappear.

### Pathway 3.2a
### Community 3.2 to 3.1

Small scale fire of other localized disturbances remove patches of woody vegetation and encourage growth of herbaceous species.

### Pathway 3.2b
### Community 3.2 to 3.3

Removal of disturbance and the absence of fire favors establishment of long-live native perennial vegetation.

### Pathway 3.3b
### Community 3.3 to 3.1

Large disturbance, like a high intensity fire, removes woody vegetation and promotes growth of non-native annuals.

### Pathway 3.3a
### Community 3.3 to 3.2

Disturbance, like a low intensity fire, removes woody vegetation and promotes growth of perennial grasses.

### 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. Non-natives can alter disturbance regimes significantly from their natural or historic range and change ecological processes therefore creating an unlikely scenario to restore the site back to reference.

### Transition T2
### State 2 to 3

Large scale high intensity fire in combination with insufficient climatic conditions for germination and establishment of blackbrush. This is the lowest elevational extent of blackbrush habitat where recovery from an intense fire or complete blackbrush removal is not expected.

## Additional community tables

**Table 13. Community 1.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Shrub/Vine** | | | | | |
| 1 | **Perennial Shrubs** | | | 294–564 | |
| | blackbrush | CORA | *Coleogyne ramosissima* | 168–244 | – |
| | creosote bush | LATR2 | *Larrea tridentata* | 84–233 | – |
| | Cooper's goldenbush | ERCO23 | *Ericameria cooperi* | 25–34 | – |
| | burrobush | AMDU2 | *Ambrosia dumosa* | 4–20 | – |
| | Eastern Mojave buckwheat | ERFA2 | *Eriogonum fasciculatum* | 12–17 | – |
| | Nevada jointfir | EPNE | *Ephedra nevadensis* | 0–6 | – |
| | Mojave woodyaster | XYTO2 | *Xylorhiza tortifolia* | 0–6 | – |
| | water jacket | LYAN | *Lycium andersonii* | 0–2 | – |
| | burrobrush | HYSA | *Hymenoclea salsola* | 0–2 | – |
| **Grass/Grasslike** | | | | | |
| 2 | **Perennial Grasses** | | | 12–56 | |
| | Sandberg bluegrass | POSE | *Poa secunda* | 12–56 | – |
| **Forb** | | | | | |
| 3 | **Annual Forbs** | | | 30–53 | |
| | combseed | PECTO | *Pectocarya* | 10–15 | – |
| | cryptantha | CRYPT | *Cryptantha* | 10–15 | – |
| | bristly fiddleneck | AMTE3 | *Amsinckia tessellata* | 4–7 | – |
| | woolly easterbonnets | ANWA | *Antheropeas wallacei* | 2–3 | – |
| | gilia | GILIA | *Gilia* | 2–3 | – |
| | white fiestaflower | PHME3 | *Pholistoma membranaceum* | 0–2 | – |
| | lacy phacelia | PHTA | *Phacelia tanacetifolia* | 1–2 | – |

**Table 14. Community 2.2 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Shrub/Vine** | | | | | |
| 1 | **Perennial Shrubs** | | | 152–344 | |
| | blackbrush | CORA | *Coleogyne ramosissima* | 103–226 | – |
| | burrobush | AMDU2 | *Ambrosia dumosa* | 27–61 | – |
| | water jacket | LYAN | *Lycium andersonii* | 11–25 | – |
| | spiny hopsage | GRSP | *Grayia spinosa* | 9–20 | – |
| | creosote bush | LATR2 | *Larrea tridentata* | 0–10 | – |
| | Nevada jointfir | EPNE | *Ephedra nevadensis* | 0–2 | – |
| **Grass/Grasslike** | | | | | |
| 2 | **Perennial Grass** | | | 38–85 | |
| | Sandberg bluegrass | POSE | *Poa secunda* | 38–85 | – |
| **Forb** | | | | | |
| 3 | **Annual forbs** | | | 34–75 | |
| | combseed | PECTO | *Pectocarya* | 18–40 | – |
| | lacy phacelia | PHTA | *Phacelia tanacetifolia* | 7–17 | – |
| | Pringle's woolly sunflower | ERPR4 | *Eriophyllum pringlei* | 4–9 | – |
| | smooth desertdandelion | MAGL3 | *Malacothrix glabrata* | 2–4 | – |
| | Mojave suncup | CACA33 | *Camissonia campestris* | 2–4 | – |

## Animal community

The dominant species on this ecological site provide good cover for small mammals. Many of these animals will burrow under shrubs where roots stabilize the soil.

The major land use on this ecological site is livestock grazing. The dominant species are of low forage value for domestic livestock (Sampson and Jesperson 1963, Marshall 1994). Other minor species such as Sandberg bluegrass (*Poa secunda*) and spiny hopsage (*Grayia spinosa*) are more valuable forage species (Howard 1997, Tirmenstein 1999). Uncontrolled grazing will reduce the presence of these species on this ecosite.

## Hydrological functions

Flooding and ponding are not significant occurrences in this ecological site. Permeability is moderate to moderately rapid. The different soils create highly variable runoff characteristics. Very deep soils have minimal runoff while shallow ones have very high runoff.

## Recreational uses

This ecological site is very scenic and offers good wildflower viewing in wet years. Many off-highway vehicle trails cross this area.

## Inventory data references

Blackbrush-Creosote bush community:
2 SCS Range 417 Production and Composition Record (2003-2004)

Blackbrush-White bursage community:
1 SCS Range 417 Production and Composition Record (2003)

## Type locality

| | |
|---|---|
| Location 1: Kern County, CA | |
| UTM zone | N |
| UTM northing | 3916697 |
| UTM easting | 404896 |
| Latitude | 35° 23′ 20″ |
| Longitude | 118° 2′ 49″ |
| General legal description | The blackbrush-creosote bush type locality is located in the Jawbone-Butterbredt ACEC, approximately 0.25 miles north of Bishop Graves on SC175. |
| Location 2: Kern County, CA | |
| UTM zone | N |
| UTM northing | 3929360 |
| UTM easting | 405357 |
| General legal description | The blackbrush-white bursage type locality is located in the Jawbone-Butterbredt ACEC at the junction of SC106 and SC82. The ecological site extends north and south from this point. |

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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:**

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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