USDA Natural Resources
Conservation Service

Ecological site R030XA036CA
Shallow Granitic Hill

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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 Granitic Hill ecological site is found on soils within the hills and mountains landscape above 3000 feet (915 m). Soils are shallow or have a shallow subsurface diagnostic horizon and is developed from colluvium and residuum derived from igneous and plutonic metamorphosed material.

The central concept of this ecological site is within the Soil Survey of Mojave Desert Area, Northwest Part, California (CA682) in the 6001 - Goldpeak-Pinyonpeak-Wingap complex, 2 to 30 percent slopes map unit.

This is a group concept and provisional STM that also covers R030XA051CA

Associated sites

R029XY184CA	**Shallow Granitic Footslope 7-9" p.z.**
R029XY185CA	**Shallow Granitic Hills 7-9" p.z.**
R029XY186CA	**Sandy Slope 10-12" p.z.**
R029XY189CA	**South Sandy Slope 9-11" p.z.**

Similar sites

R029XY185CA	**Shallow Granitic Hills 7-9" p.z.** Essentially the same ecological site concept as R030XA036CA.
R029XY182CA	**Shallow Granitic Loam 7-9" p.z.** Essentially the same ecological site concept as R030XA036CA.
R029XF010CA	**GRAVELLY SANDY** Essentially the same ecological site concept as R030XA036CA.
R029XY183CA	**Shallow Granitic Slope 7-9" p.z.** Essentially the same ecological site concept as R030XA036CA.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima*
Herbaceous	(1) *Poa secunda*

Physiographic features

This ecological site occurs on summits and backslopes of fan remnants; north-facing, upper elevation hills; and lower backslopes and footslopes of mountains. It typically occurs on slopes between 2 and 30 percent.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Hill (3) Mountain
Flooding frequency	None

Ponding frequency	None
Elevation	762–1,699 m
Slope	2–30%
Water table depth	152 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 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)	300 days
Freeze-free period (average)	315 days
Precipitation total (average)	229 mm

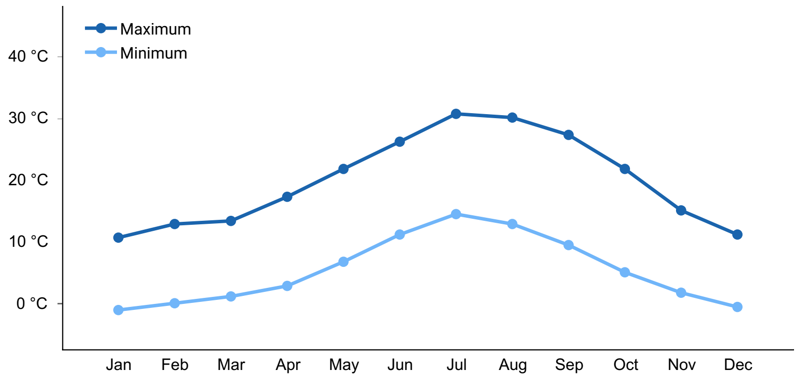


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features on this ecological site.

Soil features

Soils are found within the hills and mountain landscape between 3000 to 4300 feet. They formed in colluvium and residuum from igneous and plutonic metamorphosed material. Soil depths are shallow to a lithic contact or act shallow due to an argillic horizon obstructing rapid and very deep infiltration.

Table 4. Representative soil features

Surface texture	(1) Loamy sand (2) Gravelly loamy sand (3) Gravelly sandy loam
Family particle size	(1) Loamy

Ecological dynamics

This ecological site is located on hills and fan remnants on very shallow to very deep soils. It is dominated by blackbrush (*Coleogyne ramosissima*). Blackbrush 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) and past management activities such as prescribed burning to improve forage production for livestock (Brooks et al. 2003). That it is present on a variety of soils may be a reflection of its prior, more expansive distribution.

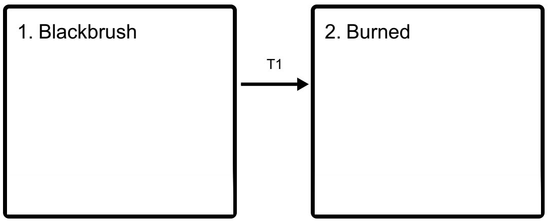
Blackbrush has infrequent germination events, low seedling survival, and does not readily establish on a site (Anderson 2001a). Because they may take thousands of years to establish (Webb et al. 1987), blackbrush communities are found on stable and older landforms where disturbance is uncommon or mild such as on fan remnants. Blackbrush can also establish well on shallow soils. The shallow root system of blackbrush lets it succeed on soils with a root-limiting layer (Anderson 2001a). An argillic horizon at shallow depth may also aid blackbrush survival due to its higher available water capacity. Other species found in late seral communities, such as mormon tea (*Ephedra viridis*) and water jacket (*Lycium andersonii*), often have deep, expansive root systems (Anderson 2001b, Tesky 1992), and are only present in small amounts. Nearly single-species stands of blackbrush probably developed as other species were outlived or outcompeted by blackbrush.

Wildfire may affect this ecosite. Wildfire has historically been a rare event in the desert because widely spaced shrubs and discontinuous fuels prevented fires from spreading easily. This ecosite has relatively high shrub cover and has more potential to carry a fire. Spread of invasive annual species in the Mojave Desert creates a more continuous and easily ignitable fuel bed, particularly after heavy rains, and can increase the size and frequency of wildfires (Clarke 2006, Howard 2006). Invasive annual plants such as red brome (*Bromus rubens*) and redstem filaree (*Erodium cicutarium*) often re-colonize these disturbed sites (Brooks et al. 2003). Red brome and redstem filaree are present on this ecosite, and their spread would increase the risk and frequency of fire on this ecosite.

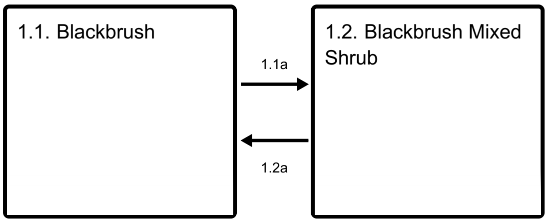
Blackbrush communities are often significantly altered by fire or other widespread disturbance. Fires in blackbrush communities were often stand-replacing (Brooks et al. 2003), but historical fire return intervals of more than 100 years allowed for slow re-establishment (Anderson 2001a). Early and mid-seral species would become more common following a disturbance. Ample seed production, easy seed dispersal, and rapid growth help these species establish on disturbed sites. Reduced competition from late seral species for light, water, and nutrients facilitates plant growth.

State and transition model

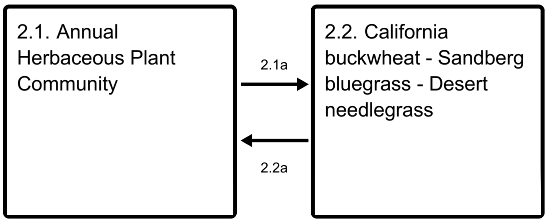
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Blackbrush

Monospecific blackbrush stands often exist with few other species scattered throughout the stand and under blackbrush canopies. Blackbrush as a climax species is supported by West (1969), Provenza and Urness (1981) and Jeffries and Klopatek (1987) but solid stands may have developed as livestock grazing removed more palatable grasses and shrubs (Bowns and West 1976b, Plummer et. al 1968).

Community 1.1
Blackbrush

The interpretive plant community is the reference plant community prior to European colonization. Several species are present on this ecological site, but blackbrush (*Coleogyne ramosissima*) is the dominant species in terms of canopy cover and annual production. The major herbaceous species is Sandberg bluegrass (*Poa secunda*). Many species are present in small amounts. Species often found in late seral communities include water jacket (*Lycium andersonii*), peach thorn (*Lycium cooperi*), spiny hopsage (*Grayia spinosa*), California juniper (*Juniperus californica*), antelope bitterbrush (*Purshia tridentata*), Mojave cottonthorn (*Tetradymia stenolepis*), and Joshua tree (*Yucca brevifolia*). Early- and mid-seral species in this community include California buckwheat (*Eriogonum fasciculatum*), narrowleaf goldenbush (*Ericameria linearifolia*), and green rabbitbrush (*Ericameria teretifolia*). The potential plant community is 85% shrubs, 10% 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	377	565	753
Grass/Grasslike	49	74	99
Forb	22	34	45
Total	**448**	**673**	**897**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	30-35%
Grass/grasslike foliar cover	2-3%
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 7. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	10-15%
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"	0%
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	–	–	–	2-3%
>0.15 <= 0.3	–	–	–	–
>0.3 <= 0.6	–	2-3%	2-3%	–
>0.6 <= 1.4	–	25-30%	–	–
>1.4 <= 4	–	1-2%	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Community 1.2
Blackbrush Mixed Shrub

Response to fire is unpredictable and can vary greatly depending on the climatic conditions at the time of fire, dynamic soil properties as well as varying land uses pre and post-fire (Bowns and West 1976a). The overall response is decreased blackbrush cover and an increase in mixed shrub and herbaceous cover. Grazing this community phase will tend to maintain a mixed shrub cover by removing the more palatable grasses. Shrub dominance may also indicate an older burn, greater than 15 years (Bates 1983, Callison et. al 1985). At the higher elevations of this ecological site, low intensity burns may also increase the number of individual Joshua trees which have been reported to sprout vigorously post fire (Gorder et al. 2005). Fire at the lower elevations of this ecological site are likely to reduce or remove Joshua tree (Minnich 2003). Eastern Mojave buckwheat is commonly very abundant in this community phase. Burrobrush (*Hymenoclea salsola*) and water jacket (*Lycium andersonii*) are common shrubs in this community phase. This is an at risk community phase. The loss of blackbrush cover can allow interspaces to become occupied by a more continuous plant cover which can help spread fire (D'Antonio and Vitousek 1992, Brooks and Matchett 2003, Brooks et al. 2004, Brooks and Matchett 2006). If the fire return interval is less than 100 years, this community is very likely to transition to State 3.

Pathway 1.1a
Community 1.1 to 1.2

Occurs with low intensity, patchy fire during early summer or drought years when perennial grasses are dry. This pathway can also occur with other forms of patchy blackbrush removal such as heavy grazing and an increase in flooding intensity.

Pathway 1.2a
Community 1.2 to 1.1

Over time (>20 years), absent the disturbance which removed blackbrush, with the occurrence of mast seed crops followed by favorable climatic conditions, monospecific stands of blackbrush may dominate the landscape. Moderate to heavy winter precipitation is likely to favor mast seed production (Beatley 1974). Livestock grazing may accelerate this transition by removing herbaceous competition (Jeffries and Klopatek 1987).

State 2
Burned

This state exists when blackbrush is lost from the community as a result of large-scale and high intensity fires, where blackbrush seed source is not available to recolonize, and/or recurrent fire does not provide intervals long enough for blackbrush recovery.

Community 2.1
Annual Herbaceous Plant Community

This community phase is dominated by annual grasses and forbs. This community phase could last for 2 to 3 years following fire depending on the intensity of the fire, the extent of the fire, weather conditions following the fire and the elevation of the fire (Bates 1983). This community phase could be short lived at this ecological site's highest elevations and may persist for longer periods at the lower elevations.

Community 2.2
California buckwheat - Sandberg bluegrass - Desert needlegrass

The reference and representative plant communities can be significantly altered by wildfires or other widespread disturbances. Blackbrush may have limited abilities to regenerate under current environmental conditions. Following a disturbance, several minor plants present in the reference community will become more common. These include narrowleaf goldenbush (*Ericameria linearifolia*), California buckwheat (*Eriogonum fasciculatum*), Sandberg bluegrass (*Poa secunda*), and desert needlegrass (*Achnatherum speciosum*). If the root crown is not killed, these plants can resprout, or they may establish on site by seed. Herbaceous species produce relatively more biomass than shrubs in this community than in the reference plant community. The potential plant community for this state is 55% shrubs, 40% perennial grasses, and 5% annual forbs.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	282	424	576
Grass/Grasslike	139	191	238
Forb	27	58	83
Total	**448**	**673**	**897**

Table 10. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	15-20%
Grass/grasslike foliar cover	5-7%
Forb foliar cover	3-5%
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	10-15%
Grass/grasslike basal cover	3-5%
Forb basal cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	30-45%
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	–	–	–	3-5%
>0.15 <= 0.3	–	2-3%	–	–
>0.3 <= 0.6	–	10-15%	5-7%	–
>0.6 <= 1.4	–	2-3%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Pathway 2.1a
Community 2.1 to 2.2

With 10-15 years following fire, perennial grasses and shrubs will become established (Bates 1983). Perennial grasses are likely to dominate sites with light livestock utilization (Hughes 1982).

Pathway 2.2a
Community 2.2 to 2.1

A high intensity fire will return this community phase to an annual herbaceous plant community.

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.

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**			377–753	
	blackbrush	CORA	*Coleogyne ramosissima*	358–560	–
	narrowleaf goldenbush	ERLI6	*Ericameria linearifolia*	4–28	–
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	4–22	–
	California juniper	JUCA7	*Juniperus californica*	0–22	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–22	–
	Joshua tree	YUBR	*Yucca brevifolia*	2–20	–
	spiny hopsage	GRSP	*Grayia spinosa*	0–17	–
	Cooper's goldenbush	ERCO23	*Ericameria cooperi*	0–17	–
	green rabbitbrush	ERTE18	*Ericameria teretifolia*	2–11	–
	water jacket	LYAN	*Lycium andersonii*	0–6	–
	peach thorn	LYCO2	*Lycium cooperi*	2–6	–
	Mojave cottonthorn	TEST2	*Tetradymia stenolepis*	1–6	–
	beardtongue	PENST	*Penstemon*	0–4	–
	burrobrush	HYSA	*Hymenoclea salsola*	1–3	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–2	–
	mormon tea	EPVI	*Ephedra viridis*	0–2	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	1–2	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–1	–
Grass/Grasslike					
2	**Perennial Grasses**			49–99	
	Sandberg bluegrass	POSE	*Poa secunda*	45–90	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	4–9	–
Forb					
3	**Perennial Forbs**			4–9	
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	4–9	–
4	**Annual Forbs**			18–36	
	giant woollystar	ERDE2	*Eriastrum densifolium*	4–9	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	4–9	–
	combseed	PECTO	*Pectocarya*	4–9	–

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**			282–576	
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	146–238	–
	narrowleaf goldenbush	ERLI6	*Ericameria linearifolia*	101–168	–
	spiny hopsage	GRSP	*Grayia spinosa*	15–27	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	6–27	–
	Mojave cottonthorn	TEST2	*Tetradymia stenolepis*	15–27	–
	purple sage	SADO4	*Salvia dorrii*	0–22	–
	burrobrush	HYSA	*Hymenoclea salsola*	0–11	–
	California juniper	JUCA7	*Juniperus californica*	0–11	–
	big sagebrush	ARTR2	*Artemisia tridentata*	0–11	–
	mormon tea	EPVI	*Ephedra viridis*	1–9	–
	green rabbitbrush	ERTE18	*Ericameria teretifolia*	0–9	–
	Joshua tree	YUBR	*Yucca brevifolia*	0–9	–
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	0–7	–
Grass/Grasslike					
2	**Perennial Grasses**			139–238	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	69–119	–
	Sandberg bluegrass	POSE	*Poa secunda*	69–119	–
Forb					
3	**Annual Forbs**			27–83	
	miner's lettuce	CLPE	*Claytonia perfoliata*	0–9	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	4–9	–
	Pringle's woolly sunflower	ERPR4	*Eriophyllum pringlei*	4–9	–
	coastal tidytips	LAPL	*Layia platyglossa*	4–9	–
	smooth desertdandelion	MAGL3	*Malacothrix glabrata*	4–9	–
	blazingstar	MENTZ	*Mentzelia*	4–9	–
	lacy phacelia	PHTA	*Phacelia tanacetifolia*	4–9	–
	mustard	BRASS2	*Brassica*	0–7	–
	red triangles	CETH3	*Centrostegia thurberi*	0–7	–
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	0–7	–

Animal community

Blackbrush is not a preferred browse species for wildlife or domestic livestock (Anderson 2001). Small mammals and birds may eat blackbrush seeds, and blackbrush provides cover for them.

The major land use on this ecological site is livestock grazing. Blackbrush has low forage value for domestic livestock (Sampson and Jesperson 1963). The plant community that results from disturbance has more valuable species for grazing. Sandberg bluegrass (*Poa secunda*) and desert needlegrass are valuable forage species (Howard 1997, Pavek 1993). Controlled grazing can promote production of grasses, but uncontrolled grazing and trampling will reduce their presence 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

In years of high precipitation, this ecological site has abundant wildflowers, making for many photographic opportunities.

This area is part of an off-highway vehicle recreation area. Travel is restricted to existing trails except in Open Areas.

Type locality

Location 1: Kern County, CA	
UTM zone	N
UTM northing	3922166
UTM easting	400557
Latitude	35° 26′ 16″
Longitude	118° 5′ 44″
General legal description	This site is located in the Jawbone-Butterbredt ACEC off of SC103, 1 mile west of the junction with SC99. This is the reference plant community.

Location 2: Kern County, CA	
UTM zone	N
UTM northing	3928817
UTM easting	397216
Latitude	35° 29′ 51″
Longitude	118° 7′ 59″
General legal description	The site is located in the Jawbone-Butterbredt ACEC at the junction of SC47 and the Pacific Crest Trail. This is the California buckwheat-Sandberg bluegrass-Desert needlegrass community. This site was sampled using the Double Weight Sampling technique.

Location 3: San Bernardino County, CA	
UTM zone	N
UTM northing	3933994
UTM easting	405493
Latitude	35° 32′ 42″
Longitude	118° 2′ 33″
General legal description	This site is located on a north-facing slope in Horse Canyon, accessable off SC65 in Jawbone-Butterbredt ACEC. This is the California buckwheat-Sandberg bluegrass-Desert needlegrass community. This site was sampled using the point-intecept technique.

Other references

Anderson, M.D. 2001a. *Coleogyne ramosissima*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available:

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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	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):**

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:**