USDA Natural Resources
Conservation Service

Ecological site R030XA042CA
Sandy Wash

Last updated: 10/21/2024
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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 ecological site is found on washes within the upper fan piedmont between 1600 feet (500) and 3600 feet (1100 m) elevation. The central concept for this ecological site is within the Soil Survey of Mojave Desert Area, Northwest Part, California (CA682) on the 1% Koehn component of the 4171 - Dovecanyon-Koehn association, 2 to 8 percent slopes map unit.

This is a group concept and provided the STM model for R030XA018CA and R030XY012CA..

Associated sites

R030XY047NV	**ALLUVIAL PLAIN** R030XY047NV Alluvial Plain is located on inset fans. The major species is cattle saltbush (Atriplex polycarpa).

Similar sites

R030XA018CA	**Dry Wash** Essentially the same ecological site concept but smaller tributaries and less frequently flooded portions of R030XA042CA.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Lepidospartum squamatum*
Herbaceous	Not specified

Physiographic features

This ecological site is found in drainageways and on stream terraces. Occasional to frequent flooding occurs and deposits fresh alluvial material on this landform at regular intervals.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	488–1,097 m
Slope	0–5%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

Climatic features

Mean annual air temperatures for this site are generally between 55 F (13 C) and 63 F (17 C). Mean annual

precipitation is between 6-8 inches.

Table 3. Representative climatic features

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

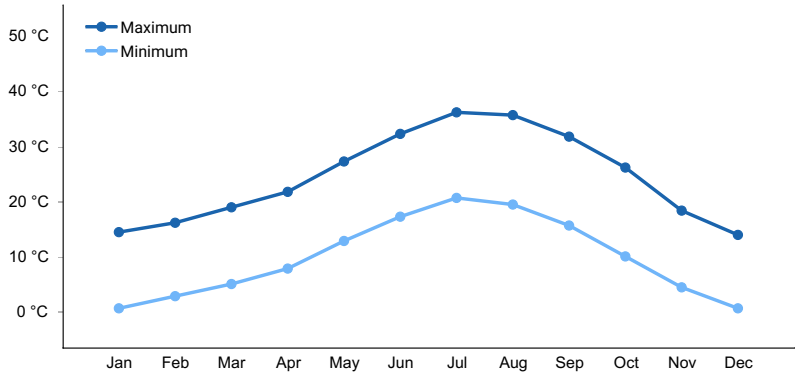


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

Soil features

This ecological site is found on alluvial soils within ephemeral streams, inset fans, fluves, washes, drainageways and other similar landforms that are sandy and very deep (>60 inches) where frequent flooding regularly deposits fresh alluvial material as well as moves material across the landforms. Frequent removal and deposition does not allow for soil development. Soils are within the Torripsamments Great Group. Available water capacity is very low to low.

Table 4. Representative soil features

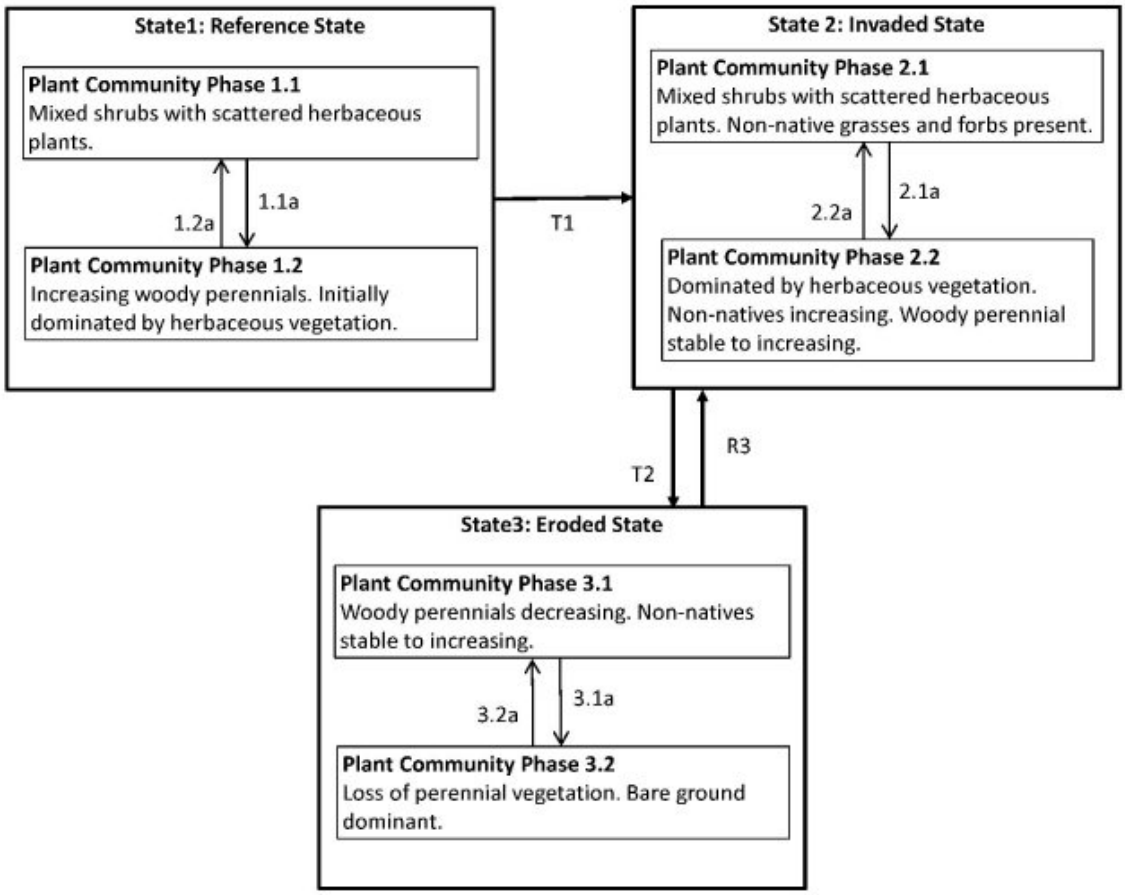
Parent material	(1) Alluvium
Surface texture	(1) Sand (2) Gravelly loamy coarse sand (3) Very gravelly loamy coarse sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	152 cm
Surface fragment cover <=3"	5–80%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	4.83–12.19 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)	10–35%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

This ecological site is located in drainageways and on stream terraces. These landforms are occasionally to frequently flooded. California broomsage is the dominant species and is generally found in sandy or gravelly washes (Hickman 1993). Other minor species present in this ecosite are also found in areas disturbed by water. These include burrobrush (*Hymenoclea salsola*) and bladderpod (*Cleome isomeris*). The biology of California broomsage is not well documented. Its distribution indicates its tolerance of frequent flooding and very low available water capacity. Many individuals in this location are relatively tall (>4 feet), which may help them withstand the physical forces of flooding better than smaller shrubs such as burrobrush. As is common in the Asteraceae family, it may also be a prolific seed producer. This may increase the chances of establishing a new individual in areas where disturbance is common.

State and transition model



State 1
California broomsage

Community 1.1
California broomsage

Figure 2. Sandy Wash

The interpretive plant community is the reference plant community prior to European colonization. This plant community is dominated by California broomsage. Minor species include California buckwheat (*Eriogonum fasciculatum*), burrobrush (*Hymenoclea salsola*), and desert senna (*Senna armata*). The vegetation is important for trapping the sediment that water carries into the drainageway. The regular disturbance to this ecological site may prevent other species from establishing in large numbers. This ecological site is approximately 95% shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	53	109	211
Forb	3	3	13
Total	**56**	**112**	**224**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	15-20%
Grass/grasslike foliar cover	0%
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	7-10%
Grass/grasslike basal cover	0%

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 8. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	1-3%
>0.15 <= 0.3	–	1-2%	–	–
>0.3 <= 0.6	–	3-5%	–	–
>0.6 <= 1.4	–	3-5%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Community 1.2
Plant Community 1.2

This plant community is characteristic of a post-disturbance plant community phase. Initially, it is heavily dominated by herbaceous vegetation and short-lived perennials. Sprouting shrubs quickly recover and provide a favorable environment for establishment of shrub seedlings. Additional run-in moisture from the surrounding landscape increases the ecological resilience and helps this site recover quickly following disturbance. This plant community is ‘at-risk’ of invasion by non-natives. Non-native species are able to take advantage of increased availability of critical resources following disturbances.

Pathway 1.1a
Community 1.1 to 1.2

Drought, wildfire, disease or insect attack or other event which reduces vegetation cover

Pathway 1.2a
Community 1.2 to 1.1

Absence from disturbance and natural regeneration over time.

State 2
Representative Plant Community

Community 2.1
Plant Community Phase 2.1

Species composition is similar to the reference plant community. Ecological processes have not been compromised

at this time, however, ecological resilience is reduced by the presence of non-natives. This plant community phase will respond differently following disturbance, when compared to the reference plant community. Management focused on decreasing the amount of anthropogenic disturbance is important for maintaining the health of perennial native species that protect the site against erosion.

Community 2.2
Plant Community Phase 2.2

This plant community is characteristic of a post-disturbance plant community. It is dominated by herbaceous vegetation, which may or may not be non-native, woody perennials are increasing. Nevada ephedra, desert almond and desert willow commonly sprout from rhizomes following disturbance. Sprouting species provide favorable sites for germination of species such as brittlebush, ratany, and bursage which reproduce sexually and are prolific seed producers. This plant community is ‘at-risk’ of increased erosion due to reduction of deep rooted perennials and increased non-native annuals.

State 3
Eroded State

This state is characterized by reduced cover of woody perennials. Bare ground is increasing, leading to increased erosion, decreased infiltration and loosening of the soil surface causing channeling. An abiotic threshold has been crossed preventing the natural repair of this plant community. Feedbacks keeping this state stable include reduced perennial vegetative cover causing increased runoff and decreased infiltration preventing the establishment of desirable perennial vegetation.

Community 3.1
Plant Community Phase 3.1

This plant community is characteristic of a short disturbance return interval. Long-lived woody perennials are decreasing. The ability of this site to dissipate energy during large flow events is severely reduced contributing to ecological damage downstream.

Community 3.2
Plant Community Phase 3.2

This plant community is characterized by the loss of long-lived woody perennials. Ecological processes have been altered including connectivity within the watershed, ground water recharge and habitat quality. Soil and soil nutrients are being redistributed down stream, leading to down cutting and channel widening.

Pathway 3.1a
Community 3.1 to 3.2

Seasonal flooding, drought, wildfire, disease, insect attack or other mechanism which reduces vegetation cover.

Pathway 3.2a
Community 3.2 to 3.1

Absence from disturbance and natural regeneration over time, allow some perennials to return to the system increasing stability.

Transition T1
State 1 to 2

Introduction of non-native species due to a combination of factors including: 1) surface disturbance, 2) changes in the kinds of animals and their grazing patterns, 3) drought and/or 4) changes in fire history.

Transition T2

State 2 to 3

Large scale reoccurring disturbance, natural or anthropogenic.

Restoration pathway R3
State 3 to 2

Ecological processes can be restored to the site, but non-natives remain. Possible restoration techniques include stabilizing the site by reestablishing native perennials and the use of artificial rip-rap to dissipate energy and reestablish the flood plain.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
1	**Shrubs**			53–211	
	California broomsage	LESQ	*Lepidospartum squamatum*	45–179	–
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	3–16	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	2–4	–
	burrobrush	HYSA	*Hymenoclea salsola*	1–4	–
	desertsenna	SEAR8	*Senna armata*	1–2	–
	burrobush	AMDU2	*Ambrosia dumosa*	0–2	–
	Acton's brittlebush	ENAC	*Encelia actonii*	0–2	–
Forb					
2	**Annual forbs**			3–13	
	flatspine bur ragweed	AMAC2	*Ambrosia acanthicarpa*	1–2	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	1–2	–
	pincushion flower	CHFR	*Chaenactis fremontii*	1–2	–
	common pussypaws	CIMO4	*Cistanthe monandra*	0–1	–
	Bigelow's tickseed	COBI	*Coreopsis bigelovii*	0–1	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–1	–
	pygmy poppy	ESMI	*Eschscholzia minutiflora*	0–1	–
	chia	SACO6	*Salvia columbariae*	0–1	–
	Booth's evening primrose	CABO7	*Camissonia boothii*	0–1	–

Animal community

This ecological site provides food for small mammals and rodents in the form of annual forbs. Because water from surrounding areas drains into this site, annual plant growth may be more consistent here than on upland areas. Desert tortoise (Gopherus agassizii) burrows have been observed in the banks of the wash channel. California broomsage also provides cover from predators for small animals. California broomsage itself is an unpalatable species and may be toxic to animals (Hickman 1993).

Hydrological functions

This ecological site is located in drainageways and on stream terraces and is flooded on a regular basis. Loss of vegetation from this ecological site will increase the rate at which water moves through this community.

Recreational uses

This ecological site is located in an off-highway vehicle recreation area. The drainageways in which this ecological site is found are large and often used as off-highway vehicle travel corridors. Smaller shrubs may be damaged by trampling and killed by repeated trampling. Loss of vegetation may increase the amount of sediment lost from the system.

Inventory data references

2 Line-point intercept transects (2006)
1 SCS Range 417 Production and Composition Record (2004)

Type locality

Location 1: Kern County, CA	
UTM zone	N
UTM northing	3911922
UTM easting	408696
Latitude	35° 20′ 47″
Longitude	118° 0′ 17″
General legal description	This site is located in the Jawbone-Butterbredt ACEC off the second Los Angeles Aquaduct road, about 4 miles north of Jawbone Canyon open area.

Other references

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

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Contributors

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Approval

Kendra Moseley, 10/21/2024

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	11/24/2024
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:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
