

Ecological site R030XA038CA

Sandy Fan

Last updated: 3/10/2025
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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 Sandy Fan ecological site is found on stream terrace landforms between 3600 feet (1100 m) and 4300 feet (1300 m). The central concept of this ecological site within the Soil Survey of Benton-Owens Valley Area Parts of Inyo and Mono Counties, California (CA802) and is found on both major components of the 374 - Yellowrock-Seaman complex, 2 to 5 percent slopes map unit.

Associated sites

R029XG013CA	Sodic Terrace Sodic Terrace
R030XA002CA	Calcareous Fan 5-7 Calcareous Fan

Similar sites

R030XA008CA	Sandy Fan 5-7 Areas north of San Diego County where this range site was used are conceptually equivalent to the R030XA038CA ecological site. The R030XA008CA range site was copied to the R030XA038CA ESD in order to avoid duplicity with R030XA008NV in the event the 'F', 'R', and state endings are dropped.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex confertifolia</i> (2) <i>Ambrosia dumosa</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i>

Physiographic features

This site occurs on alluvial fans, stream terraces, and lake terraces situated along a river flowing through a relict lakebed. Elevations are 3600 to 4300 feet. Slopes range from 0 to 5 percent.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Alluvial fan (2) River valley > Stream terrace (3) River valley > Lake terrace
Runoff class	Negligible to very low
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to rare
Elevation	1,097–1,311 m
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

The climate on this site is characterized by mild cool winters (30 to 60 degrees F) and hot dry summers (70 to 100 degrees F). The average annual precipitation ranges from 4 to 6 inches, with most falling as rain from November to March. The average frost-free period is 200 to 225 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	189 days
Freeze-free period (characteristic range)	208 days
Precipitation total (characteristic range)	127 mm
Frost-free period (actual range)	189 days
Freeze-free period (actual range)	208 days
Precipitation total (actual range)	127 mm
Frost-free period (average)	189 days
Freeze-free period (average)	208 days
Precipitation total (average)	127 mm

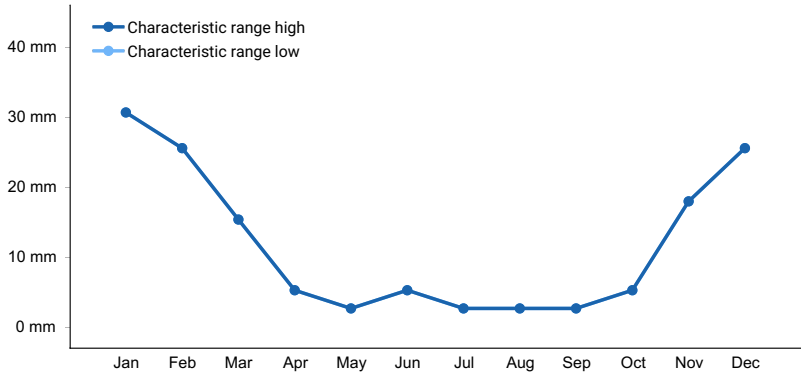


Figure 1. Monthly precipitation range

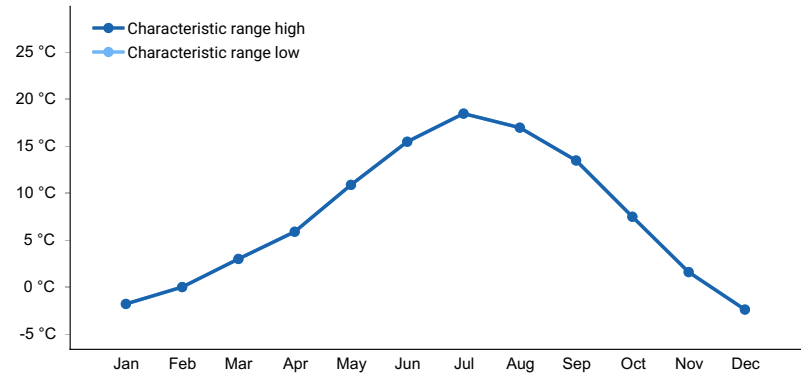


Figure 2. Monthly minimum temperature range

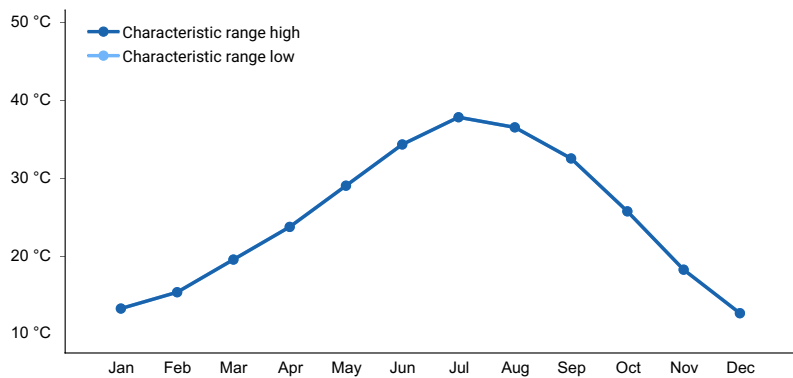


Figure 3. Monthly maximum temperature range

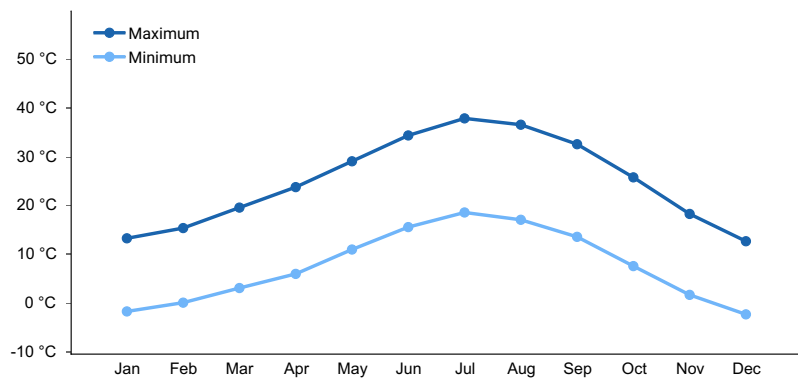


Figure 4. Monthly average minimum and maximum temperature

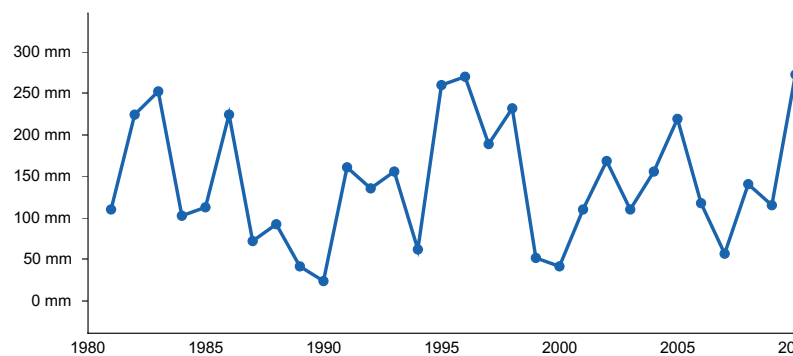


Figure 5. Annual precipitation pattern

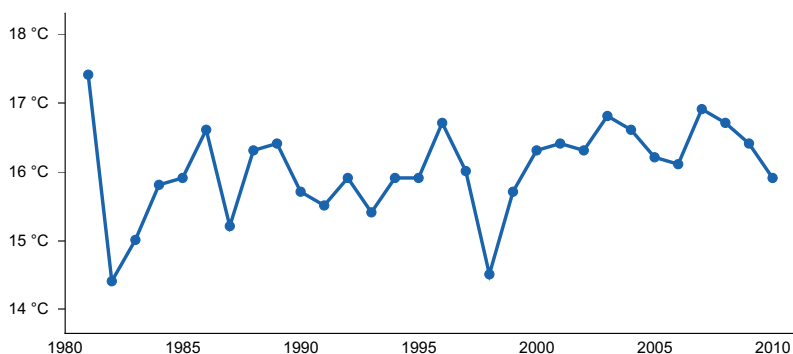


Figure 6. Annual average temperature pattern

Climate stations used

- (1) INDEPENDENCE [USC00044232], Independence, CA

Influencing water features

Soil features

The soils that characterize this site are very deep and well-drained to somewhat excessively drained. They are formed in mixed alluvium. Surface textures are loamy sands and sands. Available water capacity is low to moderate and the hazard of water erosion is slight to moderate. Wind erosion hazard is moderate to severe. Effective rooting depth is 60 inches or more.

Table 4. Representative soil features

Parent material	(1) Alluvium
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Ecological dynamics

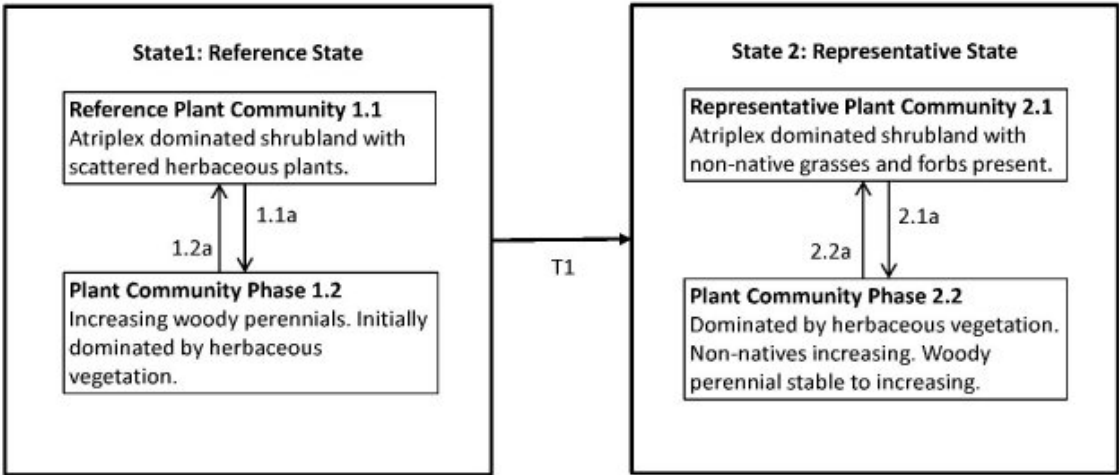
When mismanagement results in overgrazing, shadscale and white bursage increase while allscale, budsage, and Indian ricegrass decrease. Species likely to invade this site are white burrobush and Russian thistle. Allscale will dominate on abandoned agricultural land and other disturbed sites.

Reduce the hazard of wind erosion by avoiding overgrazing, preserving the existing plant cover, and limiting the operation of off-road vehicles.

Major poisonous plants at this site are, Black greasewood and Desert princesplume.

Fire is very infrequent due to the sparse plant cover.

State and transition model



State 1

Reference State

The reference state is representative of the natural range of variability under pristine conditions. Plant communities are dynamic in response to changes in disturbance regimes and weather patterns. Plant community phase changes are primarily driven by long-term drought. Historically, fire had little impact in this system due to low fuel loading and widely spaced vegetation.

Community 1.1

Reference Plant Community

The reference plant community is representative of a healthy climax condition. The reference plant community is dominated by fourwing saltbush and shadscale. Alkali sacaton is the most common perennial grass. This plant community is stable and long-lived. Potential vegetative composition is about 10 percent grasses, 5 percent perennial and annual forbs and 85 percent shrubs. Total vegetative cover (basal and crown), is 15 to 30 percent. Allscale saltbush will dominate on fans where flash flooding occurs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	118	196	275
Grass/Grasslike	34	56	78
Forb	17	28	39
Total	169	280	392

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	7-14%
Grass/grasslike foliar cover	2-4%
Forb foliar cover	1-2%
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%

Community 1.2

Plant Community 1.2

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

Pathway 1.1a

Community 1.1 to 1.2

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

Pathway 1.2a

Community 1.2 to 1.1

Absence from disturbance and natural regeneration over time.

State 2

Representative State

The Representative State is characterized by the presence of non-native annuals in the understory. Ecological resilience of the site is reduced by the presence of non-natives. A biotic threshold is crossed, with the introduction of non-native annuals that are difficult to remove from the system and have the potential to alter disturbance regimes significantly from their natural or historic range of disturbances. Introduced annuals such as red brome and redstem stork's bill have invaded the reference plant community and have become a dominant component of the herbaceous cover. These non-natives annuals are highly flammable and promote wildfires where fires historically have been infrequent.

Community 2.1

Plant Community 2.1

Plant community composition is similar to the reference plant community with the trace of non-natives in the understory. Ecological processes have not been compromised at this time, but ecological resilience is reduced by the presence of non-natives. This plant community will respond differently following a disturbance, when compared to the reference plant community. Non-natives likely to invade this site include red brome and Mediterranean grass. Increased fine fuels provided by non-native annuals can drastically change the natural fire return interval.

Community 2.2

Plant Community 2.2

This plant community is characteristic of an early seral, post-disturbance plant community and may or may not be dominated by non-native annuals. Perennial native bunchgrasses recover quickly and provide favorable sites for the establishment of shrub seedlings. Disturbance may result in increased bare ground, increasing the risk of soil erosion. This plant community is considered at-risk, due to the increased fuel loading from herbaceous biomass. Management should be focused on minimizing the threat of wildfire and reducing anthropogenic impacts to protect soil and ecological resources.

Pathway 2.1a

Community 2.1 to 2.2

Surface disturbance or fire removes mature shrubs and favors an increase of herbaceous vegetation, native and non-native.

Pathway 2.2a

Community 2.2 to 2.1

Recovery of woody perennials and absence from disturbance.

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 or changes in fire history.

Additional community tables

Animal community

Occasional use by Tule elk

LIVESTOCK GRAZING:

This site is primarily used for spring grazing. Annual forbs are abundant in years of above average precipitation.

General Guide to Initial Stocking Rate:

Before making specific recommendations, an on site evaluation must be made.

POUNDS/ACRE

air dry AUM/AC AC/AUM

Normal Years 250 20-25

Hydrological functions

Runoff is slow. The erosion hazard is slight to moderate.

Soil Series: Cajon

Hydrologic Group: A

Hydrologic Conditions and Runoff Curves:

Good 41; Fair 46; Poor 61

Soil Series: Yellowrock

Hydrologic Group: A

Hydrologic Conditions and Runoff Curves:

Good 41; Fair 46; Poor 61

Soil Series: Eclipse

Hydrologic Group: B

Hydrologic Conditions and Runoff Curves:

Good 63; Fair 66; Poor 76

Soil Series: Mazourka

Hydrologic Group: B

Hydrologic Conditions and Runoff Curves:

Good 63; Fair 66; Poor 76

Soil Series: Seaman

Hydrologic Group: B

Hydrologic Conditions and Runoff Curves:

Good 63; Fair 66; Poor 76

Recreational uses

This site is located on City of Los Angeles, Department of Water and Power (LADWP) property, and is open to public use.

Type locality

Location 1: Inyo County, CA	
Township/Range/Section	T13S R35E S13
General legal description	SE 1/4 Sec. 13, T13S, R35E 4 1/2 miles east of Independence, Inyo Co., CA

Other references

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

Kottek, M., Grieser, J., Beck, C., Rudolf, B., & Rubel, F. (2006). World map of the Köppen-Geiger climate

classification updated. Meteorologische Zeitschrift, 15(3), 259-263.

Salem, B. B. (1989). Arid zone forestry: a guide for field technicians (No. 20). Food and Agriculture Organization (FAO).

Contributors

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Approval

Kendra Moseley, 3/10/2025

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):**
-
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:**
