USDA Natural Resources
Conservation Service

Ecological site R030XY164CA
Gravelly Skirt

Last updated: 2/24/2025
Accessed: 05/12/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Ecological site concept

This ecosite occurs on alluvial flats and adjacent to playas. Runoff from adjacent alluvial fans and mountains may flood this ecosite. Soils on this ecosite are moderately deep, loamy soils derived from mixed alluvium. These soils classify as coarse-loamy, mixed Calcic Petrocalcids.

Please refer to group concept R030XA023CA to view the provisional STM.

Associated sites

R030XY165CA	**Alluvial Flat** Occurs on adjacent alluvial flats and lake plains. Soils on this ecosite are of carbonatic mineralogy, and are saline and sodic below the surface soil. Dominant species are western honey mesquite (Prosopis glandulosa var. torreyana) and shadscale (Atriplex confertifolia).

Similar sites

R030XY165CA	**Alluvial Flat** Soils on this ecosite are of carbonatic mineralogy, and are saline and sodic below the surface soil. Dominant species are western honey mesquite (Prosopis glandulosa var. torreyana) and shadscale (Atriplex confertifolia).

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Prosopis glandulosa var. torreyana* (2) *Isocoma acradenia*
Herbaceous	Not specified

Physiographic features

This ecosite occurs on alluvial flats and adjacent to playas. Runoff from adjacent alluvial fans and mountains may flood this ecosite.

Table 2. Representative physiographic features

Landforms	(1) Lake plain (2) Alluvial flat
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	None to very rare

Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	Rare to occasional
Elevation	457–914 m
Slope	0–4%
Ponding depth	0–3 cm
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 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 2002a). Winds in excess of 25 miles per hour and gusts in excess of 50 miles per hour are not uncommon (CSU 2002).

In the BLM Grazing Allotments Soil Survey (Northeast Part of Mojave Desert Area, CA (CA805)), most areas receive approximately 5 to 7 inches of precipitation annually (WRCC 2002b). At elevations above 4000 feet (1370 meters), average annual precipitation in the form of rain may reach 8 inches or more, and average annual snowfall may reach up to 10 inches (WRCC 2002b).

The data from the following climate stations were used to describe the climate in the BLM Grazing Allotments Soil Survey (station number in parentheses):
Pahrump, NV (265890)
Mountain Pass, CA (045890)
Searchlight, NV (267369)
Red Rock Canyon State Park, NV (266691)

"Maximum monthly precipitation" represents average monthly precipitation.

Table 3. Representative climatic features

Frost-free period (average)	240 days
Freeze-free period (average)	282 days
Precipitation total (average)	178 mm

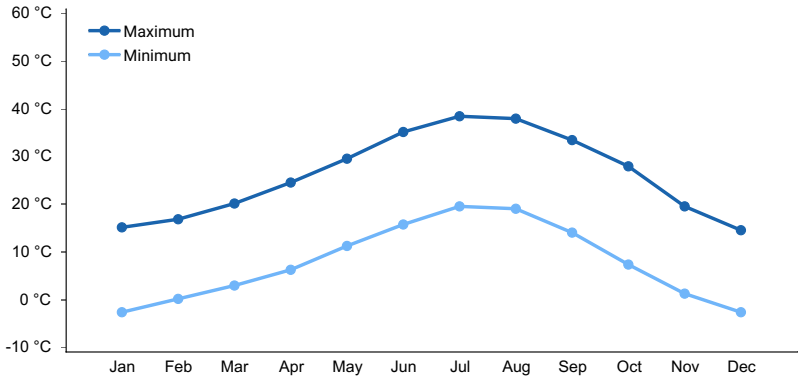

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

Soil features

Please refer to group concept R030XA023CA to view the provisional STM.

Soils on this ecosite are moderately deep, loamy soils derived from mixed alluvium. These soils classify as coarse-loamy, mixed Calcic Petrocalcids. Soils moderately well to well drained. Permeability is moderately rapid to rapid. Mixed alluvium influenced by metamorphic mountains, gravel, and lower clay content may moderate the salinity of the soil on this ecosite. These soils are found on the outermost edge of the lake plain of Mesquite Lake, and soil features do not indicate lacustrine influences. Therefore, these soils are not saline or sodic. Alluvial activity has deposited a large amount of gravel on the soil surface.

Soil survey area - Map unit symbol - Component
CA805 - 4775 - Calcic Petrocalcids, mixed (minor component)

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately rapid to rapid
Soil depth	51–102 cm
Surface fragment cover <=3"	10–30%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–10.16 cm
Calcium carbonate equivalent (0-101.6cm)	5–30%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	8–8.4
Subsurface fragment volume <=3" (Depth not specified)	5–15%

Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This ecosite occurs on alluvial flats and outer lake plains. This ecosite is dominated by shrubs. Grasses are a minor component. The dominant species are western honey mesquite (*Prosopis glandulosa* var. torreyana) and alkali goldenbush (*Isocoma acradenia*).

In the Mojave Desert, western honey mesquite often establishes along dry lakes and low-lying areas into which water drains (Hickman 1993). It grows extensive lateral roots to extract water from a large volume of soil, particularly if restrictive layers limit the growth of the taproot.

Alkali goldenbush is found in alkaline or gypsum flats (Hickman 1993). The abundant calcium carbonate and a relatively low sodium concentration of the soil on this ecosite likely facilitates alkali goldenbush establishment. When soils were high in sodium and low in calcium, alkali goldenbush established after halophytic species Mojave seablite (*Suaeda moquinii*), which is present in small amounts on this ecosite (Vasek and Lund 1980). The shift in species corresponded in part to decreases in sodium and increases in calcium.

Biological soil crusts—slow-growing complexes of fungi, lichen, moss, and cyanobacteria—cover small areas of this ecosite. They indicate site stability and recover slowly following disturbance (Belnap and Lange 2001). They moderate several processes that occur in the desert (Belnap and others 2001). These processes include reducing water and wind erosion. They act like a living mulch and slow evaporative water loss. They also affect soil fertility by increasing the available nitrogen in the soil. By occupying spaces between shrubs, biological soil crusts limit the establishment of invasive species that change disturbance regimes. The presence of biological soil crusts on this ecosite suggest that disturbance on this ecosite historically was not severe.

Invasive species red brome (*Bromus rubens*) and Mediterranean grass (*Schismus arabicus*) are present in small amounts on this ecosite. Expansion of these species contributes to higher ground cover, potentially increasing the risk of fire. Fire in desert ecosystems has historically been rare due to discontinuous fuels. Spread of these invasive species would create a more continuous, easily ignitable fuel source.

State and transition model

Ecosystem states

1. Western Honey Mesquite - Alkali Goldenbush

State 1 submodel, plant communities

1.1. Western Honey Mesquite - Alkali Goldenbush

State 1
Western Honey Mesquite - Alkali Goldenbush

Community 1.1
Western Honey Mesquite - Alkali Goldenbush

The interpretive plant community is the reference plant community prior to European colonization. The site is

dominated largely by western honey mesquite (*Prosopis glandulosa* var. torreyana) with an understory of shrubs dominated by alkali goldenbush (*Isocoma acradenia*). Other minor shrubs in the understory include shadscale (*Atriplex confertifolia*), Mojave seablite (*Suaeda moquinii*), and desert princesplume (*Stanleya pinnata*). Grasses are a minor component, and major species are galleta (*Pleuraphis rigida*) and alkali sacaton (*Sporobolus airoides*). “Percent Composition by Frequency of Overstory Species” represents only low, RV, and high canopy cover. Production values are not listed.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Tree	897	1121	1569
Shrub/Vine	167	276	384
Grass/Grasslike	–	2	4
Forb	1	2	3
Total	**1065**	**1401**	**1960**

Table 6. Soil surface cover

Tree basal cover	5-15%
Shrub/vine/liana basal cover	10-15%
Grass/grasslike basal cover	0%
Forb basal cover	0%
Non-vascular plants	0%
Biological crusts	0-2%
Litter	20-50%
Surface fragments >0.25" and <=3"	5-15%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	8-15%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	15-30%	–	–
>0.3 <= 0.6	–	15-30%	–	–
>0.6 <= 1.4	–	5-10%	–	–
>1.4 <= 4	15-25%	–	–	–
>4 <= 12	15-25%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Tree					
1	**Trees**			897–1569	
	western honey mesquite	PRGLT	*Prosopis glandulosa var. torreyana*	897–1569	–
Shrub/Vine					
2	**Perennial Shrubs**			167–384	
	alkali goldenbush	ISAC2	*Isocoma acradenia*	118–275	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	25–58	–
	Mojave seablite	SUMO	*Suaeda moquinii*	11–22	–
	desert princesplume	STPI	*Stanleya pinnata*	9–18	–
	water jacket	LYAN	*Lycium andersonii*	4–11	–
Forb					
3	**Annual Forbs**			1–3	
	cryptantha	CRYPT	*Cryptantha*	1–3	–
Grass/Grasslike					
4	**Perennial Grasses**			0–4	
	big galleta	PLRI3	*Pleuraphis rigida*	0–2	–
	alkali sacaton	SPAI	*Sporobolus airoides*	0–2	–

Animal community

Western honey mesquite is a valuable food and habitat resource for wildlife and livestock. The fruit of western honey mesquite is considered nutritious and is eaten in large quantities by many animals, including birds, rodents, jackrabbits, coyotes, and deer (Steinberg 2001). Flowers are eaten by many bird species. Foliage is generally eaten only in small amounts. Livestock consume western honey mesquite fruit and flowers, but rarely consume foliage unless other food sources are scarce (Steinberg 2001). Grasses are scarce but valuable forage, particularly when new growth is present.

The major use of this ecosite is livestock grazing. Uncontrolled grazing may decrease vegetation cover. The major grasses on this ecosite, galleta (*Pleuraphis rigida*) and alkali sacaton (*Sporobolus airoides*), are few and may be damaged or killed by uncontrolled grazing or trampling. Small shrubs may be more easily damaged by trampling. Biological crusts are fragile, easily damaged, and very slow to recover following a disturbance. Disturbance may also facilitate establishment of invasive species by creating areas of bare soil or dispersing seeds.

Hydrological functions

This ecological site occurs in low positions in the landscape, and water from adjacent areas will drain toward this area.

Recreational uses

Off-highway vehicle use occurs on the lake plain. Effects of this activity are similar to those of uncontrolled grazing. Vegetation cover may decline as a result of trampling, and smaller plants may be more easily killed. Biological crusts are easily damaged, and disturbance to the soil surface may facilitate establishment of invasive species.

Wood products

Western honey mesquite is mainly used as firewood and in the barbeque industry. It is also used as lumber for furniture and flooring.

Other information

Nitrogen-fixing bacteria in the roots of western honey mesquite provide a source of nitrogen for the mesquite. They also enrich the soil locally, possibly facilitating the establishment of other species.

Inventory data references

Vegetation cover was sampled in lieu of production due to a poor growing season. Ten 100-foot point-intercept transects were sampled on 22 March 2006 at the type locality. The top two tiers of vegetation or other cover class (e.g. bare soil, gravel, rock, litter, biological soil crust) were recorded at every foot.

Tree production was sampled at the type locality using a one acre plot and production estimates from USDA NRCS Range Note #52-Arizona: Annual herbage yield for some woody plants in Arizona.

Annual production numbers for other species were estimated based on similar ecological sites.

Type locality

Location 1: San Bernardino County, CA	
UTM zone	N
UTM northing	3951113
UTM easting	626038
Latitude	35° 41′ 45″
Longitude	115° 36′ 25″
General legal description	The type site is located on the western edge of Mesquite Lake.

Other references

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Contributors

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Approval

Sarah Quistberg, 2/24/2025

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	05/12/2025
Approved by	Sarah Quistberg
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:**
