USDA Natural Resources
Conservation Service

Ecological site R030XB162CA
Shallow South Slope

Last updated: 2/25/2025
Accessed: 05/13/2025

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 site occurs on shallow slopes typically with a southern exposure. The soils on this site are very shallow to shallow soils formed from metamorphic colluvium and residuum.

Please refer to group concept R030XB151CA to view the provisional STM.

Associated sites

R030XB143CA	**Shallow Granitic Loam 5-7" P.Z.** Occurs on adjacent slopes and alluvial fans
R030XB060NV	**GRANITIC NORTH SLOPE 5-7 P.Z.** This site occurs on north-facing slopes.

Similar sites

R030XB077NV	**STEEP SOUTH SLOPE** This site is dominated by brittlebush (Encelia farinosa), is lacking in catclaw acacia, and is lower producing.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Acacia greggii* (2) *Encelia virginensis*
Herbaceous	Not specified

Physiographic features

This site occurs on shallow slopes typically with a southern exposure.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	None to very rare
Ponding frequency	None
Elevation	914–1,524 m

Slope	8–50%
Water table depth	152 cm
Aspect	SE, S, SW

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)

"Minimum monthly precipitation" represents average monthly precipitation at Pahrump, NV (low elevation).

"Maximum monthly precipitation" represents average monthly precipitation at Mountain Pass, CA (high elevation).

Maximum and minimum temperatures are from Pahrump, NV. Average high temperatures at Mountain Pass are approximately 8-10 degrees cooler than at Pahrump, NV. Average low temperatures at Mountain Pass are within 3-5 degrees of average low temperatures at Pahrump.

Table 3. Representative climatic features

Frost-free period (average)	280 days
Freeze-free period (average)	270 days
Precipitation total (average)	178 mm

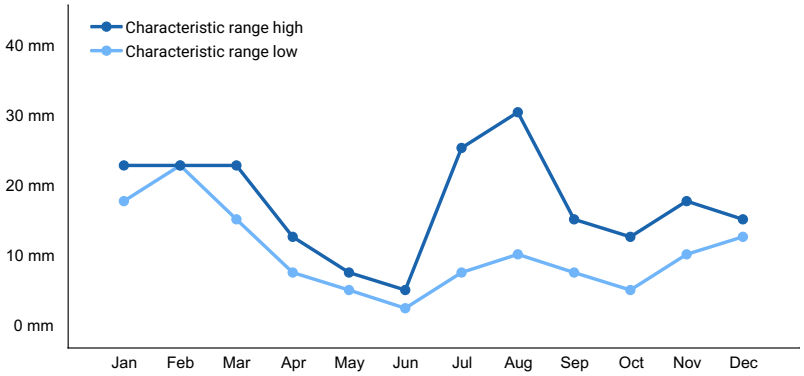

Figure 1. Monthly precipitation range

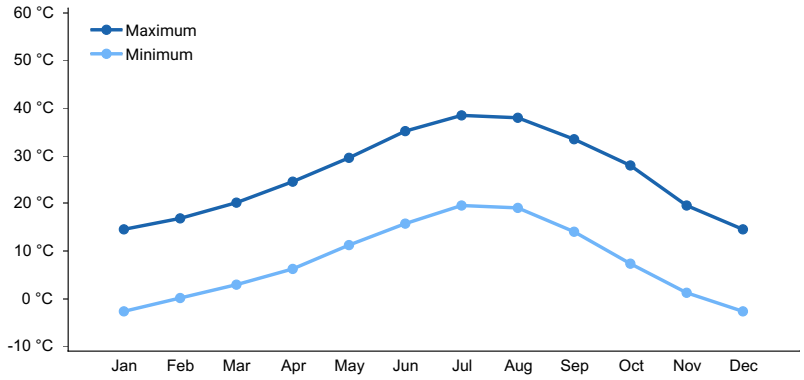

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

The soils on this site are very shallow to shallow soils formed from metamorphic colluvium and residuum. Soils are somewhat excessively to excessively drained, and permeability is moderately rapid to rapid above very slow to impermeable bedrock. Runoff is very high. Soils for this site are described at the family level as: Loamy-skeletal, mixed, superactive, calcareous, thermic, Lithic Torriorthents.

Soil survey area - Map unit symbol - Component
CA805 - 3000 - Lithic Torriorthents (minor component)

Table 4. Representative soil features

Surface texture	(1) Cobbly loamy sand (2) Sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	10–38 cm
Surface fragment cover <=3"	25–40%
Surface fragment cover >3"	40–65%
Available water capacity (0-101.6cm)	2.54–5.08 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)	7.8–8.2
Subsurface fragment volume <=3" (Depth not specified)	30–50%
Subsurface fragment volume >3" (Depth not specified)	5–15%

Ecological dynamics

Please refer to group concept R030XB151CA to view the provisional STM.

This ecological site occurs on steep, south-facing slopes in close proximity to rock outcrops. Water infiltration is limited due to steep slopes. This results in high runoff and creates a disturbance similar to that found in drainageways.

The major species on this ecological site—Virgin River brittlebush (*Encelia virginensis*) and catclaw acacia (*Acacia greggii*)—are common to both drainageways and rocky slopes (Hickman 1993), indicating tolerance to the disturbance and soil conditions on this ecosite. Both species have well-developed lateral root systems that enhance water uptake on this ecosite and help to anchor the plant (Rundel and Gibson 1996).

Water disturbance on this ecological site helps disperse catclaw acacia seed (Gucker 2005). Animals are also an important dispersal agent. The dynamics of catclaw acacia in other ecosystems also suggest that edaphic conditions may have played a role in its establishment on this ecosite. In a desert plains grassland, catclaw acacia was often limited to sandy loam and alkaline soils in drainageways and floodplains (Whitfield and Anderson 1938).

Information specific to Virgin River brittlebush was minimal, but characteristics of other Mojave Desert brittlebush species may offer insight into Virgin River brittlebush's succesional status and its adaptations to the ecosite's microclimate. Button brittlebush (*Encelia frutescens*) is often found in drainageways, and brittlebush (*Encelia farinosa*) on stony hillsides. Both have intermediate life spans (<50 years) and were found on debris flows younger than 100 years but not between 100 and 500 years. This suggests that more recently disturbed areas are more favorable for the establishment of Encelia spp. (Bowers et al. 1997). Brittlebush (*Encelia farinosa*) exhibits variation in physical characteristics (e.g. leaf size and pubescence) that enable it to live in hot, dry environments as well as under less harsh conditions (Housman et al. 2002). Virgin River brittlebush may have similar variations in its physical characteristics. Encelia spp. produce wind-dispersed seeds and can easily spread to open or disturbed areas (Esser 1993).

State and transition model

Ecosystem states

1. Catclaw Acacia - Virgin River Brittlebush

State 1 submodel, plant communities

1.1. Catclaw Acacia - Virgin River Brittlebush

State 1
Catclaw Acacia - Virgin River Brittlebush

Community 1.1
Catclaw Acacia - Virgin River Brittlebush

The interpretive plant community is the reference plant community prior to European colonization. The site is dominated by catclaw acacia (*Acacia greggii*) and Virgin River brittlebush (*Encelia virginensis*). Sub-dominant shrubs include buckhorn cholla (*Cylindropuntia acanthocarpa*), blackbrush (*Coleogyne ramosissima*), California buckwheat (*Eriogonum fasciculatum*), and Mojave yucca (*Yucca schidigera*). This site also contains many shallow-rooted cacti that thrive on the shallow soils and exposed bedrock on this ecosite. “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)
Shrub/Vine	188	328	426
Grass/Grasslike	34	61	74
Forb	2	3	4
Total	**224**	**392**	**504**

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	4-8%
Grass/grasslike basal cover	1-2%
Forb basal cover	1-2%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-15%
Surface fragments >0.25" and <=3"	40-70%
Surface fragments >3"	5-15%
Bedrock	0%
Water	0%
Bare ground	2-6%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	5-15%	2-4%	0-1%
>0.15 <= 0.3	–	20-30%	2-3%	–
>0.3 <= 0.6	–	30-45%	2-3%	–
>0.6 <= 1.4	–	5-10%	–	–
>1.4 <= 4	–	5-10%	–	–
>4 <= 12	–	–	–	–
>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 (%)
Shrub/Vine					
1	**Perennial Shrubs**			188–426	
	catclaw acacia	ACGR	*Acacia greggii*	34–76	–
	Virgin River brittlebush	ENVI	*Encelia virginensis*	34–76	–
	blackbrush	CORA	*Coleogyne ramosissima*	18–40	–
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	13–30	–
	Mojave yucca	YUSC2	*Yucca schidigera*	13–30	–
	spiny menodora	MESP2	*Menodora spinescens*	9–20	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	6–15	–
	California barrel cactus	FECY	*Ferocactus cylindraceus*	4–10	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	4–10	–
	littleleaf ratany	KRER	*Krameria erecta*	4–10	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	4–10	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	4–10	–
	banana yucca	YUBA	*Yucca baccata*	4–10	–
	Palmer's crinklemat	TIPA	*Tiquilia palmeri*	2–4	–
	desert almond	PRFA	*Prunus fasciculata*	2–4	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	2–4	–
	common fishhook cactus	MATE4	*Mammillaria tetrancistra*	1–3	–
Grass/Grasslike					
2	**Perennial Grasses**			34–74	
	big galleta	PLRI3	*Pleuraphis rigida*	11–25	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	11–25	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	4–10	–
	Sandberg bluegrass	POSE	*Poa secunda*	4–10	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–4	–
Forb					
3	**Annual Forbs**			2–4	
	desert trumpet	ERIN4	*Eriogonum inflatum*	2–4	–

Animal community

This plant community offers shrub cover for small mammals, and perching habitat for birds. Catclaw acacia and Virgin River brittlebush are important food sources for these animals. Larger grazers such as feral asses also consume these species. Catclaw acacia pods are eaten by wildlife, and foliage is consumed in spring when new growth is available or when forage is scarce. The site is poor habitat for burrowing animals due to the rocky, shallow soils.

Catclaw acacia is considered marginal forage for livestock (Ladyman 2003), and may be injurious due to the prickles on its branches. Forage values specific to Virgin River brittlebush were unavailable, but other Mojave Desert species of Encelia are considered to have little forage value for livestock (Esser 1993). This ecosite is also poorly suited for livestock grazing due to steep, rocky slopes.

Hydrological functions

This ecological site occurs on shallow soils, and precipitation will rapidly run off this ecosite. This creates disturbances similar to those of water flowing in a drainageway.

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 29 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.

Annual production numbers were estimated based on similar ecological sites.

Type locality

Location 1: San Bernardino County, CA	
UTM zone	N
UTM northing	630899
UTM easting	3940199
Latitude	35° 35′ 48″
Longitude	115° 33′ 18″
General legal description	The type locality is located off the Powerline Rd. in the Clark Mountains (Soil Survey Area 695).

Other references

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Contributors

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Approval

Sarah Quistberg, 2/25/2025

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	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:**
