USDA Natural Resources
Conservation Service

Ecological site R040XD017CA
Steep Granitic Slope 4-6" p.z.

Last updated: 3/11/2025
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.

Classification relationships

Sawyer, J.O. and T. Keeler-Wolf. 1995. Manual of California Vegetation - Brittlebush-white bursage series

NDDB/Holland type and status: Sonoran desert scrubs (34000). Sonoran mixed woody scrub (33210 in part) G3 S3. Sonoran mixed woody and succulent scrub (33220 in part) G3 S2.2.

Barry type: G74 G7411211.
Brown Lowe Pase type: 154.113
Cheatham & Haller type: Desert cactus scrub.
Thorne type: Stem-succulent scrub.
WHR type: Desert succulent shrub.

Ecological site concept

This site occurs on hillslopes and mountain slopes. The soils consist of very shallow, somewhat excessively drained soils that formed in residuum and colluvium, dominantly from gneissic sources and of very shallow, somewhat excessively drained soils that formed in residuum and colluvium from granite and metamorphic rocks.

Due to the slope and shallow soils the site is dominated by shallow-rooted plants such as white brittlebush (*Encelia farinosa*), teddybear cholla, and ocotillo. Throughout the site there are moderate variations in the abundance of teddybear cholla as it seems especially sensitive to soil depth and/or texture. This is true to a lesser extent with ocotillo. The potential plant community is 90% shrubs, 5% forbs and 5% grasses. The total vegetation cover is 25%.

Associated sites

R040XD015CA	**Limy 4-6" p.z.** This site can occur in some of the smaller adjacent drainages.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Encelia farinosa* (2) *Opuntia bigelovii*
Herbaceous	(1) *Plantago ovata*

Physiographic features

This site occurs on hillslopes and sideslopes of mountains.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to rare
Elevation	1,000–2,400 ft
Slope	15–30%
Aspect	Aspect is not a significant factor

Climatic features

The Colorado Desert of California represents the northwesternmost portion of the Sonoran Desert. The subtropical Colorado Desert results from the descent of cold air which is heated by compression and arrives hot and dry at the earth's surface. Precipitation is frontal in nature during the winter and convectional in the summer. Reduced summer rainfall and high potential evapotranspiration make the Colorado Desert one of the most arid regions in North America. Summer temperatures frequently exceed 105 degrees F. The average annual precipitation ranges from 2 to 6 inches with most falling as rain. Snowfall is rare. Approximately 35% of the annual precipitation occurs from July to September as a result of intense convection storms. Spring months are the windiest.

Table 3. Representative climatic features

Frost-free period (average)	360 days
Freeze-free period (average)	360 days
Precipitation total (average)	6 in

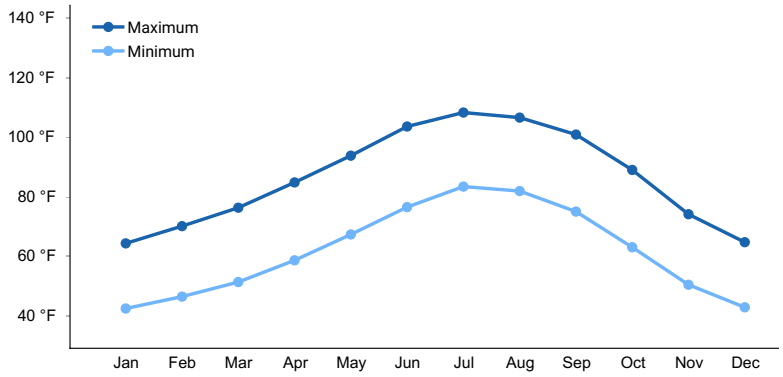


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

Soil features

This site occurs on hillslopes and mountain slopes. The soils consist of very shallow, somewhat excessively drained soils that formed in residuum and colluvium, dominantly from gneissic sources and of very shallow, somewhat excessively drained soils that formed in residuum and colluvium from granite and metamorphic rocks. Soils series include Goldroad and Stormjade.

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderately slow to moderate

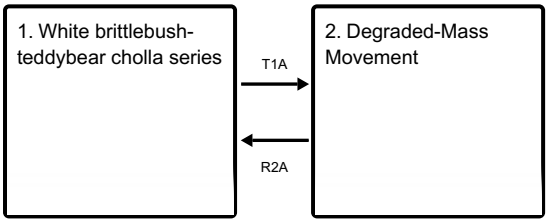
Soil depth	1–20 in
Surface fragment cover <=3"	60–70%
Surface fragment cover >3"	10–89%
Available water capacity (0-40in)	0.08–0.74 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	7.4–8.6
Subsurface fragment volume <=3" (Depth not specified)	30–39%
Subsurface fragment volume >3" (Depth not specified)	2–3%

Ecological dynamics

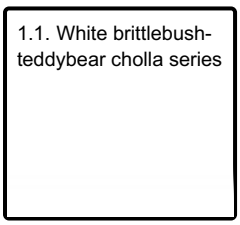
When this site becomes degraded, it looses its tall, shallow-rooted plants first. This includes teddybear cholla (*Cylindropuntia bigelovii*) and ocotillo (*Fouquieria splendens*), both of which do not root-sprout. Since the site occurs on steep slopes, the loss of plant cover would result in significant erosion of the soil surface, possibly causing rock slides. Site degradation also invites shorter-lived perennials to dominate the site, such as white bursage (*Ambrosia dumosa*), mojave woodyaster (Xylohriza tortifolia), and white ratany (*Krameria grayi*).

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
White brittlebush-teddybear cholla series

Community 1.1
White brittlebush-teddybear cholla series

The interpretative plant community is the historic climax community prior to European colonization. This plant community occurs on steep granitic slopes with shallow coarse-gravelly soils. The higher elevation in which the site occurs provides slightly more rainfall than elsewhere in the Major Land Resource Area (MLRA) and the shallow soils are favored by shallow-rooted plants which can quickly take up any available water. The result is a high-producing community dominated by shallow-rooted plants such as white brittlebush (*Encelia farinosa*), teddybear

cholla, and ocotillo. Throughout the site there are moderate variations in the abundance of teddybear cholla as it seems especially sensitive to soil depth and/or texture. This is true to a lesser extent with ocotillo. The potential plant community is 90% shrubs, 5% forbs and 5% grasses. The total vegetation cover is 25%.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	226	362	408
Forb	24	38	42
Total	**250**	**400**	**450**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	15-20%
Grass/grasslike foliar cover	0-2%
Forb foliar cover	1-5%
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 7. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	10-15%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-10%
Surface fragments >0.25" and <=3"	60-70%
Surface fragments >3"	0-5%
Bedrock	5-10%
Water	0%
Bare ground	5-10%

Table 8. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	0-2%	1-5%
>0.5 <= 1	–	–	–	–
>1 <= 2	–	5-10%	–	–
>2 <= 4.5	–	10-15%	–	–
>4.5 <= 13	–	1-5%	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

State 2
Degraded-Mass Movement

Since the site occurs on steep slopes, the loss of plant cover would result in significant erosion of the soil surface, possibly causing rock slides. Site degradation also invites shorter-lived perennials to dominate the site, such as white bursage (*Ambrosia dumosa*), mojave woodyaster (Xylohriza tortifolia), and white ratany (*Krameria grayi*).

Transition T1A
State 1 to 2

Loss of plant cover over time due to a combination of repetitive, high utilization and drought cause the loss of important species which anchor the soil.

Restoration pathway R2A
State 2 to 1

The re-colonization of important plant species which anchor the soil. Management must be intentional about rest and recovery.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
1	**Deep-rooted Shrubs**			64–116	
	creosote bush	LATR2	*Larrea tridentata*	26–46	–
	burrobush	AMDU2	*Ambrosia dumosa*	20–38	–
	white ratany	KRGR	*Krameria grayi*	18–32	–
2	**Shallow-rooted Shrubs**			162–292	
	brittlebush	ENFA	*Encelia farinosa*	72–131	–
	ocotillo	FOSP2	*Fouquieria splendens*	26–47	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	19–33	–
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	9–16	–
	California barrel cactus	FECY	*Ferocactus cylindraceus*	6–11	–
Forb					
3	**Forbs**			24–42	
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	10–18	–
	desert Indianwheat	PLOV	*Plantago ovata*	10–18	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	4–6	–

Animal community

Both desert tortoises (Gopherus agassizii) and desert tortoise burrows have been spotted in and around the site indicating that this is suitable borrowing habitat. On good rainfall years a good annual plant bloom would be expected, providing forage for tortoises as well as rodents. The site also offers a good array of vertical structure, a feature important as bird perches.

Recreational uses

This site offers excellent opportunities for photography of the natural features present. Both the teddybear cholla and ocotillo prove very charismatic subjects for pictures. Some Off-Highway Vehicle recreation is permitted on designated trails.

Other information

White brittlebush is allelopathic and produces a toxic, water soluble substance that inhibits the growth of several winter annuals. White brittlebush is also a useful plant for revetating areas. Native americans would burn the sap from white brittlebush as insence.

Type locality

Location 1: San Bernardino County, CA	
UTM zone	N
UTM northing	3821641
UTM easting	720987
Latitude	34° 30′ 45″
Longitude	114° 35′ 33″
General legal description	This site is located in the northern Chemehuevi Wash OVH area, 5 miles east of CA HWY 95 on a major powerline road.

Contributors

Heath M. McAllister

Approval

Kendra Moseley, 3/11/2025

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	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):**

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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:**
