

Ecological site R040XD021CA

Very Gravelly Wash

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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): 040X–Sonoran Basin and Range

MLRA Description: Major land resource area (MLRA) 31 is the Lower Colorado Desert. This area is in the extreme southeastern part of California, in areas along the Colorado River, and in Western Arizona. The area is comprised of rough, barren, steep, and strongly dissected mountain ranges, generally northwest to southwest trending that are separated by intermontane basins. Elevation ranges from approximately 275 feet below sea level at the lowest point in the Salton Trough to 2700 feet along low northwest to southeast trending mountain ranges. The average annual precipitation is 2 to 6 inches with high temporal and spatial variability. Winter temperatures are mild, summer temperatures are hot, and seasonal and diurnal temperature fluctuations are large. Monthly minimum temperature averages range from 40 to 80 degrees F (4 to 27 degrees C). Monthly maximum temperature averages range from 65 to 110 degrees F (18 to 43 degrees C) (WRCC 2002). Temperatures are rarely below 28 degrees F, and extremely rarely fall below 24 degrees F. Precipitation is bimodal, with approximately 20 to 40 percent of annual precipitation falling between July and September. This summer rainfall, in combination with very hot temperatures and very few to no days of hard freeze are what characterize this MLRA and distinguish it from the Mojave Desert (MLRA 30). Ecological Site Concept - This small ephemeral stream has rare to occasional flood events, and occurs on interfluvies and inset fans on fan remnants with desert pavement surfaces. Soils are very deep, with loamy-skeletal or sandy skeletal particle control section. Creosote bush (*Larrea tridentata*) is dominant, with brittlebush (*Encelia farinosa*) co-dominant. Desert lavender (*Hyptis emoryi*) and white ratany (*Krameria grayii*) are typically present as secondary species. Data ranges in the physiographic data, climate data, water features, and soil data sections of this Ecological Site Description are based on all components.

Associated sites

R040XD009CA	Gravelly Fan Remnants And Fan Aprons This ecological site occurs on fan remnants and fan aprons near the mountain base. Additional run-on and rocky surfaces promote a creosote bush-Schott's dalea community.
R040XD201CA	Cobbly Fan Remnants This ecological site occurs on stony fan remnants with creosote bush and brittlebush dominant.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Larrea tridentata</i> (2) <i>Encelia farinosa</i>
Herbaceous	(1) <i>Chamaesyce albomarginata</i> (2) <i>Plantago ovata</i>

Physiographic features

This site occurs on interfluves and inset fans on fan remnants with desert pavement surfaces. Elevations range from 69 to 1720 feet. Slopes are typically 4 to 8 percent, but may range from 2 to 15 percent.

Table 2. Representative physiographic features

Landforms	(1) Interfluve (2) Inset fan
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Elevation	20 – 520 m
Slope	0 – 20 %
Aspect	Aspect is not a significant factor

Climatic features

The Colorado Desert of California represents the north westernmost 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. Mean annual temperatures range from 70 to 81 degrees F, with summer temperatures frequently exceed 105 degrees F. The average annual precipitation ranges from 2 to 4 inches with most falling as rain. Snowfall is rare. Approximately 35% of 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)	370 days
Freeze-free period (average)	370 days
Precipitation total (average)	100 mm

Influencing water features

Soil features

This site occurs on interfluves and inset fans dissecting and bordering desert pavements. Soils are very deep, somewhat excessively drained, and formed in alluvium from mixed sources. Surface textures are very gravelly fine sandy loam, and gravelly coarse sand. Subsurface textures are loamy sand or sandy loam with gravelly modifiers. The soils series associated with this site are Chemehuevi and Rizzo.

The Chemehuevi soils are loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids. The Chemehuevi soils are strongly calcareous soils, with calcic horizons beginning at depths of 2 to 10 inches. The Rizzo soils are sandy-skeletal, mixed, hyperthermic

Typic Torriorthents.

This ecological site has been correlated to the following mapunits and soil components in the Colorado Desert Area Soil Survey (CA803):

Mapunit; Mapunit name; Component; phase; percent

2001; Emptygun-Chemehuevi association, 2 to 30 percent slopes; Chemehuevi; loamy substratum; 3

2011; Havasulake gravelly silt loam, 1 to 4 percent slopes; Chemehuevi; loamy substratum; 5

2012; Havasulake gravelly sandy loam, 1 to 4 percent slopes; Chemehuevi; loamy substratum; 5

2055; Catfishbay association, 0 to 8 percent slopes; Chemehuevi; loamy substratum; 4

2090; Deprave-Rockhound-Rizzo complex, 2 to 4 percent slopes; Rizzo; occasionally flooded; 3

This ecological site has been correlated to the following mapunits and soil components in the Joshua Tree National Park Soil Survey (CA794):

Mapunit; Mapunit name; Component; phase; percent

2090; Deprave-Rockhound-Rizzo complex, 2 to 4 percent slopes; Rizzo; occasionally flooded; 3

Table 4. Representative soil features

Surface texture	(1) Very gravelly fine sandy loam (2) Gravelly coarse sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	150 cm
Surface fragment cover <=3"	40 – 70 %
Surface fragment cover >3"	0 – 40 %
Available water capacity (0-101.6cm)	2.29 – 7.62 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 30 %
Electrical conductivity (0-101.6cm)	Not specified

Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	20 – 70 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

Ecological dynamics

These small ephemeral streams occur on inset fans, and interfluves that drain stable fan remnants with desert pavement surfaces. These ephemeral streams form dendritic (branched) drainage patterns as they collect runoff from adjacent fan remnants. Desert pavement is distinguished by almost barren, level surfaces covered with tightly interlocked surface gravels, which are often darkly colored by desert varnish. Ephemeral streams among desert pavement surfaces appear as wavy lines of vegetation among the dark barren surfaces. Desert pavement has near surface soil features that reduces the rate of infiltration, thus excess flow drains across the flat surfaces to the multiple small ephemeral streams that have developed on the fan remnants. Drainageways among desert pavement surfaces receive continuous soil disturbance from runoff events, which prevents formation of desert pavement features, such as an interlocking gravelly surface or a vesicular horizon. Instead, soils are composed of very deep sands with very gravelly or extremely gravelly modifiers. Regular flooding of the drainageways flushes the fine eolian dust deposits from the surface, and inhibits the development of the vesicular horizon and the associated uplift of gravels that lead to desert pavement formation. The deep sands allow for quick and deep infiltration of water. Vegetation is dense and diverse in contrast to the barren desert pavement surfaces, because plants can access deeper water. Creosote bush and brittlebush are dominant, with white ratany and desert lavender common secondary shrubs. A diversity of other shrubs and forbs may be present.

The stable gravel surface and the flat topography of the desert pavement are resistant to erosion, and provide little sediment to the streams during flood events. Occasional floods have low volume and intensity, and are contained within the drainageway. These drainageways are in stable positions, and are not inclined to braid or migrate, unless disturbed.

If the desert pavement surface is disturbed, and the protective gravels are removed, surface erosion and gullyng may increase sediment and run off to the adjacent ephemeral streams. Road development and associated ditches alter drainage patterns, which may cause drainageways to become wider, deeper, and braided.

This ecological site is very unlikely to burn, or to burn extensively due to the large expanses of barren desert pavement between the vegetated channels. Non-native species were not recorded in the plot data, but are present in low amounts in the area. However, they will not likely form a continuous fuel load to carry fire.

State and transition model

Figure 3. R031XY021CA model

Additional community tables

Table 5. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Shrub/Vine					
1	Shrubs			493-789	
	creosote bush	LATR2	<i>Larrea tridentata</i>	325-516	–

	brittlebush	ENFA	<i>Encelia farinosa</i>	95-157	–
	white ratany	KRGR	<i>Krameria grayi</i>	45-72	–
	desert lavender	HYEM	<i>Hyptis emoryi</i>	28-45	–
Grass/Grasslike					
2	Perennial Grass			11-18	
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	11-18	–
Forb					
3	Forbs			56-90	
	whitemargin sandmat	CHAL11	<i>Chamaesyce albomarginata</i>	45-72	–
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	11-18	–

Table 6. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

This site is dominated by creosote bush, the root mound of which is well suited for small mammals to burrow in. These animals include ground squirrels, lizards, and mice. Additionally, this site receives abundant moisture in the form of run-off which makes for periodic wildflower shows. This then provides good food plants for the small mammals. Also, many birds perch on the branches of the creosote bush.

Hydrological functions

This site is a narrow, concave channel which drains the surrounding desert patinas.

Recreational uses

This site would be of great interest to those who study desert ecology. A high production community in a region which receives little rain, the site illustrates how important moisture run-off is. Due to this increased moisture, the site also has good periodic wildflower shows which provide many photographic opportunities.

Other information

One abundant plant of the site, brittlebush, was favored by Native Americans of the area for its fragrant sap which they would dry and burn like incense. This practice was observed by the early Spanish settlers and prompted them to name the plant 'incienso,' or incense in Spanish. This same sap is a water soluble substance that inhibits the growth of several winter annuals.

Type locality

Location 1: San Bernardino County, CA	
UTM zone	N
UTM northing	3811724
UTM easting	736268
Latitude	34° 25'12"

Longitude	114° 25'44"
General legal description	This site is located about 3 miles east of West Well on the powerline road in Chemehuevi Wash OHV area. The powerline road intersects a north-south road at this point. The type location is about one half mile south on this road.

Other references

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Contributors

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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	
Approved by	
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:

17. Perennial plant reproductive capability:
