USDA Natural Resources
Conservation Service

Ecological site R030XB225CA
Warm Sloping Pediments

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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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 030X–Mojave Basin and Range

MLRA Description:

Major Land Resource Area (MLRA) 30, Mojave Desert, 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 climate of the area is hot (primarily hyperthermic and thermic; however at higher elevations, generally above 5000 feet, mesic, cryic and frigid) and dry (aridic). Elevations range from below sea level to over 12,000 feet in the higher mountain areas found within the MLRA. Due to the extreme elevational range found within this MLRA, Land Resource Units (LRUs) were designated to group the MLRA into similar land units.

LRU Description:

This LRU (designated by 'XB') is found across the eastern half of California, much of the mid-elevations of Nevada, the southernmost portions of western Utah, and the mid-elevations of northwestern Arizona. Elevations range from 1800 to 5000 feet and precipitation ranges from 4 to 9 inches per year, but is generally between 5-6 inches. This LRU is characterized primarily by the summer precipitation it receives, ranging from 18 – 35% but averages 25%. Summer precipitation falls between July and September in the form of rain, and winter precipitation falls starting in November and ends between February and March, also mostly in the form of rain; however it does receive between

0 and 3 inches of snow, with an average of 1 inch. The soil temperature regime is thermic and the soil moisture regime is typic-aridic. Vegetation includes creosote bush, burrobush, Nevada jointfir, ratany, Mojave yucca, Joshua tree, chollas, cactus, big galleta grass and several other warm season grasses. At the upper portions of the LRU, plant production and diversity are greater and blackbrush is a common dominant shrub.

Ecological Site Concept -

This ecological site is found on dissected pediments at elevations of 2740 to 4040 feet. Soils have a warm thermic temperature regime, and are very shallow to shallow over bedrock. This site occurs at the southern edge of the Mojave Desert (the Mojave Desert- Lower Colorado Desert or MLRA30-31 boundary). Thus, it represents a transition from a warm desert where winter precipitation is significant, to a low desert where summer precipitation is much more significant.

Production Reference Value (RV) is 325 pounds per acre and ranges from 230 to 530 pounds per acre depending on annual precipitation and annual forb production. The reference plant community is weakly dominated by Hall's shrubby spurge (Tetracoccus hallii) and burrobush (Ambrosia dumosa), and secondary shrub diversity is high. Shallow soils increase the competitive ability of the shallow-rooted burrobush. The dissected pediment landscape with localized run-off and run-on, and the transitional climatic location of this ecological site supports a high diversity of shrubs. The area is likely a relictual stronghold of a formerly more continuous distribution of Hall's shrubby spurge, when rainfall was more abundant.

Data in the following sections is based on major components (15% or greater of a mapunit) only.

Associated sites

R030XB140CA	**Shallow Hill 4-6" P.Z.** This ecological site occurs on adjacent pediments. Burrobush (Ambrosia dumosa) is dominant.
R030XB218CA	**Moderately Deep To Very Deep Loamy Fan Remnants** This ecological site occurs on adjacent fan aprons on fan remnants. Burrobush (Ambrosia dumosa) and creosote bush (Larrea tridentata) are dominant.
R030XB221CA	**Loamy Fan Remnants And Pediments** This ecological site occurs on adjacent pediments and fan remnants. Blackbrush (Coleogyne ramosissima) and burrobush (Ambrosia dumosa) are dominants.
R030XB228CA	**Warm Shallow Pediments** This ecological site occurs on adjacent pediments. Creosote bush (Larrea tridentata) and burrobush (Ambrosia dumosa) are dominants.
R030XD003CA	**Hyperthermic Steep South Slopes** This ecological site occurs on adjacent south-facing mountain slopes. Brittlebush (Encelia farinosa) is dominant.

Similar sites

R030XB166CA	**Dissected Pediment, Cool** This ecological site occurs at higher elevations, and is dominated by blackbrush (Coleogyne ramosissima) and California juniper (Juniperus californica). Hall's shrubby spurge (Tetracoccus hallii) is not present.
R030XB221CA	**Loamy Fan Remnants And Pediments** This ecological site occurs on pediments and fan remnants with moderately deep soils to a duripan. It is dominated by blackbrush (Coleogyne ramosissima), burrobush (Ambrosia dumosa) and Hall's shrubby spurge (Tetracoccus hallii).
R030XB228CA	**Warm Shallow Pediments** This ecological site typically occurs on pediments located farther from the mountain front, where erosion rates are lower and the landscape is less dissected. Vegetation is dominated by creosote bush (Larrea tridentata) and burrobush (Ambrosia dumosa), and Hall's shrubby spurge (Tetracoccus hallii) is not present.

R030XB188CA	**Cool Shallow to Moderately Deep Fans** This ecological site occurs at higher elevations, and is co-dominated by blackbrush (Coleogyne ramosissima) and creosote bush (Larrea tridentata). Burrobush (Ambrosia dumosa) is not an important species, and Hall's shrubby spurge (Tetracoccus hallii) is not present.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Tetracoccus hallii* (2) *Ambrosia dumosa*
Herbaceous	Not specified

Physiographic features

This ecological site occurs on pediments at elevations of 2740 to 4040 feet. Slopes range from 4 to 50, but slopes of 4 to 30 percent are typical. Runoff class is medium to very high.

Table 2. Representative physiographic features

Landforms	(1) Pediment
Flooding frequency	None
Ponding frequency	None
Elevation	2,740–4,040 ft
Slope	4–50%
Aspect	Aspect is not a significant factor

Climatic features

The climate on this site is characterized by cool, somewhat moist winters and hot, somewhat moist summers, with approximately 60 percent of precipitation falling as rain between November and March, and approximately 30 percent falling as rain between July and October (slightly higher than the average for the XB LRU). Summer precipitation falls as heavy monsoonal events, while winter precipitation is spread out over a longer time period. The average annual precipitation ranges from 4 to 7 inches. Mean annual air temperature is 63 to 68 degrees F, and the frost free period ranges from 270 to 320 days per year.

Maximum and minimum monthly climate data for this ESD were generated by the Climate Summarizer (http://www.nm.nrcs.usda.gov/technical/handbooks/nrph/Climate_Summarizer.xls) using data from the following climate stations:

44405 Joshua Tree, California (Period of record = 1959 to 2011) [1]

LTHC1 Lost Horse, Joshua Tree National Park (Period of record = 1991 to 2011) [1]

49099, Twentynine Palms, California (Period of record = 1935 – 2011) [1]

The data from multiple weather were combined to most accurately reflect the climatic conditions of this ecological site. The Lost Horse and Joshua Tree weather stations have colder temperatures and less summer precipitation than this ecological site. The Twentynine Palms weather station has hotter temperatures and less total precipitation than this ecological site.

Table 3. Representative climatic features

Frost-free period (average)	320 days
Freeze-free period (average)	
Precipitation total (average)	7 in

Influencing water features

Soil features

The dominant soils associated with this ecological site are very shallow to shallow, and formed in colluvium derived from granitoid over residuum weathered from granitoid, or in residuum weathered from granitoid. Surface textures are gravelly sandy loam, gravelly loamy fine sand and loamy sand with subsurface textures of gravelly sandy loam, gravelly fine sandy loam, loamy fine sand and sand over bedrock. For rock fragments less than 3 inches in diameter, the percent surface cover range from 70 to 85 percent, and subsurface volume is 5 to 34 percent (subsurface fragments by volume for a depth of 0 to 14 inches). For rock fragments greater than 3 inches in diameter, the percent surface cover is 0 to 5 percent, with no large fragments in subsurface horizons. These soils are well to somewhat excessively drained with slow to moderately rapid permeability.

The associated soil series that are 15 percent or greater of any one map unit are: Langwell (loamy, mixed, superactive, calcareous, thermic Lithic Torriorthents); Stranger (mixed, thermic Lithic Torripsamments); and Grinder (loamy, mixed, superactive, thermic Lithic Haplargids). Another soil on which this site is found is typically 10 percent or less of any map unit when associated with this site. It is the Jetmine soil(loamy, mixed, superactive, thermic, shallow Cambidic Haplodurids).

The Langwell soils occur on mountains, hills, and pediments. These soils are very shallow to shallow over unweathered, slightly to highly fractured granitioid bedrock. These soils typically have gravelly sandy loam textures. The Stranger soils occur on pediments. They are very to a paralithic contact over bedrock, and are sandy throughout. The Grinder soils are very shallow and shallow to unweathered, slightly fractured granitioid bedrock. They have an argillic horizon above the bedrock contact. The Jetmine soils have a weakly cemented duripan occurring at shallow depths below the surface. Because of the dissected character of the pediment landforms, rare to frequent flooding may occur in interfluves. Soils may experience rare to frequent flooding. The vegetation occurring immediately adjacent to, or within these flooded positions may be slightly more productive than surrounding vegetation, but they are considered to be within the overall vegetation community of the ecological site.

This ecological site is correlated with the following map units and soil components in the Joshua Tree National Park Soil Survey:

3242;Langwell-Rock outcrop-Typic Helendale complex, 4 to 30 percent slopes;Langwell; 50
4620;Stranger-Rock outcrop-Grubstake complex, 8 to 50 percent slopes;Stranger; 40
4625;Grinder-Pinkcan complex, 4 to 30 percent slopes;Grinder;cool;20
;Gocougs loamy coarse sand, 2 to 8 percent slopes;Jetmine;very rarely flooded;9
3213;Dalvord-Aguilareal-Rock outcrop complex, 15 to 60 percent slopes;Langwell; 5
3110;Coppermine-Stranger complex, 8 to 50 percent slopes; Stranger; 30; Stranger;frequently flooded;1
4830;Rock outcrop-Pinecity complex, 8 to 30 percent slopes;Stranger; 3

Table 4. Representative soil features

Parent material	(1) Colluvium–granite
Surface texture	(1) Gravelly sandy loam (2) Gravelly loamy fine sand (3) Loamy sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Slow to moderately rapid
Soil depth	3–14 in
Surface fragment cover <=3"	70–85%
Surface fragment cover >3"	0–5%

Available water capacity (0-40in)	0.2–1.1 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	5–34%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Abiotic Factors

The abiotic factors driving this ecological site are a dissected pediment landscape, shallow soils, and a transitional climate. This ecological site is found on dissected pediments at elevations of 2740 to 4040 feet. Soils have a warm thermic temperature regime, and are very shallow to shallow over bedrock. This site occurs at the southern edge of the Mojave Desert (the Mojave Desert-Lower Colorado Desert or MLRA30-31 boundary). Thus, it represents a transition from a warm desert where winter precipitation is dominant, to a hot desert where summer precipitation is much more significant. The combination of shallow soils, dissected topography with localized run-off and run-on, and the relatively high summer precipitation and warm climate produces a unique and diverse plant community.

The reference plant community is weakly dominated by Hall’s shrubby spurge and burrobush, and a high diversity of secondary species is present. Hall's shrubby spurge is a rare plant endemic to southeastern California and Western Arizona. It occurs as a dominant shrub on a range of soils and landforms around Cottonwood Springs and the Eagle Mountains of Joshua Tree National Park, with a more localized distribution in other parts of its range (Dressler 1954). There is little research about the life cycle, drought and fire response of this species. The Cottonwood Springs area is likely a relictual stronghold of a formerly more continuous distribution of Hall’s shrubby spurge, when rainfall across the region was more abundant (Dressler 1954). Burrobush is drought-deciduous, shallow-rooted species widespread in the Mojave and Colorado Deserts.

Pediments are gently sloping, bedrock erosional surfaces of low relief that form at the base of receding mountain fronts. Pediment surfaces are covered by a discontinuous layer of alluvium that is typically thinner closer to the mountain front and eventually thick enough that the pediment is no longer distinct from the alluvial fan (Dohrenwend and Parsons 2009). Closer to the mountain front, erosion is active, and exposed bedrock is dissected and undulating (Dohrenwend and Parsons 2009). Different topographical positions within these dissected pediment landscapes experience different rates of overland flow and rainsplash erosion (Edinger-Marshall and Lund 1999).

The dissected pediment landscape, with contrasting and localized areas of soil erosion and deposition, and run-off and run-on, supports a diverse plant community. The majority of the landscape is characterized by shallow soils subject to active erosion, which support a sparse but diverse community of shallow-rooted woody shrubs and subshrubs. Species that are capable of sprouting after mechanical damage are more common in this ecological site; these include catclaw acacia (Acacia gregii), jojoba (*Simmondsia chinensis*), Nevada jointfir (*Ephedra nevadensis*), Parry’s beargrass (*Nolina parryi*), Parish’s goldeneye (*Viguiera parishii*), mouse's eye (*Bernardia myricifolia*), range ratany (*Krameria erecta*), and white ratany (*Krameria grayi*). The frequency of disturbance supports the continuous presence of shorter-lived subshrubs, which in more stable landforms are eventually replaced by longer-lived dominants. Annual species are limited in this site by the lack of soil moisture, and by soil erosion, which limits seedling establishment (Guerrero-Campo et al. 2008). Interfluves transport material, receive run-on from higher positions, and are mantled by a deeper layer of alluvium, which supports deeper-rooted species like creosote bush (*Larrea tridentata*) and species requiring greater moisture like California juniper (*Juniperus californica*) and catclaw acacia.

Disturbance dynamics

The major disturbances affecting this ecological site are drought, invasion by non-native species, and erosion.

Drought is an important shaping force in Mojave Desert plant communities (Webb et al. 2003, Hereford et al. 2006). Short-lived perennial shrubs and perennial grasses demonstrate the highest rates of mortality (Webb et al. 2003, Bowers 2005, Hereford et al. 2006, Miriti et al. 2007), and annual species remain dormant in the soil seedbank (Beatley 1969, 1974, 1976). Long-lived shrubs are more likely to exhibit branch-pruning, and or limited recruitment during drought (e.g. Hereford et al. 2006, Miriti et al. 2007), leading to reduced cover and biomass in drought-afflicted communities. Because this ecological site already has sparse cover, further loss of cover due drought-induced mortality increases the susceptibility of this site to increased damages from erosion.

Non-native annual species, including red brome (*Bromus rubens*), Mediterranean grass (Schismus species), and redstem stork's bill (*Erodium cicutarium*), have become naturalized throughout the Mojave Desert over the past century (Rickard and Beatley 1965, D'Antonio and Vitousek 1992, Brooks 1999, Reid et al. 2006, Norton et al. 2007). Although non-native annuals are present in this ecological site, the site is relatively resistant to invasion. The active erosion that characterizes this site limits seedling establishment annual species (Guerrero-Campo and Montserrat-Marti 2000), and shallow soils and a hot climate reduce available soil moisture, which limits biomass of annuals.

The inability of this site to support a high biomass of annuals, and overall sparse vegetation cover, with natural fire breaks created by rock outcrops, makes this site relatively resistant to fire, which has increased in other Mojave Desert plant communities due to the continuous fine fuel layer created by non-native annuals in wet years (D'Antonio and Vitousek 1992, Brooks et al. 2004). In the very unlikely instance of ignition in this ecological site, fire is likely to be small and of low intensity so the effects are insignificant at the landscape scale.

Water erosion is the dominant process modifying and maintaining exposed pediment surfaces (Edinger-Marshall and Lund 1999, Dohrenwend and Parsons 2009), and is an important process modifying and maintaining the vegetation community. Without additional disturbance, the affects of erosion are within the natural range of variability of the reference plant community. However, with additional disturbance (anthropogenic or natural), the effects of erosion may be more severe leading to vegetation and soil loss and potentially a new community phase or state. For example, shrub cover protects the gravelly soils of this ecological site from erosion (Edinger-Marshall and Lund 1999). If shrub cover is reduced due to drought, erosion will remove more soil, which reduces the availability of safe sites for plant establishment, which further reduces shrub cover.

State and transition model

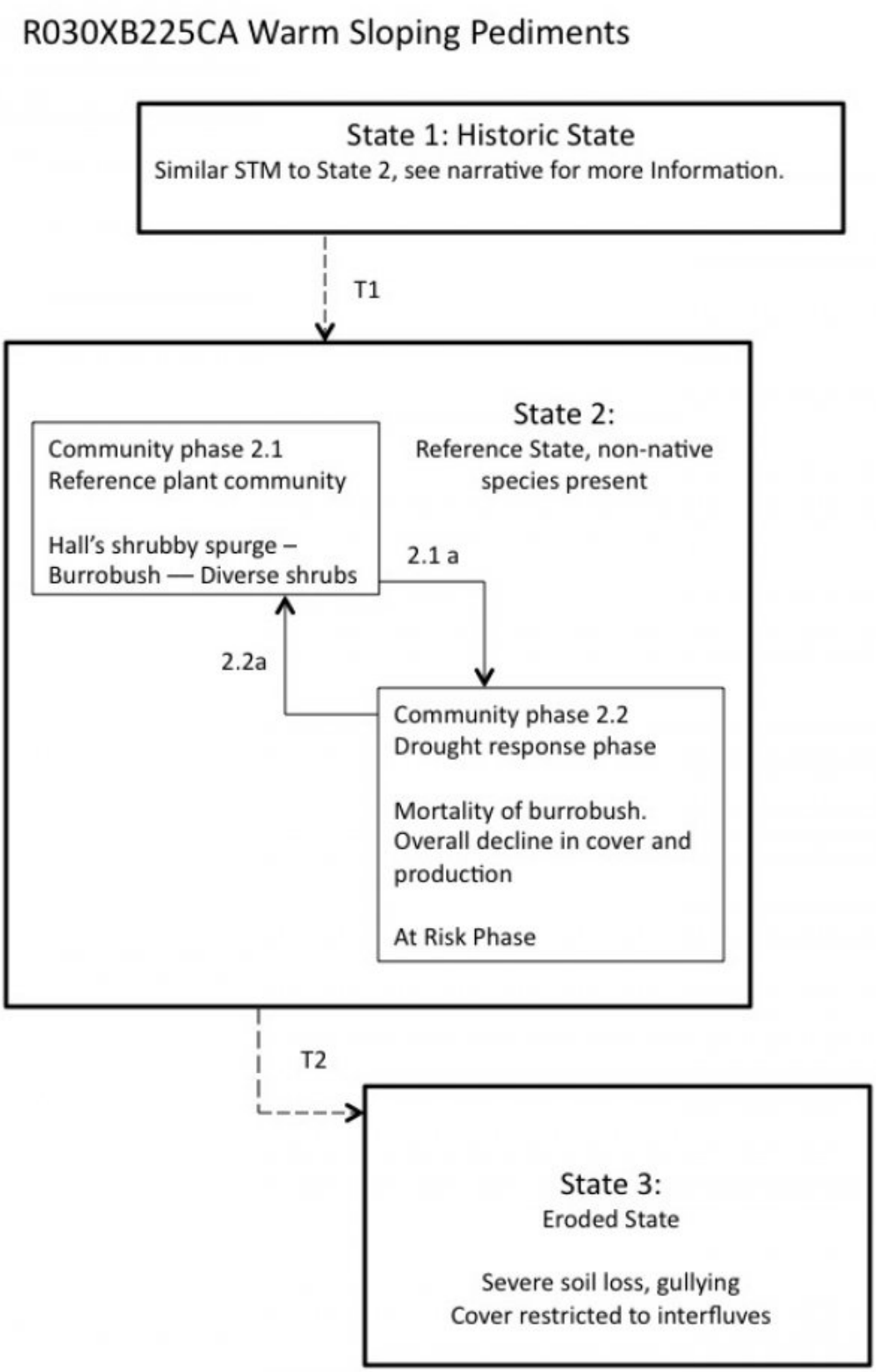

Figure 4. R030XB225CA

State 1

Historic State

State 1 represents the historic range of variability for this ecological site. This state no longer exists due to the ubiquitous naturalization of non-native species in the Mojave Desert. Periodic drought and water erosion were the natural disturbances influencing this ecological site. Data for this State does not exist, but it would have been similar to State 2, except with only native species present. See State 2 narrative for more detailed information.

State 2
Reference State

State 2 represents the current range of variability for this site. Non-native annuals, including red brome, Mediterranean grass, and redstem stork's bill are naturalized in this plant community. Their abundance varies with precipitation, but they are at least sparsely present (as current year's growth or present in the soil seedbank).

Community 2.1
Reference plant community

Figure 5. Community Phase 2.1

The current potential plant community is weakly dominated by Hall's shrubby spurge and burrobush. The small tree California juniper is typically scattered throughout the site in interfluves, at up to 1 percent cover. Jojoba, Parry's beargrass, Parish's goldeneye, Mojave yucca, range ratany, white ratany, are important secondary species. Catclaw acacia, creosote bush, and mouse's eye may be present. The cactus species Engelmann's hedgehog cactus (Echinocerus engelmannii) and cottontop cactus (*Echinocactus polycephalus*) are important species, and the limited distribution cushion foxtail cactus (*Escobaria alversonii*) is often present. The native perennial grasses big galleta (Pleuraphis rigda) and desert needlegrass (*Achnatherum speciosum*) may be present. Subshrubs and perennial forbs are an important component of the vegetation community, and include Mojave aster (*Xylorhiza tortifolia*), shrubby deervetch (Lotus rigida), and narrowleaf bedstraw (*Galium angustifolium*). Native winter annuals are seasonally present, and common species include pincushion flower (*Chaenactis fremontii*), curvenut combseed (*Pectocarya recurvata*). Mediterranean grass, red brome and redstem stork's bill are sparsely present. Biological soil crusts (BSC) are often associated with grus (granite that is crumbled, but not fully decomposed), which is typical of soil surfaces on this ecological site. These crusts are important for improving soil stability, infiltration, and nutrient cycling on these shallow soils (Belnap et al. 2001). Biological soil crusts form slowly, and are very sensitive to physical disturbance (such as from trampling or off-road vehicle disturbance).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	220	300	410
Forb	10	25	90
Grass/Grasslike	0	0	20
Tree	0	0	10
Total	**230**	**325**	**530**

Community 2.2
Drought response

This community phase is characterized by an overall decline in cover due to mortality of burrobush and other short-lived species, branch-pruning and lack of recruitment of longer-lived species, including Hall's shrubby spurge, and lack of emergence of annual forbs and grasses. Severe drought may cause mortality of long-lived species including Hall's shrubby spurge and California juniper. A long-term monitoring study in the reference plant community found long-periods of stability under average conditions and moderate drought, but high rates of mortality resulting from one year of extreme drought. Following severe drought in 2002, burrobush suffered 68% mortality, Hall's shrubby spurge 58%, short-lived shrubs and subshrubs up to 100% mortality (Miriti et al. 2007). This is an at-risk phase, as the increase in bare ground that occurs during drought increases the susceptibility of this site to erosion. Biological soil crusts are dormant during drought, and are especially susceptible to damage by mechanical disturbance when dry (Warren and Eldridge 2003). Thus, any additional disturbance threatens to transition this community phase to a phase of increased erosion, or a new state, where significant loss of ecological function has occurred.

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs with severe or prolonged drought.

Pathway 2.2a
Community 2.2 to 2.1

This pathway occurs with time and a return to average or above average precipitation.

State 3
Eroded State

This state is characterized by severe soil erosion. Biological soil crusts are largely absent, gullying is pronounced, and soil surfaces have no protective surface gravels. Vegetative cover is restricted to interfluves.

Transition 1
State 1 to 2

This transition occurred with the naturalization of non-native species in this ecological site. Non-native species were introduced with settlement of the Mojave Desert region in the 1860s.

Transition 2
State 2 to 3

This transition occurs with severe or continuous anthropogenic disturbance that increases the effects of erosion.

Additional community tables

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
1	**Native shrubs**			220–410	
	Hall's shrubby-spurge	TEHA	*Tetracoccus hallii*	30–120	7–15
	burrobush	AMDU2	*Ambrosia dumosa*	25–80	7–15
	Parish's goldeneye	VIPA14	*Viguiera parishii*	15–50	1–3
	Parry's beargrass	NOPA	*Nolina parryi*	1–30	0–2
	Nevada jointfir	EPNE	*Ephedra nevadensis*	3–25	1–3
	littleleaf ratany	KRER	*Krameria erecta*	2–25	1–3
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	2–25	0–1
	cottontop cactus	ECPO2	*Echinocactus polycephalus*	5–25	0–1
	Mojave yucca	YUSC2	*Yucca schidigera*	5–20	1–3
	jojoba	SICH	*Simmondsia chinensis*	5–20	0–2
	catclaw acacia	ACGR	*Acacia greggii*	0–20	0–1
	Wiggins' cholla	CYEC3	*Cylindropuntia echinocarpa*	0–4	0–1
	creosote bush	LATR2	*Larrea tridentata*	0–3	0–1
	cushion foxtail cactus	ESAL2	*Escobaria alversonii*	2–3	0–1
	mouse's eye	BEMY	*Bernardia myricifolia*	0–2	0–2
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	0–2	0–1
Tree					
2	**Trees**			0–10	
	California juniper	JUCA7	*Juniperus californica*	0–10	0–1
Forb					
3	**native forbs**			30–70	
	pincushion flower	CHFR	*Chaenactis fremontii*	0–40	0–5
	narrowleaf bedstraw	GAAN2	*Galium angustifolium*	2–15	0–1
	shrubby deervetch	LORI3	*Lotus rigidus*	0–15	0–1
	curvenut combseed	PERE	*Pectocarya recurvata*	0–10	0–4
	chia	SACO6	*Salvia columbariae*	0–1	0–1
	cryptantha	CRYPT	*Cryptantha*	0–1	0–1
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–1	0–1
6	**non-native forbs**			0–90	
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0–90	0–5
Grass/Grasslike					
4	**Native perennial grasses**			0–10	
	big galleta	PLRI3	*Pleuraphis rigida*	0–10	0–1
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–2	0–1
5	**non-native annual grasses**			0–1	
	compact brome	BRMA3	*Bromus madritensis*	0–1	0–1

Animal community

A diverse assemblage of reptiles and mammals are likely to be found in this site. These may include (based on habitat preferences):

Lizards:
Mojave Desert tortoise (Gopherus agassizii agassizii)
Desert banded Gecko (Coleonyx variegatus variegatus)
Northern desert iguana (Dipsosaurus dorsalis dorsalis)
Long-nosed leapard lizard (Gambelia wislizenii wislizenii)
Western chuckwalla (Sauromalus ater obesus)
Mojave zebra-tailed lizard (Callisaurus draconoides rhodostictus)
Southern desert horned lizard (Phrynosoma platyrhinos calidiarum)
Western brush lizard (Urosaurus graciosus graciosus)
Desert side-blotched lizard (Uta stansburiana stejnegeri)
Great basin whiptail (Aspidoscelis tigris tigris)

Snakes:
Desert glossy snake (Arizona occidentalis eburnata)
Mojave shovel-nosed snake (Chionactis occipitalis occipitalis)
California kingsnake (Lampropeltis getula californae)
Red coachwhip (Masticophis flagellum piceus)
Western leaf-nosed snake (Phyllorynchus decurtatus perkinsi)
Sonoran gopher snake (Pituophis catenifer affinis)
Western long-nosed snake (Rhinocheilus lecontei lecontei)
Desert patch-nosed snake (Salvadora hexalepis hexalepis)
Smith's black-headed snake (Tantilla hobartsmithi)
Western diamondback snake (Crotalus atrox)
Mojave Desert sidewinder (Crotalus cerastes cerastes)
Colorado Desert sidewinder (Crotalus cerastes laterorepens)

The following mammals are likely to occur in this ecological site:
American badger (Taxidea taxus berlandieri)
California desert bat (Myotis californicus stephensi)
Western pipistrelle (Pipistrellus hesperus hesperus)
Desert big brown bat (Eptesicus fuscus pallidus)
Pallid bat (Antrozous pallidus minor)
Desert coyote (Canis macrotis arsipus)
Desert kit fox (Vulpes macrotis arsipus)
Southern Desert cottontail (Sylvilagus audobonii arizonae)
Desert blacktail jackrabbit (Lepus californicus deserticola)
Whitetail antelope squirrel (Ammospermphilus leucurus leucurus)
Mojave roundtail ground squirrel (Spermophilus tereticaudus tereticaudus)
Mojave pocket gopher (Thomomys bottae mojavensis)
Coachella pocket gopher (Thomomys bottae rupestris)
Eastern spiny pocket mouse (Peroganthus spinatus spinatus)
Pallid (San Diego) pocket mouse (Chaetodipus fallax pallidus)
Mojave little pocket mouse (Perognathus longimembris longimembris)
Merriam's kangaroo rat (Dipodomys merriami merriami)
Desert kangaroo rat (Dipodomys deserti)
Desert wood rat (Neotoma fuscipes simplex)
Sonoran deer mouse (Peromyscus maniculatus sonoriensis)
Desert grasshopper mouse (Onychomys torridus pulcher)
Desert shrew (Notiosorex crawfordi crawfordi

Recreational uses

This site may be used for botanizing, wildflower viewing, and aesthetic enjoyment. Pediment landscapes are an unusual and interesting feature of arid environments. The plant community represents an interesting assemblage of Mojave and Sonoran Desert species that come together at this transitional area. This ecological site is home to one of the densest concentrations of Hall's shrubby spurge.

Inventory data references

The following NRCS vegetation plots were used to describe this ecological site:

Community 2.1:
COSP10 (Type location)
POWA106
POWA107
COSP11

Type locality

Location 1: Riverside County, CA	
UTM zone	N
UTM northing	3733462
UTM easting	611204
General legal description	The type location is approximately 400 feet northwest of Mastodon Peak, in Joshua Tree National Park.

Other references

Beatley, J. C. 1969. Dependence of desert rodents on winter annuals and precipitation. Ecology 50:721-724.

Beatley, J. C. 1974. Effects of rainfall and temperature on the distribution and behavior of *Larrea tridentata* (Creosote-bush) in the Mojave Desert of Nevada. Ecology 55:245-261.

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Approval

Kendra Moseley, 10/21/2024

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	05/10/2025
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

---

7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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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:**
