USDA Natural Resources Conservation Service

Ecological site R030XD003CA
Hyperthermic Steep South Slopes

Accessed: 05/05/2024

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.

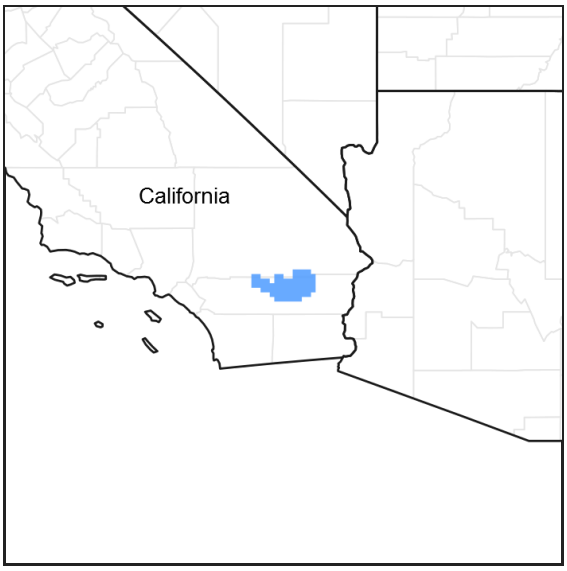

Figure 1. Mapped extent

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:

The XD LRU is essentially equivalent to the Death Valley/Mojave Central Trough EPA Level IV Ecoregion and associated Mojave Sand Dunes and Mojave Playas Ecoregions. Extremely-arid conditions often extend to ranges and footslopes exposed to this region as well as portions of the Mojave bordering the Central Sonoran/Colorado Desert Basins and the Imperial/Lower Coachella Valleys. Generally below 1650 ft (500 m), higher elevations exist, up to 2500 ft (750 m), on southern exposures or slopes exposed to hot air convection currents from extremely low elevations. Higher elevations can occur when extremely-arid conditions exist such as mean annual precipitation is less than 4 inches (110 mm) and/OR average summer maximum temperatures for August is roughly greater than 40

degrees C. Also, areas where soil surfaces have a very low albedo, are heavily armored with surface fragments and vesicular horizons prevent moisture infiltration; vegetation is sparse enough to drive a vehicle between shrubs.

Classification relationships

The Encelia farinosa Association of the Encelia farinosa shrubland alliance (Sawyer et al. 2009) is found within this ecological site.

Ecological site concept

This ecological site occurs on steep arid sideslopes of fan remnants, hillslopes and mountain slopes at elevations of 390 to 4000 feet. This site is associated with hot landscape positions, typically occurring on south-facing aspects, but at lower elevations it may occur on all aspects. Soils are typically skeletal, with gravel surface textures, and range from very shallow to deep. Annual production reference value (RV) is 257 pounds per acre and ranges from 159 to 356 pounds per acre, depending on precipitation. This site is dominated by brittlebush (Encelia farinosa), and creosote bush (Larrea tridentata) is an important secondary shrub. Hot soil temperatures on warm landscape positions favor dominance by the drought-tolerant but cold-intolerant brittlebush.

The data in the following sections is from major (15% of map unit or greater) components only.

Associated sites

R030XB172CA	**Warm Gravelly Shallow Hills** R030XB172CA is found on adjacent warm thermic slopes. Creosote bush (Larrea tridentata) and Parish's goldeneye (Viguiera parishii) dominate.
R030XB213CA	**Moderately Deep Gravelly Mountain Slopes** R030XB213CA occurs on thermic slopes at higher elevations. Eastern mojave buckwheat (Eriogonum fasciculatum), desert needlegrass (Achnatherum speciosum) and California juniper (Juniperus californica) are dominant species.
R030XD001CA	**Hyperthermic Dry Hills** R030XD001CA occurs on adjacent north-facing slopes. Burrobush (Ambrosia dumosa) and creosote bush (Larrea tridentata) dominate.
R030XD004CA	**Low-Production Hyperthermic Hills** R030XD004CA occurs on adjacent slopes. Creosote bush (Larrea tridentata) dominates.
R030XD008CA	**Hyperthermic Sandhill** R030XD008CA is found on adjacent sand hills. Big galleta (Pleuraphis rigida) and creosote bush (Larrea tridentata) are dominant.
R030XY023CA	**Hyperthermic Dissected Shallow Pediment** R030XD023CA is found on adjacent pediments. Mojave indigobush (Psorothamnus arborescens), desertsenna (Senna armata), and burrobush (Ambrosia dumosa) are dominant species.
R030XD025CA	**Hyperthermic Sandsheets** R030XD025CA is found on adjacent sandsheets. Big galleata (Pleuraphis rigida) and creosote bush (Larrea tridentata) dominate.
R030XD039CA	**Coarse Gravelly Fans** R030XD039CA occurs on alluvial fan remnants below this site. Brittlebush (Encelia farinosa) and creosote bush (Larrea tridenata) dominante.
R030XD040CA	**Hyperthermic Steep North Slopes** R030XD040CA occurs on adjacent north-facing mountain slopes. Burrobush (Ambrosia dumosa) co-dominates with creosote bush (Larrea tridentata) and brittlebush (Encelia farinosa).
R030XD042CA	**Hyperthermic Shallow To Moderately Deep Fan Remnants** R030XD042CA is found on adjacent fan remnants. Vegetation is sparse, and dominated by creosote bush (Larrea tridentata), with burrobush (Ambrosia dumosa) and white ratany (Krameria grayi).

R030XY128CA	**Broad, Gravelly, Hyperthermic Ephemeral Stream** R030XY128CA occurs in medium-sized drainageways adjacent to this site. Desert lavender (Hyptis emoryi), creosote bush (Larrea tridentata) and burrobrush (Hymenoclea salsola) are dominant species.
R040XD030CA	**Extremely Stony Fan Remnants** R031XY030CA is found on adjacent stony fan remnants. Teddybear cholla (Cylindropuntia bigelovii) and creosote bush (Larrea tridentata) are dominant species.

Similar sites

R030XB164CA	**Steep South Slopes** R030XB164CA occurs on warm thermic soils. Production, density and diversity are typically higher than this site, and secondary species composition is different.
R030XD039CA	**Coarse Gravelly Fans** R030XD039CA occurs on fan remnants. Production is lower than this site, and ocotillo (Foequieria splendens)is often present.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Encelia farinosa* (2) *Larrea tridentata*
Herbaceous	Not specified

Physiographic features

This ecological site typically occurs on south-facing hill and mountain slopes, but at lower elevations it may occur on all aspects. Elevations range from 390 to 3990 feet, and slopes are typically 15 to 75 percent (but may range from 8 to 75 percent). This site experiences no flooding or ponding, and runoff class is low to very high.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	119–1,216 m
Slope	8–75%
Aspect	S, SW, W

Climatic features

The climate of this ecological site is characterized by hot temperatures, aridity, and a bimodal precipitation pattern. Precipitation falls as rain, with 30 percent falling in summer between July and October, and 65 percent falling in winter between November and March. The mean annual precipitation is 3 to 5 inches and mean annual air temperature is 68 to 73 degrees F. The frost free period is 300 to 360 days.

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 (results are unweighted averages):

42598, Eagle Mountain, CA (Period of record = 1933 to 2011) [1]

43855, Hayfield Reservoir, CA (Period of record = 1933 to 2011) [1]

049099, Twentynine Palms, California (Period of record = 1935 to 2011) [1]

The data from multiple weather were combined to most accurately reflect the climatic conditions of this ecological site.

Table 3. Representative climatic features

Frost-free period (average)	360 days
Freeze-free period (average)	0 days
Precipitation total (average)	127 mm

Influencing water features

Soil features

The soils associated with this ecological site range from very shallow to very deep over bedrock. Soils typically have minimal soil development, and are skeletal, with gravel surface textures and gravelly or very gravelly subsurface textures. These soils are well to somewhat excessively drained with slow to rapid permeability. The soils associated with this ecological site occur on mountains and hills, and formed from colluvium derived from granitoid, gneiss, or basalt over residuum weathered from granitoid, gneiss, or basalt; or soils occur on steep sideslopes of fan remnants, and formed in alluvium derived from granitoid and gneissic sources.

The associated soil series that are 15 percent or greater of any one map unit are: Blackeagle (loamy-skeletal, mixed, superactive, hyperthermic Lithic Haplocambids); Jadestorm (loamy-skeletal, mixed, superactive, calcareous, hyperthermic, shallow Typic Torriorthents); Ironlung (sandy-skeletal, mixed, hyperthermic, shallow Typic Torriorthents); Missionwell (loamy-skeletal, mixed, superactive, calcareous, hyperthermic Lithic Torriorthents); Meccapass (loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocambids); Whiterobe (sandy, mixed, hyperthermic Typic Torriorthents); Rainbowsend (loamy-skeletal, mixed, superactive, hyperthermic, shallow Typic Haplodurids); Descent (sandy-skeletal, mixed, hyperthermic Typic Torriorthents); Goldenhills (sandy-skeletal, mixed hyperthermic Typic Torriothents); and Fanhill (loamy, mixed, superactive, hyperthermic, shallow Typic Haplocambids). Other soils on which this site is found are typically 10 percent or less of any map unit when associated with this site. They are: Impedimenta (mixed, hyperthermic Lithic Torripsamments); Supplymine (loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids); and a higher order of Typic Haplocalcids.

Most of these soils occur predominately on hill and mountain slopes, but the Rainbowsend and Descent soils occur on fan remnants. The Rainbowsend soils are shallow to a duripan (less than 20 inches), and have extremely gravelly fine sandy loam surface textures. The Descent soils are very deep, and typically have channery surface textures with channery subsurface textures. The Missionwell and Typic Haplocalcid soils occur on basalt hills and lava flows and are derived from colluvium derived from basalt over residuum weathered from basalt. The Missionwell soils are very shallow to hard bedrock while Ironlung soils are very shallow to soft, weathered granitoid or gneissic bedrock. Both soils have more than 35 percent rock fragments in the horizons above the contact. Other soils with a shallow bedrock contact such as Blackeagle and Fanhill are 14 to 20 inches to the contact and have a cambic horizon above the bedrock. The Whiterobe soils are moderately deep, and are sandy throughout, but have very gravelly loamy sand or gravel surface textures, and have an RV of 45 to 80 percent rock fragments in the surface horizon (1 inch depth).. The Meccapass soils are also moderately deep, but are loamy-skeletal. The Goldenhills soils are sandy-skeletal and deep.

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

Map unitsymbol; Mapunit name; Component;phase; percent
1220; Jadestorm-Blackeagle-Rock outcrop complex, 15 to 50 percent slopes; Jadestorm ; 60
1225; Blackeagle-Rock outcrop complex, 15 to 75 percent slopes; Blackeagle ; 65
1225; Blackeagle-Rock outcrop complex, 15 to 75 percent slopes; Jadestorm; 10
1230; Jadestorm-Rock outcrop complex, 30 to 75 percent slopes; Jadestorm; 45
1230; Jadestorm-Rock outcrop complex, 30 to 75 percent slopes; Meccapass; 6
1240; Meccapass-Bulletproof-Rock outcrop complex, 30 to 75 percent slopes; Meccapass; 45

1240; Meccapass-Bulletproof-Rock outcrop complex, 30 to 75 percent slopes; Meccapass; 10
1241; Meccapass-Seanna-Contactmine complex, 15 to 75 percent slopes; Meccapass; 45
1241; Meccapass-Seanna-Contactmine complex, 15 to 75 percent slopes Whiterobe; 2
1242; Meccapass-Jadestorm-Rock outcrop complex, 15 to 75 percent slopes; Jadestorm; 25
1242; Meccapass-Jadestorm-Rock outcrop complex, 15 to 75 percent slopes; Meccapass; 40
1250; Ironlung-Rock outcrop complex, 30 to 75 percent slopes; Ironlung; 50
1250; Ironlung-Rock outcrop complex, 30 to 75 percent slopes; Whiterobe; 3
1255; Goldenhills-Bulletproof-Fanhill-Whiterobe complex, 30 to 75 percent slopes; Fanhill; 15
1255; Goldenhills-Bulletproof-Fanhill-Whiterobe complex, 30 to 75 percent slopes; Goldenhills; 40
1255; Goldenhills-Bulletproof-Fanhill-Whiterobe complex, 30 to 75 percent slopes; Ironlung rubbly; 2
1255; Goldenhills-Bulletproof-Fanhill-Whiterobe complex, 30 to 75 percent slopes; Whiterobe ; 15
1260; Whiterobe-Bigbernie complex, 30 to 75 percent slopes; Whiterobe; 45
1410; Missionwell-Rock outcrop complex, 15 to 50 percent slopes; Missionwell; 50
1410; Missionwell-Rock outcrop complex, 15 to 50 percent slopes; Typic Haplocalcids volcanic; 10
1415; Bolero-Rock outcrop complex, 30 to 75 percent slopes; Ironlung; 5
1550; Buzzardsprings-Coxpin-Dalelake complex, 2 to 8 percent slopes; Missionwell; 2
2085; Rainbowsend-Goldenbell complex, 4 to 50 percent slopes; Rainbowsend; 45
2111; Descent-Rubylee association, 8 to 50 percent slopes; Descent; warm;45
2717; Dalelake-Rock outcrop-Buzzardsprings association, 4 to 30 percent slopes; Missionwell; 9
2825; Rock outcrop-Supplymine-Bolero-Ironage complex, 15 to 60 percent slopes; Blackeagle; 5
2830; Rock outcrop-Blackeagle complex, 30 to 75 percent slopes, dry; Blackeagle; 3
2830; Rock outcrop-Blackeagle complex, 30 to 75 percent slopes, dry; Impedimenta; 2
2830; Rock outcrop-Blackeagle complex, 30 to 75 percent slopes, dry; Supplymine; 1
2835; Rock outcrop-Blackeagle complex, 30 to 75 percent slopes; Blackeagle ; 40
2835; Rock outcrop-Blackeagle complex, 30 to 75 percent slopes; Supplymine ; 10
2840; Rock outcrop-Stormjade complex, 30 to 75 percent slopes; Jadestorm; 30
3110; Coppermine-Stranger complex, 8 to 50 percent slopes; Supplymine; 10
3120; Aguilareal-Rock outcrop-Blackeagle complex, 30 to 60 percent slopes; Blackeagle; 20
4830; Rock outcrop-Pinecity complex, 8 to 30 percent slopes; Blackeagle ; 5

Table 4. Representative soil features

Parent material	(1) Colluvium–granite (2) Residuum–granite (3) Residuum–gneiss
Surface texture	(1) Very gravelly loamy sand (2) Very gravelly sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Slow to rapid
Soil depth	8–381 cm
Surface fragment cover <=3"	20–80%
Surface fragment cover >3"	7–65%
Available water capacity (0-101.6cm)	0.25–6.1 cm
Calcium carbonate equivalent (0-101.6cm)	0–16%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–4
Soil reaction (1:1 water) (0-101.6cm)	6.2–9

Subsurface fragment volume <=3" (Depth not specified)	15–85%
Subsurface fragment volume >3" (Depth not specified)	0–45%

Ecological dynamics

Abiotic Factors

The most important abiotic factors driving this site are a hot climate with hyperthermic soil temperatures, steep slopes and increased dryness in the soil due to greater solar radiation on steep south-facing slopes. This ecological site is associated with hot landscape positions, so at higher elevations and more westerly positions, this site is associated with south-facing aspects, but at lower elevations and more easterly positions, this site may occur on all aspects. These factors favor dominance by the extremely drought-tolerant, but cold-intolerant brittlebush, with creosote bush as an important secondary shrub.

Throughout its range, brittlebush is most abundant on steeper south-facing slopes (McAuliffe and Devender 1998, Martre et al. 2002). When dominant on lower landscape positions, such as alluvial fans, it is generally a disturbance community (Sawyer et al. 2009). Steeper slopes experience greater degrees of water stress (Monson et al. 1992, Martre et al. 2002), and brittlebush is more competitive in these positions (Ehleringer 1988). Brittlebush is an extremely drought-tolerant, drought-deciduous shrub. Adaptations in degree of leaf pubescence and leaf size allow brittlebush to occupy sites ranging from relatively mesic coastal environments to extremely arid deserts (Ehleringer and Cook 1990, Sandquist and Ehleringer 1997, Housman et al. 2002, Sandquist and Ehleringer 2003). Desert plants have smaller, more pubescent leaves, and a more compact growth form. Smaller more pubescent leaves reduce leaf temperatures and increases water use efficiency. The tradeoff is that plant productivity declines because smaller leaves have less surface area available for photosynthesis, and because pubescence reduces the absorption of solar radiation (Housman et al. 2002, Sandquist and Ehleringer 2003).

While leaf and shoot-adaptations allow brittlebush to withstand hot temperatures and extreme aridity, freezing temperatures restrict brittlebush. Frosts cause branch die-back and mortality in adult brittlebush (Sandquist and Ehleringer 1996), and reduce seedling establishment (Bowers 1994). Brittlebush seedlings emerge over multiple pulses in response to cool season rains, with emergence triggered by a minimum of 19 mm of precipitation, and seedlings are killed if freezing temperatures occur within nine days of the trigger event (Bowers 1994). Warm, south-facing slopes experience fewer and less severe frosts, allowing brittlebush populations to persist without damage. Further, optimal soil temperatures for root growth of established brittlebush occur over winter, and conditions are more favorable on warm, south-facing slopes (Martre et al. 2002).

This site is associated with skeletal soils with little horizon development and gravelly to cobbly surface textures. Throughout its range, brittlebush dominance is associated with rocky soils and is not dominant on clayey or sandy soils (Tesky 1993). This is probably because brittlebush has less of a competitive advantage on these soils, and other species are better able to dominate.

Productivity and cover of this site are lower in the more arid, easterly extent of its range, and on soils derived from basalt where surface rock cover may approach desert pavement.

Disturbance Dynamics

The disturbances impacting this ecological site include drought, invasion by non-native species and fire.

Desert regions are characterized by low mean annual precipitation and extreme variability in the amount of precipitation received in any year or decade (Hereford et al. 2006). Thus, episodic mortality in response to periods of drought is important in shaping desert community dynamics (Hereford et al. 2006, Miriti et al. 2007). This ecological site is buffered from severe drought-induced impacts by the physiological adaptations of brittlebush. Brittlebush can vary the degree of leaf pubescence in response to periods of drought, where each successive leaf cohort produces more pubescence over the course of a drought (Sandquist and Ehleringer 2003). Individuals are able to continue photosynthesizing during drought, although at reduced rates of production.

The hot temperatures and skeletal soils of this ecological site reduce available soil moisture, which limits the susceptibility of this site to invasion by non-native annuals. However, microsites that are sheltered by large rock fragments and/or that receive additional run-on are susceptible to invasion by non-native annuals including red-stemmed stork's bill (Erodium cicutarum) and Mediterranean grass (*Schismus barbatus*). These non-native annuals may usurp space from native annuals that also depend on these microsites for establishment.

The low potential for high biomass of annual species limits the continuity of fine fuels in this site, and reduces the susceptibility of this site to fire. However brittlebush can reach high densities, and since this site occurs on steep slopes over which fire may rapidly move, this site may burn during conditions of extreme fire behavior. If this ecological site does burn, a brittlebush dominated community recovers rapidly (Brown and Minnich 1986, Steers and Allen 2011), so this ecological site is not considered at risk of transitioning to a fire-altered State.

State and transition model

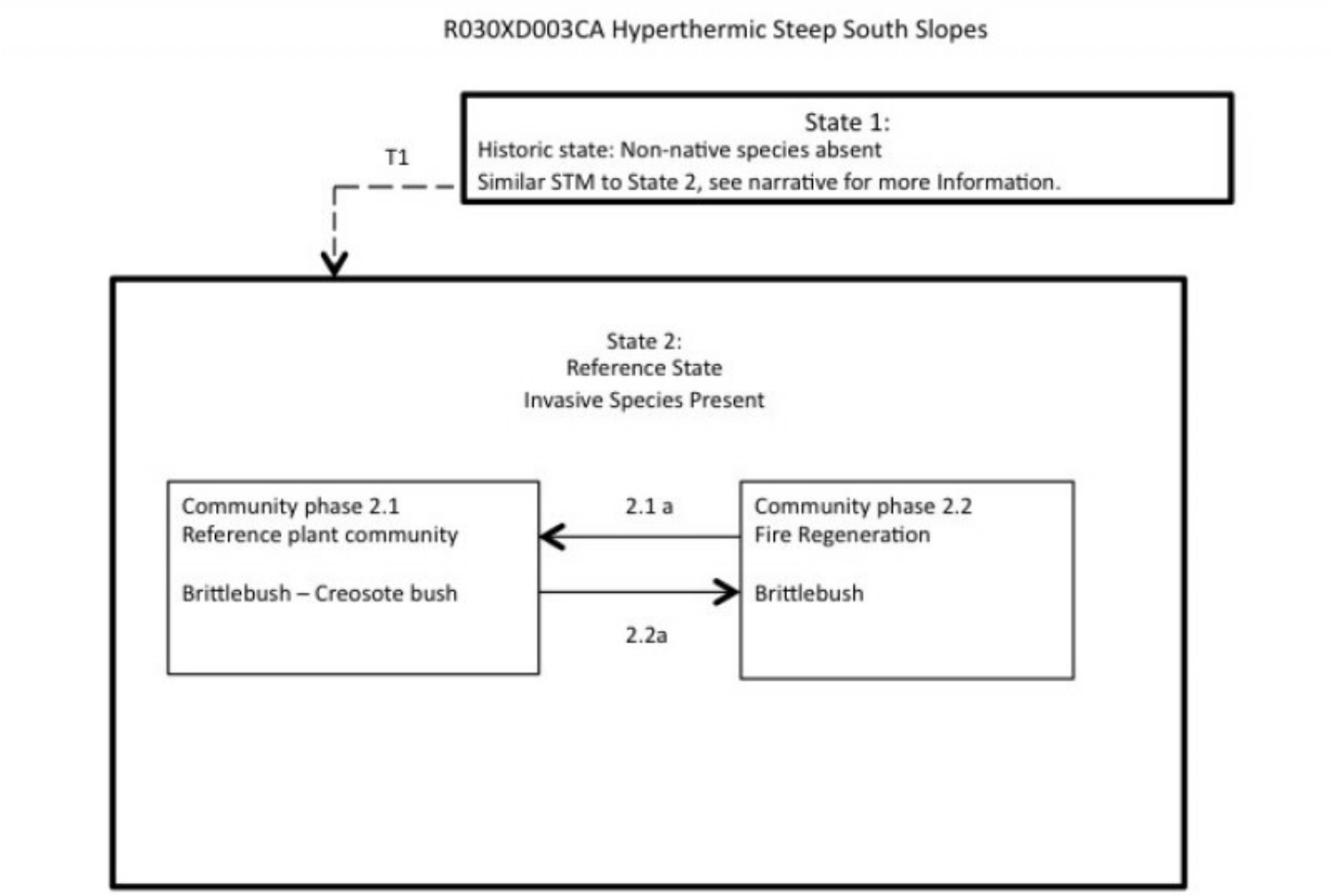

Figure 4. R030XD003CA

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 and Colorado Deserts. Drought and very rare fire 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 Mediterranean grass (*Schismus barbatus*) are naturalized in this plant community. Abundance varies with precipitation, but it is 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

Figure 6. Community Phase 2.1

This community phase is dominated by brittlebush and creosote bush. Secondary shrubs are present at low levels, and include burrobush (*Ambrosia dumosa*), California fagonbush (*Fagonia laevis*), white ratany (Kramerica grayi), desert lavender (*Hyptis emoryi*), and Schott's dahlia (*Psorothamnus schottii*). Annuals species, though present, have relatively low abundance and biomass in this ecological site. Low soil moisture limits the production of annual species, high surface fragment cover limits microsites available for annuals, and the canopy of the short-lived brittlebush does not provide suitable habitat for annuals (Muller 1953). Though not abundant, winter annuals are seasonally present, and commonly include pincushion flower (*Chaenactis fremontii*), phacelia (Phacelia spp.), cryptantha (Cryptantha spp.), buckwheat (Eriogonum spp.), and smooth desertdandelion (*Malacothrix glabrata*). The non-native annual forb red-stem stork's bill is typically present, as is the non-native common Mediterranean grass (*Schismus barbatus*). Declines in cover and production occur in response to prolonged or severe periods of drought in this community phase, but remain within the natural range of variation. Bowers (2005) measured no effect of drought on mortality rates of brittlebush during modest drought in the 1950s, but approximately 26% increased mortality during severe drought in the early 2000s. Creosote bush exhibits branch-pruning, but low mortality in response to drought in the Mojave Desert (Webb et al. 2003, Hereford et al. 2006, Miriti et al. 2007). In the Sonoran desert, mortality of creosote bush due to severe drought may be more pronounced, but still less than 5% (Bowers 2005). These rates remain within the natural range of variability for the ecological site. This ecological site may also experience declines in cover and production due to freezing events. Brittlebush may die, or exhibit branch die-back in response to freezing (Sandquist and Ehleringer 1996).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	174	269	364
Forb	4	19	34
Grass/Grasslike	–	–	1
Total	**178**	**288**	**399**

Community 2.2
Fire Regeneration Community

This community phase is characterized by the loss of creosote bush from the plant community. Brittlebush rapidly colonizes burned areas, and reaches dominance before associated shrub species (Brown and Minnich 1986, Steers and Allen 2011). In burned creosote bush scrub in the Colorado Desert, brittlebush seedlings overwhelmingly dominated shrub succession within the first year after burning, and within 3 to 5 year dominated total cover (Brown and Minnich, 1986). By twelve years after fire, pre-burn cover and density is reached, and is dominated by brittlebush (Steers and Allen 2011). By twenty years, there is sparse cover of creosote bush and other secondary shrubs with brittlebush (Steers and Allen 2011).

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs with moderate to severe fire.

Pathway 2.2a
Community 2.2 to 2.1

This community pathway occurs with time without fire.

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 Southwest Desert region in the 1860s.

Additional community tables

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
1	**Native shrubs**			174–364	
	brittlebush	ENFA	*Encelia farinosa*	62–213	8–25
	creosote bush	LATR2	*Larrea tridentata*	22–151	1–11
	burrobush	AMDU2	*Ambrosia dumosa*	0–34	0–5
	white ratany	KRGR	*Krameria grayi*	0–26	0–3
	California fagonbush	FALA	*Fagonia laevis*	0–19	0–6
	desert lavender	HYEM	*Hyptis emoryi*	0–10	0–1
	Schott's dalea	PSSC5	*Psorothamnus schottii*	0–2	0–1
Forb					
2	**Native annual forbs**			4–34	
	pincushion flower	CHFR	*Chaenactis fremontii*	0–22	0–3
	cryptantha	CRYPT	*Cryptantha*	0–22	0–3
	buckwheat	ERIOG	*Eriogonum*	0–22	0–3
	smooth desertdandelion	MAGL3	*Malacothrix glabrata*	0–1	0–2
	phacelia	PHACE	*Phacelia*	0–1	0–2
4	**Non-native annual grasses**			0–2	
	Asian mustard	BRTO	*Brassica tournefortii*	0–1	0
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0–1	0
Grass/Grasslike					
3	**Non-native annual grasses**			0–1	
	common Mediterranean grass	SCBA	*Schismus barbatus*	0–1	0–1
5	**Native perennial grasses**			0–1	
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–1	0–1

Animal community

This ecological site provides habitat for many reptiles and mammals. Brittlebush is used as forage by desert bighorn sheep and mule deer. The species most likely to be encountered in this ecological site (based on preferred habitat characteristics) are listed below.

REPTILES:

Lizards:
Desert banded Gecko (Coleonyx variegatus variegatus)
Long-nosed leopard lizard (Gambelia wislizenii wislizenii)
Mojave collared lizard (Crotaphytus bicinctores)
Western chuckwalla (Sauromalus aster obesus)
Desert side-blotched lizard (Uta stansburiana stejnegeri)

Snakes:
Desert blind snake (Leptotyphlops humilis cahuilae)
Desert rosy boa (Lichanura trivirgata gracia)
California kingsnake (Lampropeltis getula californae)
Red coachwhip (Masticophis flagellum piceus)
Desert night snake (Hypsiglena torquata deserticola)
California kingsnake (Lampropeltis getula californae)
Western leaf-nosed snake (Phyllorynchus decurtatus perkinsi)

Sonoran gopher snake (Pituophis catenifer affinis)
Desert patch-nosed snake (Salvadora hexalepis hexalepis)
California lyre snake (Trimorphodon biscutatus vandenburghi)
Western diamondback snake (Crotalus atrox)
Colorado Desert sidewinder (Crotalus cerastes laterorepens)
Southwestern speckled rattlesnake (Crotalus mitchelli Pyrrhus)

Mammals:
Long-tailed weasel (Mustela latirosta)
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)
Common gray fox (Urocyon cinereoargenteus scottii)
California mountain lion (Felis concolor californica)
Desert bobcat (Lynx rufus baileyi)
California ringtail (Bassariscus astutus ocatvus)
Southern mule deer (Odoceileus hemionus fuliginatus)
Desert bighorn sheep (Ovis canadensis nelson)
Southern Desert cottontail (Sylvilagus audobonii arizonae)
Whitetail antelope squirrel (Ammospermphilus leucurus leucurus)
Western Mojave ground squirrel (Spermophilus beecheyi parvulus)
Mojave rountail ground squirrel (Spermophilus tereticaudus tereticaudus)
Eastern spiny pocket mouse (Peroganthus spinatus spinatus)
Narrow-nosed (Desert) pocket mouse (Chetodipus penicillatus angustirostris)
Long-tailed pocket mouse (Chaetodipus mojavensis)
Merriam's kangaroo rat (Dipodomys deserti)
Desert kangaroo rat (Dipodomys deserti)
Desert wood rat (Neotoma fuscipes simplex)
White-throated wood rat (Neotoma albigula venusta)
Desert canyon mouse (Peromyscus crinitus stephensi)
Cactus mouse (Peromyscus eremicus eremicus)
Sonoran deer mouse (Peromyscus maniculatus sonoriensis)
Desert grasshopper mouse (Onychomys torridus pulcher)

Recreational uses

This ecological site may be used for cross-country hiking and aesthetic enjoyment. When brittlebush is in flower, it lights up entire hill sides with yellow blooms, hence the common name 'goldenhills'.

Other products

Brittlebush has medicinal uses for Native Americans, including as a poultice for pain and for toothaches. Brittlebush resin is used as chewing gum, to fasten arrow points to twigs, to waterproof water bottles, and is melted to make a varnish. Brittlebush twigs were used as kindling for quick fires. http://herb.umd.umich.edu/herb/search.pl?searchstring=Encelia+farinosa.

Brittlebush resin is burned as incense in churches in Mexico (Tesky 1993).

Inventory data references

Community Phase 2.1:

1249810407 (Type location)
1249800214
1249810424
033110-2

040710-1
BB-4
COSP-06
PRR19-10

Type locality

Location 1: Riverside County, CA	
UTM zone	N
UTM northing	550612
UTM easting	3760591
General legal description	The type location is approximately 3.5 miles northeast of the town of Desert Hot Springs in Joshua Tree National Park.

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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:**

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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:**

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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):**

---

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):**

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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:**