USDA Natural Resources Conservation Service

Ecological site R030XE191CA
Dry Sandy Mountain Slopes

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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.

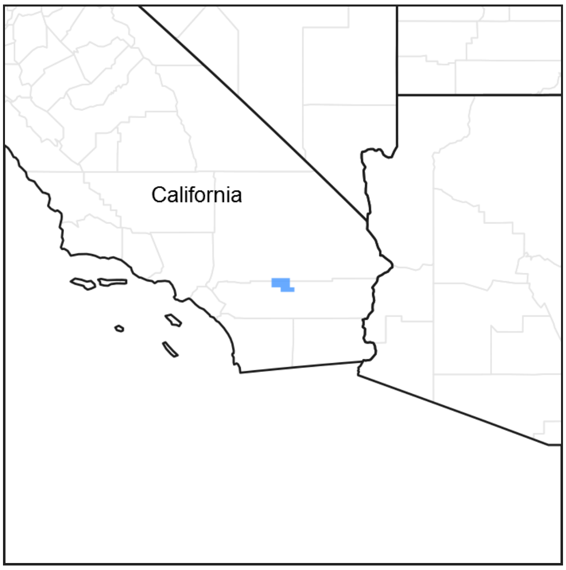

Figure 1. Mapped extent

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 notes

This LRU (designated by 'XE') is found only in California at the transition zone between MLRA 20, the Southern California Mountains, and MLRA 30. Elevations range from 3500 to 5800 feet and precipitation ranges from 8 to 12 inches per year. The LRU is characterized primarily by cool thermic and mesic soil temperature regimes and aridic bordering on xeric soil moisture regimes. Precipitation is mostly winter, receiving approximately 85% between October and February, going from rain in the fall to snow into the winter. Snow can range from between 1 and 6 inches. Soils show indications of greater moisture storage with some mollic colors in the soil profile. Vegetation is highly productive and vigorous for the Mojave Desert and includes non-typical Mojave species such as, scrub oaks, manzanita, sumac, ziziphus, mountain mahogany, presence of singleleaf pinyon, and desert needlegrass.

Classification relationships

Pinus monophylla Woodland Alliance (Sawyer et al. 2009).

Ecological site concept

This site occurs on steep mountain slopes at elevations of 3400 to 5800 feet. Soils are very shallow and shallow and have a xeric bordering on aridic soil moisture regime. The site is associated with dry landscape positions that do not support high tree or shrub cover relative to cooler and/or moister topographic positions. Single-leaf pinyon pine (Pinus monophylla) and Muller's oak (Quercus cornelius-mulleri) dominate this site, with a sparse understory of perennial grasses, subshrubs and secondary shrubs. Sparse vegetation cover results in increased soil erosion on these steep slopes, which causes a feedback that maintains low cover.

Data ranges in the physiographic data, climate data, water features, and soil data sections of this Ecological Site Description are based on major components only (15 percent of map unit or greater).

This site is part of group provisional concept R030XE196CA.

Associated sites

R030XB189CA	**Shallow Cool Hills** R030XB189CA occurs on adjacent cool thermic slopes with a typic aridic soil moisture regime. Blackbrush (Coleogyne ramosissima) and California juniper (Juniperus californica) dominate.
R030XB172CA	**Warm Gravelly Shallow Hills** R030XB172CA is found on adjacent warmer slopes with a high percentage of large surface rock fragments. Creosote bush (Larrea tridentata) and Parish's goldeneye (Vigueira parishii) are dominant.
R030XB213CA	**Moderately Deep Gravelly Mountain Slopes** R030XB213CA is found on adjacent slopes with a typic aridic soil moisture regime and moderately deep, skeletal soils. Eastern mojave buckwheat (Eriogonum fasciculatum), desert needlegrass (Achnatherum speciosum) and California juniper (Juniperus californica) are dominant species.
R030XD040CA	**Hyperthermic Steep North Slopes** R030XD040CA is found on adjacent hyperthermic slopes. Burrobush (Ambrosia dumosa), brittlebush (Encelia farinosa) and creosote bush (Larrea tridentata) are dominant species.
R030XE196CA	**Sandy Xeric-Intergrade Slopes** R030XE196CA occurs on adjacent cooler and moister landform positions, often north-facing slopes. Single-leaf pinyon pine (Pinus monophylla), California juniper (Juniperus californica) and Muller's oak (Quercus turbinella) are dominants, with a high diversity of understory shrub species.
R030XY202CA	**Very Rarely To Rarely Flooded Thermic Ephemeral Stream** R030XY202CA is found on adjacent small, rarely flooded ephemeral drainageways. California jointfir (Ephedra californica) and burrobrush (Hymenoclea salsola) dominate, but a productive and diverse assemblage of shrubs is present.

Similar sites

R030XE196CA	**Sandy Xeric-Intergrade Slopes** R030XE196CA is found on more cooler and moister landform positions and has higher shrub diversity and cover.
R030XB213CA	**Moderately Deep Gravelly Mountain Slopes** R030XB213CA is found on slopes with a typic aridic soil moisture regime and moderately deep skeletal soils. Eastern mojave buckweat (Eriogonum fasciculatum) and desert needlegrass (Achnatherum speciosum) are dominants with California juniper (Juniperus callifornica). Single-leaf pinyon pine (Pinus monophylla) is trace if present.

R030XE200CA	**Xeric Very Deep Sandy Fan Aprons On Pediments** R030XE200CA occurs on pediments and low hills and blackbrush (Coleogyne ramosissima) is an important species.
R030XA178CA	**Moderately Deep Sandy Slopes** R030XA178CA is found on moderately deep soils and has greater shrub diversity. Parry's jujube (Ziziphus parryi) is an important species.

Table 1. Dominant plant species

Tree	(1) *Quercus cornelius-mulleri* (2) *Pinus monophylla*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This ecological site is found on mountain and hills with slopes of 30 to 75 percent at elevations of 3440 to 5740 feet. The site is associated with dry landform positions; in the western Little San Bernardinos this site is associated with south-facing slopes. At more arid, easterly latitudes, the site may occur on all aspects, and at the most arid extent of its range, this site is associated with north-facing aspects. Runoff class is medium to high.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	1,049–1,750 m
Slope	30–75%

Climatic features

The climate at this site is arid characterized by cool, somewhat moist winters and hot, dry summers. The average annual precipitation ranges from 7 to 10 inches with most falling as rain from November to March. Mean annual air temperature ranges from 55 to 63 degrees F, and the frost freeze period is 210 to 270 days. June, July, and August can experience average maximum temperatures of 100 degrees F while December and January can have average minimum temperatures near 20 degrees F.

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 weighted averages; numbers in square brackets represent relative weights):

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

44467 Kee Ranch, CA (Period of record = 1948 to 1979) [1]

45112 Yucca Valley, CA (Period of record = 1990 to 2011) [2]

45863 Morongo Valley, CA (Period of record = 1948 to 1972) [2]

The Lost Horse weather station is closest to this ecological site but is limited by the number of years data was collected. Kee Ranch weather station contains precipitation data for all years of the period of record but has no temperature data. The Yucca Valley weather station contains reliable temperature and precipitation data for the 20 year period of record at an elevation of 3260 ft. Morongo Valley, at elevation 2570 ft, only has precipitation data.

This ecological site is generally found at elevations (3400-5600ft) higher than these climate station.

Table 3. Representative climatic features

Frost-free period (average)	270 days
Freeze-free period (average)	
Precipitation total (average)	254 mm

Influencing water features

Soil features

The soils associated with this ecological site formed in colluvium derived from granite and/or colluvium derived from gneiss over residuum weathered from granitoid and/or residuum weathered from gneiss. They have a xeric soil moisture regime and a typic aridic soil temperature regime. Soils are typically very shallow to shallow over weathered bedrock, but at lower elevations or south-facing slopes, the site may occur on very deep soils. Surface textures are typically gravelly sand or gravelly loamy sand, with gravelly loamy sand beneath. Bedrock is encountered at 9 to 14 inches, and is weathered, fractured bedrock of low excavation difficulty. Surface rock fragments less than or equal to three inches in diameter range from 20 to 25 percent, and rock fragments greater than 3 inches in diameter are about 2 percent. Subsurface fragments less than or equal to three inches in diameter range from 15 to 42 percent (for a depth of 0 to 9 inches), and no larger fragments are present. When the site occurs on deeper soils, subsurface fragments less than 3 inches in diameter range from 15 to 65 percent (for a depth of 50 inches), with 0 to 2 percent larger fragments. These soils are somewhat excessively drained with rapid permeability.

The associated soils that are greater than 15 percent of any one map unit are: Smithcanyon (mixed, thermic, shallow Xeric Torripsamments), and Xeric Torriorthents soils. The Xeric Torriorthents are moderately deep to very deep soils which are not typical for this ecological site.

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

3294;Smithcanyon gravelly sand, 30 to 75 percent slopes;Smithcanyon;dry;80; Smithcanyon;dry;10; Xeric Torriorthents;dry, moderately steep;3
3293;Smithcanyon-Pinecity association, 15 to 50 percent slopes; Smithcanyon;dry;4; Smithcanyon;mesic;4
3335;Xeric Torriorthents-Rock outcrop association, 15 to 75 percent slopes; Xeric Torriorthents;;25; Smithcanyon;dry;10
3336;Xeric Torriorthents-Bigbernie association, 30 to 75 percent slopes;Smithcanyon;dry;2
3345;Bigcanyon association, 30 to 75 percent slopes;Smithcanyon;dry;7

Table 4. Representative soil features

Parent material	(1) Colluvium–granite (2) Residuum–gneiss
Surface texture	(1) Gravelly sand (2) Gravelly loamy sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained
Permeability class	Rapid
Soil depth	8 cm

Surface fragment cover <=3"	20–25%
Surface fragment cover >3"	2%
Available water capacity (0-101.6cm)	1.02–6.86 cm
Calcium carbonate equivalent (0-101.6cm)	0–1%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–4
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	15–42%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Abiotic Factors

This site occurs on steep slopes with a xeric bordering on aridic soil moisture regime, typically with very shallow to shallow soils, at elevations of approximately 3400 to 5800 feet. The site is associated with dry landscape positions that do not support high tree or shrub cover relative to cooler, moister topographic positions. Single-leaf pinyon pine and Muller's oak dominate this site, with a sparse understory of secondary shrubs and perennial grasses. Sparse vegetation cover increases soil erosion on these steep slopes, which causes a feedback that maintains low cover.

Single-leaf pinyon pine is a long-lived, slow-growing tree that is a widespread dominant of Mojave Desert woodlands on shallow soils with xeric soil moisture regimes (Minnich 2007). At 7 to 10 inches, the mean annual precipitation of this ecological site is at the low end of the mean annual precipitation range for single-leaf pinyon, which is 8 to 18 inches (Zouhar 2001). Low precipitation, with dry landscape positions, means that an open cover of relatively low density pinyon pine is found on this site. Muller's oak is a long-lived, deep-rooted evergreen shrub that occurs in areas of higher rainfall such as the western margins of Mojave and Colorado Desert mountains and into the eastern slopes of the Peninsular Ranges in the California Floristic Province (Baldwin et al. 2002). The deep roots of both single-leaf pinyon and Muller's oak can penetrate deeply into cracks in weathered bedrock, accessing water stored below the soil horizons (Jones and Graham 1993).

Disturbance Dynamics

Invasion by non-native species, drought and insect attack, and fire are the primary disturbances affecting this ecological site.

Drought, and interactions with insect attack and disease are the most important drivers of dynamics within desert pinyon woodlands (Minnich 2007, Romme et al. 2009). Pinyon woodlands are highly susceptible to drought, with widespread mortality and increased susceptibility to insect attack during drought (Shaw 2006, Minnich 2007, Romme et al. 2009). Trees in southern California close to urban centers may be especially at risk because increased nitrogen deposition from air pollution further increases susceptibility of pinyon pine to pathogens (Jones et al. 2004, Allen et al. 2010). Pinyon-juniper woodlands in the southwest experienced unprecedented drought and insect-induced mortality in the early 2000's, with higher mortality in lower elevation stands, and a significant increase in standing dead pinyon pines (Shaw 2006). Cone-bearing trees (> 35 years of age) are more likely to die during drought, so older stands may be more severely drought-affected (Romme et al. 2009). This ecological site receives relatively heavy nitrogen deposition due to its proximity to the greater Los Angeles area (Allen et al. 2009), and is characterized by taller, old trees; thus, this ecological site may be especially vulnerable to the effects of drought.

The historic fire return interval in southern California pinyon-juniper woodlands is approximately 480 years, and in some stands there is no evidence of widespread fire (Minnich 2007, Romme et al. 2009). Stands occupying unproductive sites with a sparse shrub and herbaceous understory are especially unlikely to burn (Romme et al. 2009). Consequently these areas are significant in that they house many of the remaining old-growth pinyon-juniper stands (Weisberg et al. 2008, Romme et al. 2009).

Non-native annual grasses (red brome [*Bromus rubens*], cheatgrass [*Bromus tectorum*] and Mediterranean grass [Schismus species]) 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). Invasion by non-native annual grasses has increased the flammability of Mojave Desert shrub communities by providing a continuous fine fuel layer between widely spaced shrubs (Brown and Minnich 1986, Brooks 1999, Brooks et al. 2004, Rao and Allen 2010, Rao et al. 2010). After fire, these communities appear to be more susceptible to invasion by exotic grasses, leading to a grass-fire cycle (D'Antonio and Vitousek 1992). Non-native annual grasses have also invaded desert woodlands; their role in promoting fire in these systems is unclear since although there has been a recent increase in fire in desert woodlands in the southwest, this could be a natural product of the build-up of woody fuels after very long periods of time without fire rather than a result of non-native annual grass cover (Minnich 2007).

The abundance and biomass of non-native annual grasses is highest on sandy soils with higher soil moisture availability, and where nitrogen deposition from air pollution from adjacent urban areas is high (Rao and Allen 2010, Rao et al. 2010). This ecological site receives relatively heavy nitrogen deposition due to its proximity to the greater Los Angeles area (Allen et al. 2009). However, the aridness of this site, combined with a sparse overstory, does not support an overall high biomass of non-native annual grasses. Where these species are abundant in this site, they occur under the shelter of tree and shrub canopies.

State and transition model

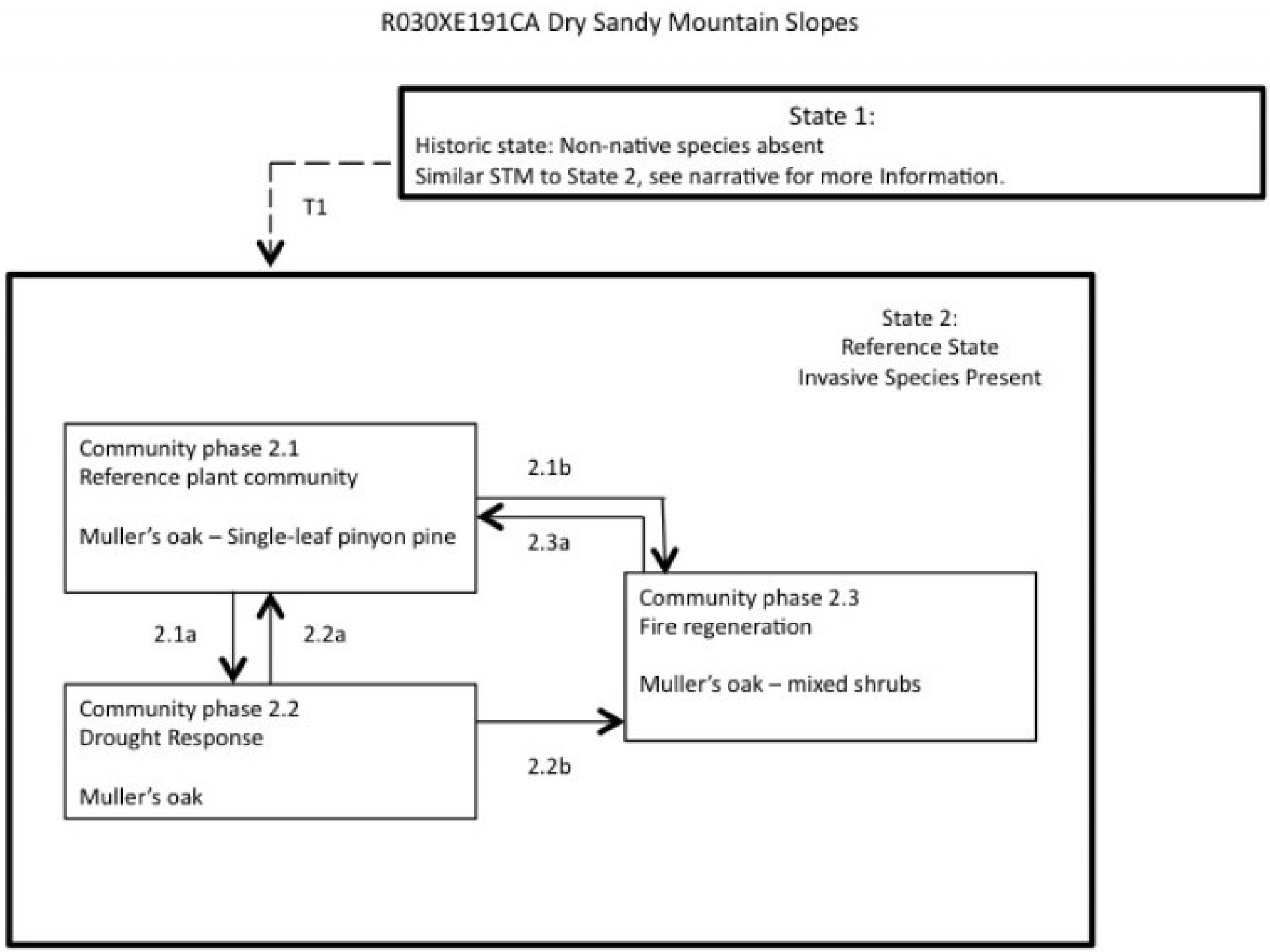

Figure 4. R030XE191CA

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 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 cheatgrass and red brome, 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 dominated by single-leaf pinyon pine and Muller's oak. Joshua tree (*Yucca brevifolia*) may be very sparsely present. A sparse shrub cover includes narrowleaf goldenbush (Ericameria liearifolia), green rabbitbrush (*Ericameria teretifolia*), eastern Mojave buckwheat (*Eriogonum fasciculatum*), grizzlybear pricklypear (Opuntia polycantha var. erinacea), and beavertail pricklypear (*Opuntia basilaris*). Perennial bunchgrasses are sparsely present, and include sandberg bluegrass (*Poa secunda*), desert needlegrass (*Achnatherum speciosum*), Indian rice grass (*Achnatherum hymenoides*), and purple threeawn (*Aristida purpurea*). The loose, erosion prone soils of this ecological site support a diverse subshrub community, these may include granite prickly phlox (*Linanthus pungens*), wishbone bush (*Mirabilis laevis* var. villosa), hoary buckwheat (*Eriogonum saxatile*), grape soda lupine (*Lupinus excubitus*), and the rare San Bernardino milkvetch (*Astragalus bernardinus*). Winter annuals seasonally present are likely to include distant phacelia (*Phacelia distans*), pincushion flower (*Chaenactis fremontii*), and cryptantha (Cryptantha spp.). The non-native annual cheatgrass may be abundant under tree or shrub canopy, and red brome is typically sparsely present.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	129	196	291
Tree	90	179	269
Grass/Grasslike	–	22	146
Forb	–	22	34
Total	**219**	**419**	**740**

Community 2.2
Drought Response

This community phase develops after prolonged or severe drought, and is characterized by mortality of single-leaf pinyon pine, and an increase in the importance of Muller's oak. Pine mortality is more severe in older trees, and the prevalence of large, standing dead trees increases. Pinyon mine mortality may occur as a direct of water stress, or indirectly, pathogen attack of drought-stressed trees. Muller's oak has extremely high drought-tolerance, and since it is shade-intolerant, it may increase in response to the mortality of pine. Drought causes overall declines in cover, with mortality also occurring in perennial grasses, subshrubs and short-lived shrubs. Pinyon pine is slow-growing, recruitment episodic, and seedling establishment is most successful under cover of nurse plants or rocks (Chambers et al. 1999, Pearson and Theimer 2004). Further, pinyon is dependent on seed-caching rodents for dispersal to safe sites (Chambers et al. 1999), and rodent populations also decline during drought (Beatley 1969). With reduced seed production due to mortality, fewer dispersers, fewer safe sites for establishment and slow growth rates of the individuals that do establish, the effects of drought-induced pine mortality are long-lasting. Dead standing trees persist, and their replacement will take decades.

Community 2.3

Fire Regeneration Community

This community phase is characterized by the loss of pinyon pine, dominance by Muller's oak, and an increase in perennial grass and subshrub cover. Pinyon pine is generally killed by even moderate fire intensity (Romme et al. 2009). Muller's oak is a vigorous resprouter, and will begin recovery in the first year after fire. The perennial grasses found in this site can also quickly resprout, and these species will increase in response to fire (Sawyer et al. 2009). Subshrubs can rapidly recolonize from seed, as can the short-lived shrubs narrow-leaved goldenbush, eastern Mojave buckwheat, and green rabbitbrush. As tall shrub cover increases, shade-dependent seedlings of pinyon pine will begin to establish. After fifty years with no disturbance, pine cover will begin to shade out shorter-lived shrubs, and mature woodlands will re-establish at 100 to 150 years post-fire (Wangler and Minnich 1996).

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs with severe or prolonged drought.

Pathway 2.1b
Community 2.1 to 2.3

This pathway occurs with moderate to severe fire. The widely spaced vegetation of this ecological site confers high resistance to fire, and ignition generally results in spot fire due to the lack of continuous fuel. However, given the steep slopes of this ecological site, fire can be more extensive during periods of extreme fire behavior.

Pathway 2.2a
Community 2.2 to 2.1

This pathway occurs with time, and a return to average or above average climatic conditions.

Pathway 2.2b
Community 2.2 to 2.3

This pathway occurs with severe fire. Although live annuals are largely absent from Community Phase 2.2, standing annual biomass in drought years immediately following a period of heavy precipitation poses a severe risk for fire. Cured native annual cover may pose a risk during the first year of drought, and non-native annual grasses pose a risk for three or more years (Minnich 2003, Brooks et al. 2007, Rao et al. 2010).

Pathway 2.3a
Community 2.3 to 2.1

This pathway occurs with a long period of time without disturbance (100 – 150 years).

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.

Additional community tables

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Tree					
1	**Tree**			90–269	
	singleleaf pinyon	PIMO	*Pinus monophylla*	90–269	2–5
	Joshua tree	YUBR	*Yucca brevifolia*	0–1	0–1
Shrub/Vine					
2	**Native shrubs**			129–291	
	Muller oak	QUCO7	*Quercus cornelius-mulleri*	45–151	11–40
	narrowleaf goldenbush	ERLI6	*Ericameria linearifolia*	50–141	2–4
	green rabbitbrush	ERTE18	*Ericameria teretifolia*	0–1	0–1
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	0–1	0–1
	grizzlybear pricklypear	OPPOE	*Opuntia polyacantha var. erinacea*	0–1	0–1
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	0–1	0–1
Forb					
3	**Subshrubs/Forbs**			0–34	
	distant phacelia	PHDI	*Phacelia distans*	0–34	0–1
	San Bernardino milkvetch	ASBE4	*Astragalus bernardinus*	0–1	0–1
	pincushion flower	CHFR	*Chaenactis fremontii*	0–1	0–1
	cryptantha	CRYPT	*Cryptantha*	0–1	0–1
	hoary buckwheat	ERSA6	*Eriogonum saxatile*	0–1	0–1
	granite prickly phlox	LIPU11	*Linanthus pungens*	0–1	0–1
	grape soda lupine	LUEX	*Lupinus excubitus*	0–1	0–1
	desert wishbone-bush	MILA6	*Mirabilis laevis*	0–1	0–1
Grass/Grasslike					
4	**Native grasses**			1–22	
	Sandberg bluegrass	POSE	*Poa secunda*	2–7	0–2
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–2	0–1
	purple threeawn	ARPU9	*Aristida purpurea*	0–1	0–1
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–1	0–1
5	**Non-native annual grasses**			0–146	
	cheatgrass	BRTE	*Bromus tectorum*	0–146	0–5
	compact brome	BRMA3	*Bromus madritensis*	0–11	0–1

Animal community

This ecological site provides important habitat for birds, reptiles and mammals due to its structural diversity and pinyon woodlands.

The following reptiles and mammals are likely to be found within this ecological site (based on habitat preferences).

REPTILES
Lizards:
Desert banded Gecko (Coleonyx variegatus variegatus)
Northern desert iguana (Dipsosaurus dorsalis dorsalis)
Mojave collared lizard (Crotaphytus bicinctores)

Western chuckwalla (Sauromalus aster obesus)
Yellow-backed spiny lizard (Sceloporus magister uniformus)
Great Basin fence lizard (Sceloporus biseriatus longipes)
Western brush lizard (Urosaurus graciosus graciosus)
Desert side-blotched lizard (Uta stansburiana stejnegeri)
Great Basin Whiptail (Aspidoscelis tigris tigris)

Snakes:
Southwestern blind snake (Leptotyphlops humilis humilis)
Desert rosy boa (Lichanura trivirgata gracia)
Mojave glossy snake (Arizona occidentalis candida) California kingsnake (Lampropeltis getula californae)
Red coachwhip (Masticophis flagellum piceus)
Desert night snake (Hypsiglena torquata deserticola)
California kingsnake (Lampropeltis getula californae)
California striped racer (Masticophis lateralis lateralis)
Western leaf-nosed snake (Phyllorynchus decurtatus perkinsi)
Great Basin gopher snake (Pituophis catenifer deserticola)
Western long-nosed snake (Rhinocheilus lecontei lecontei)
Smith's black-headed snake (Tantilla hobartsmithi)
California lyre snake (Trimorphodon biscutatus vandenburghi)
Southwestern speckled rattlesnake (Crotalus mitchelli Pyrrhus)
Red diamond rattlesnake (Crotalus ruber ruber)
Southern pacific rattlesnake (Crotalus helleri)

MAMMALS

Western spotted skunk (Spilogale gracilis gracilis)
Long-tailed weasel (Mustela latirosta)
California desert bat (Myotis californicus stephensi)
Western pipistrelle (Pipistrellus hesperus hesperus)
Desert big brown bat (Eptesicus fuscus pallidus)
Desert long-legged bat (Myotis volans interior)
Northern fringed bat (Myotis thysanodes thysanodes)
Spotted bat (Euderma maculatum)
Western mastiff bat (Eumops perotis)
Hoary bat (Lasiurus cinereus cinereus)
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)
Dusky chipmonk (Tamias obscurus davisi)
Whitetail antelope squirrel (Ammospermphilus leucurus leucurus)
Western Mojave ground squirrel (Spermophilus beecheyi parvulus)
Long-tailed pocket mouse (Chaetodipus mojavensis)
Merriam's kangaroo rat (Dipodomys deserti)
Desert wood rat (Neotoma fuscipes simplex)
Eastern dusky-footed wood rat (Neotoma fuscipes simplex)
White-throated wood rat (Neotoma albigula venusta)
Desert canyon mouse (Peromyscus crinitus stephensi)
Southern brush mouse (Peromyscus boylii rowleyi)
Sonoran deer mouse (Peromyscus maniculatus sonoriensis)
Southern California pinyon mouse (Peromyscus truei chlorus)
Desert grasshopper mouse (Onychomys torridus pulcher)

Desert shrew

Recreational uses

This ecological site occurs in remote, steep terrain with limited access. As such, it has important wilderness values. It may be used for cross-country hiking, solitude, botanizing, and aesthetic enjoyment.

Wood products

Wood of single-leaf pinyon may be used for fuel wood and fence posts, particle and cement board (Zouhar 2001). It is not suitable for lumber because of its small size and irregular growth pattern (Zouhar 2001).

California juniper is a poor source of lumber because of low volume and multi-stemmed growth form. However, early ranchers used juniper for fenceposts, and it is used for fuel and as Christmas trees (Cope 1992).

Other products

Single-leaf pinyon pine is very important for many Native American tribes. The melted gum is used to bind and heal cuts, prevent sunburn, to stop menstruation, for muscle soreness, diarhea, rheumatism, colds, and nausea, among others. Pinyon nuts are an important food source, and were the staple food source in the past for many tribes. The pinyon seeds were one of the few foods given to babies as an alternative food source by the Cahuilla. Needles are used to make baskets, and were used as a spice to flavor meats. Wood and bark were used in house construction, and the pitch was used for water-proofing. http://herb.umd.umich.edu/herb/search.pl?searchstring=Pinus%20monophylla).

Inventory data references

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

1249806929 (type location, approximately 500 ft south of soil pit)

Type locality

Location 1: San Bernardino County, CA	
UTM zone	N
UTM northing	3765785
UTM easting	559774
General legal description	The type location is approximately 0.15 mile west of Eureka Peak in Joshua Tree National Park.

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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	05/13/2025
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):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if**

their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

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17. **Perennial plant reproductive capability:**
