USDA Natural Resources
Conservation Service

Ecological site R030XA178CA
Moderately Deep Sandy 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.

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 ‘XA’) is found primarily in the rain shadow on the east side of the San Bernardino and San Gabriel Mountains as well as the most southern flank of the Sierra Nevada mountain range of California and some areas along the CA-NV border near Death Valley and the Amargosa Valley. Elevations range from 1500 to 4500 feet and precipitation ranges from 3 to 8 inches per year, but is generally between 5-6 inches. This LRU is characterized primarily by winter precipitation, receiving approximately 80% between November and February mostly in the form of rain; however it does receive between 0 and 3 inches of snow, with an average of 1-2 inches. The soil temperature regime is thermic and the soil moisture regime is typic-aridic. Vegetation includes creosotebush (Larrea tridentata), burrobush (Ambrosia dumosa), blackbrush (Coleogyne ramosissima), desert needlegrass (*Achnatherum speciosum*), squirreltail (Elymus elymoides), and Indian ricegrass (Achnatherum hymenoides). This LRU is noticeably missing warm season species more typical of much of the Mojave, including Mojave yucca (Yucca schidigera) and ratany (Krameria) species.

Classification relationships

Juniperus californica Woodland Alliance (Sawyer et al. 2009).
Quercus cornelius-mulleri Shrubland Alliance (Sawyer et al. 2009).

Ecological site concept

This site occurs on steep hill and mountain slopes with moderately deep sandy soils. Production Reference Value (RV) is 505 pounds per acre and ranges from 370 to 689 pounds per acre. Vegetation is chaparral, and is dominated by California juniper (Juniperus californica), Muller oak (Quercus cornelius-mulleri), and bigberry manzanita (Arctostaphylos glauca) is an important secondary species. Sandberg bluegrass is an important perennial grass. The important abiotic factors driving this ecological site are steep slopes, cool thermic soil temperatures, typic aridic soil moisture regime, predominantly winter precipitation, and moderately deep sandy soils.

Data ranges in the physiographic data, climate data, water features, and soil data sections of this Ecological Site Description are based on all components (major and minor) correlated with this ecological site.

This site is part of group concept R030XD004CA.

Associated sites

R030XD040CA	**Hyperthermic Steep North Slopes** This ecological site occurs on adjacent south-facing mountain slopes at lower elevations. Burrobush (Ambrosia dumosa) is dominant with a high diversity of secondary shrub species.
R030XE191CA	**Dry Sandy Mountain Slopes** This ecological site occurs on adjacent north-facing slopes. Muller's oak (Quercus cornelius-mulleri) and single-leaf pinyon pine (Pinus monophylla) are dominant.
R030XB172CA	**Warm Gravelly Shallow Hills** This ecological site occurs on adjacent south-facing, rocky mountain slopes. Creosote bush (Larrea tridentata) and Parish's goldeneye (Viguiera parishii) are dominant, with a high diversity of secondary shrubs.

Similar sites

R030XE191CA	**Dry Sandy Mountain Slopes** This ecological site occurs in the 'XE' LRU, and receives more summer precipitation. Shrub diversity and cover is lower. Single-leaf pinyon pine (Pinus monophylla) is a dominant species.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Juniperus californica* (2) *Quercus cornelius-mulleri*
Herbaceous	(1) *Poa secunda*

Physiographic features

This ecological site occurs on hill and mountain slopes at elevations of 2790 to 3280 feet, and slopes of 30 to 75 percent. Runoff class is medium.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	2,790–3,280 ft
Slope	30–75%

Climatic features

The climate is arid with hot, dry summers and warm, moist winters. The mean annual precipitation is 4 to 7 inches and the mean annual air temperature is 63 to 68 degrees F. The frost-free season is 280 to 320 days. Freeze free period was not entered and defaults to zero.

The tabular climate summary for this ESD was generated by the Climate Summarizer (http://www.nm.nrcs.usda.gov/technical/handbooks/nrph/Climate_Summarizer.xls) using data from the climate stations listed below (results are unweighted averages).

Table 3. Representative climatic features

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

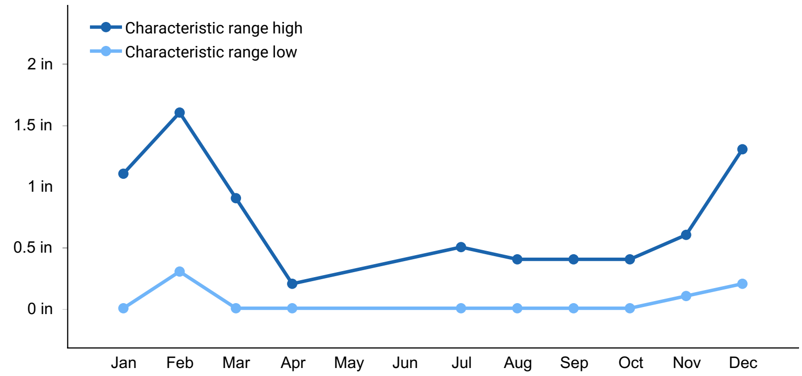

Figure 1. Monthly precipitation range

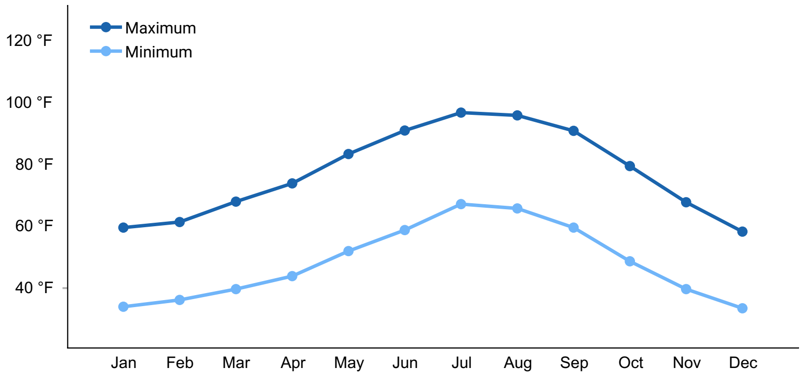

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

The soils associated with this ecological site are moderately deep, somewhat excessively drained and formed in colluvium and residuum derived from granite or gneiss. Surface textures is sand, and subsurface textures are non-gravelly to gravelly sand or fine sand. Surface cover of gravel-sized rock fragments (< 3 inches in diameter), is approximately 28 percent, and larger fragments cover approximately 3 percent. Subsurface volume of gravel-sized fragments (for a depth of 0 to 39 inches) is 5 to 12 percent, with no larger sized fragments. Bedrock is extremely weakly cemented, with cracks greater than 10 cm apart, and moderate excavation difficulty.

This ecological site is associated with the following soil series: Bigcanyon (mixed, thermic Typic Torripsamments).

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

3345;Bigcanyon association, 30 to 75 percent slopes;Bigcanyon;cool;20

Table 4. Representative soil features

Parent material	(1) Colluvium–granite (2) Residuum–gneiss
Surface texture	(1) Sand

Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained
Permeability class	Rapid
Soil depth	20–39 in
Surface fragment cover <=3"	28%
Surface fragment cover >3"	3%
Available water capacity (0-40in)	0.9–1.6 in
Calcium carbonate equivalent (0-40in)	0–1%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	5–12%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Abiotic features

The most important abiotic factors driving this ecological site are steep slopes, cool thermic soil temperature regimes with a typic aridic soil moisture regime, dominantly winter precipitation, and moderately deep sandy soils. Vegetative cover is relatively high, and is dominated by California juniper, Muller's oak, and bigberry manzanita is an important secondary species. Sandberg bluegrass is an important perennial grass.

Muller's oak is a long-lived, deep-rooted evergreen shrub that occurs on the higher rainfall, 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). California juniper is a long-lived small tree or large shrub that is a co-dominant in arid woodlands and scrub throughout California, achieving maximum dominance where mean annual precipitation is above 9.5 inches (Rhode 2002). Bigberry manzanita is a long-lived, evergreen shrub that grows in chaparral vegetation below approximately 4600 feet from Contra Costa County in California to Baja Mexico, and desert pinyon – juniper woodlands on the western edge of the Mojave and Sonoran Deserts (Vasek and Clovis 1976). It is an obligate fire-seeder, and has apparently adapted to the desert environment where fire is less frequent by developing a smaller, more compact growth form, with later flowering and reduced seed development, and relying more on reproduction by vegetative layering (Vasek and Clovis 1976). Sandberg bluegrass is a widely distributed, shallow-rooted, cool-season perennial bunchgrass that tends to occur on sandy, well-drained soils (Howard 1997). It responds to early cool season moisture, and must complete growth before shallow soil moisture stores (upper four inches) are depleted (Howard 1997). Its abundance on this ecological site is an indication of the XA LRU.

Disturbance dynamics

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

Non-native annual grasses (red brome [*Bromus rubens*] and cheatgrass [*Bromus tectorum*]) 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). The abundance and biomass of these grasses is highest on sandy soils where nitrogen deposition from air pollution from adjacent urban areas is high (Rao and Allen 2010, Rao et al. 2010). 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 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). Nitrogen deposition may also enhance juniper productivity (Allen et al. 2010), further increasing fuel loads. This ecological site is susceptible to high biomass loads of non-native annual grasses due to its moderately deep sandy soils, relatively high cool season precipitation, and proximity to the greater Los Angeles area.

Drought is an important shaping force in Mojave Desert shrub communities, causing reductions in cover and production, and in some cases, high rates of mortality (Webb et al. 2003, Mueller et al. 2005, Hereford et al. 2006, Miriti et al. 2007). Short-lived species suffer the highest-rates of drought-induced mortality (Hereford et al. 2006, Miriti et al. 2007). Annual species remain dormant in the soil seedbank (Beatley 1969, 1974, 1976), and several years of drought can cause significant declines in non-native annual grasses because seeds are short-lived (Minnich 2003). Differential mortality of long-lived species in response to drought can have long-lasting impacts on the trajectory of the vegetation (Breshears et al. 2005, Mueller et al. 2005).

State and transition model

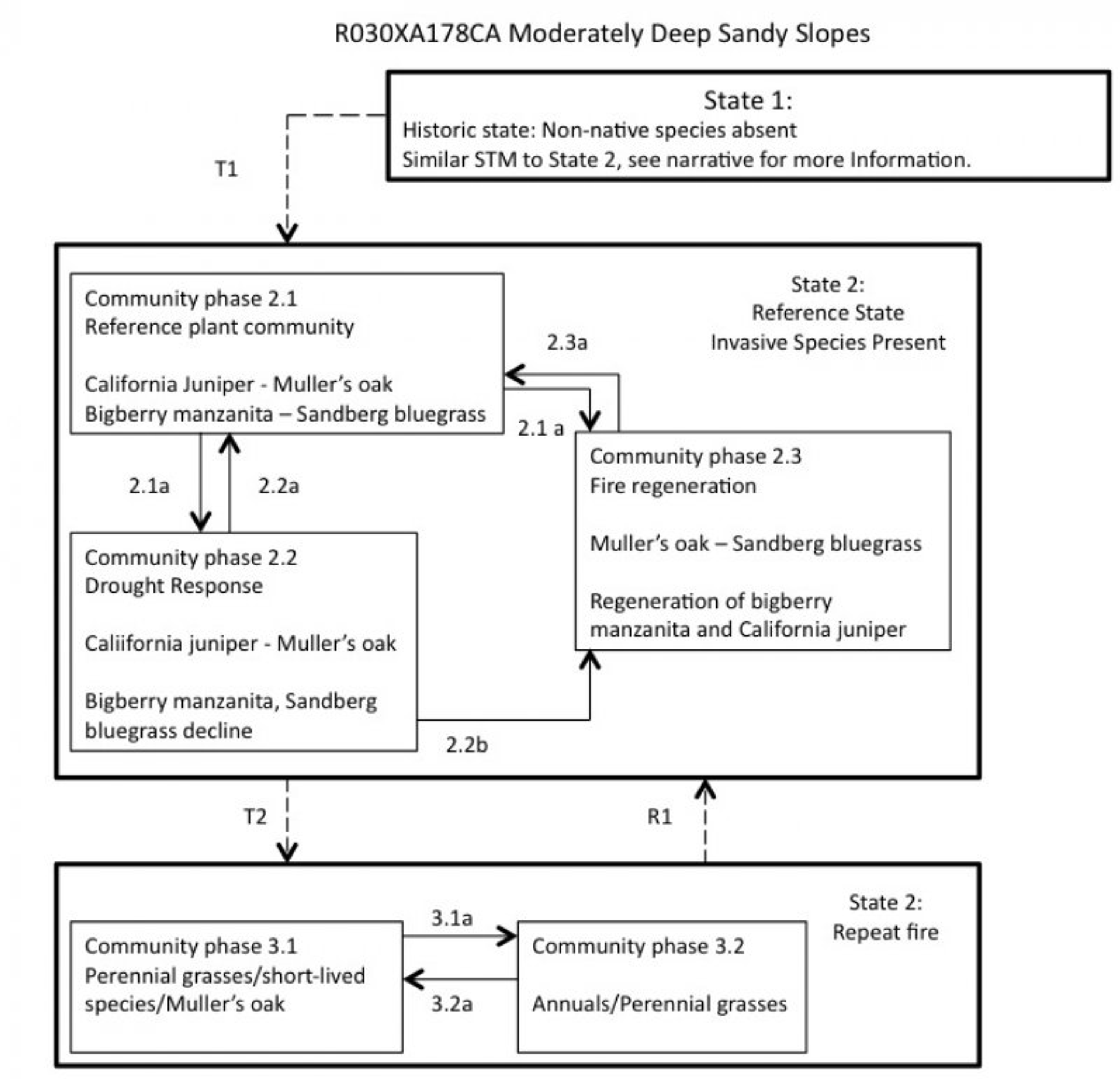

Figure 3. R030XA178CA

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. Historically, stand-replacing fire was probably very rare in this ecological site due to the absence of non-native grasses to fuel fires (Sawyer et al. 2009). When fire did occur, it was probably low severity surface fire that promoted regeneration of short-lived species, but did not cause widespread mortality in California juniper (Sawyer et al. 2009). In the current potential plant community, fires tend to be larger and of moderate to high severity due to the buildup of non-native annual grasses. A recurrence of fire may cause this ecological site to transition to a state dominated by non-native annual grasses and native perennial bunchgrasses. 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 and cheatgrass 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 4. Community Phase 2.1

The current potential plant community is dominated by California juniper and Muller's oak, and bigberry manzanita is an important secondary shrub. The uncommon Parry's jujube (*Ziziphus parryi*) is typically present at low levels. Sandberg's bluegrass is an important herbaceous species, contributing approximately 15% of annual production. Desert needlegrass (*Achnatherum speciosum*) is typically present at low levels. Other secondary shrubs may include narrowleaf goldenbush (*Ericameria linearifolia*), Parish's goldeneye (*Viguiera parishii*), Nevada joitfir (*Ephedra nevadensis*), Acton's brittlebush (*Encelia actonii*), eastern Mojave buckwheat (*Eriogonum fasciculatum*), desert almond (Prunus fasciculatum), beavertail pricklypear (*Opuntia basilaris*), and burrobrush (*Hymenoclea salsola*). Subshrubs typically present include desert globemallow (*Sphaeralcea ambigua*) and shrubby deervetch (*Lotus rigidus*). Winter annuals are seasonally present, and common species include pincushion flower (*Chaenactis fremontii*), bristly fiddleneck (*Amsinckia tessellata*), Cryptantha (Cryptantha ssp), and Bigelow's monkeyflower (*Mimulus bigelovii*). The non-native annual grasses red brome and cheatgrass are present in this site.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	180	270	359
Tree	90	100	160
Grass/Grasslike	60	80	100
Forb	40	55	70
Total	**370**	**505**	**689**

Community 2.2

Drought Response

This community phase is characterized by an overall decline in cover and production due to mortality of bigberry manzanita, Sandberg bluegrass, desert needlegrass, and other short-lived species, lack of emergence of annual forbs and grasses. California juniper and Muller's oak populations are likely to remain stable, but may suffer mortality with severe drought. California juniper is extremely drought-tolerant (Willson et al. 2008), with relatively low rates of mortality during drought (Breshears et al. 2005, Shaw 2006, Breshears et al. 2008, Floyd et al. 2009, Allen et al. 2010). Mortality rates of juniper species in response to drought in the early 2000s range from 2 to 26% (Breshears et al. 2005, Mueller et al. 2005, Floyd et al. 2009), although they tend to be at the lower end of this range (3 to 10%). Widespread mortality of bigberry manzanita has been observed in Joshua Tree National Park in response to recent drought (NRCS staff observations). Sandberg bluegrass is short-lived, and populations may fluctuate with climatic conditions (Howard 1997), and may be largely absent from the drought response community phase.

Community 2.3
Fire regeneration community

This community phase is characterized by high mortality of California juniper, and an increase in the importance of Muller's oak and Sandberg bluegrass, eastern Mojave buckwheat, desert needlegrass and secondary shrubs. California juniper is generally killed by even moderate fire, and is not capable of resprouting (Sawyer et al. 2009). Muller's oak quickly resprouts after fire. Bigberry manzanita is killed by fire, and in typical chaparral habitats, it is an obligate fire-seeder that regenerates from the seedbank after fire (Keeley and Keeley 1977). In desert habitats where seed production is much reduced (Vasek and Clovis 1976), postfire regeneration from the seedbank is extremely limited (Howard 1997). Sandberg bluegrass typically increases after fire, as it is not killed by fire, and increases when released from competition with other species (Howard 1997). Desert needlegrass also quickly resprouts after fire, and increases in the postfire community (Sawyer et al. 2009). Eastern Mojave buckwheat is capable of rapid colonization of burned areas from the seedbank (Sawyer et al. 2009). Other species capable of resprouting include Parry's jujube, Nevada jointfir, shrubby deervetch, and desert bitterbrush (*Purshia glandulosa*). Short-lived shrubs capable of quickly recolonizing from seed include narrowleaf goldenbush, Parish's goldeneye, burrobrush, and desert globemallow. Initially, native and non-native annual forbs and grasses are most abundant. As tall shrub cover increases, shade-dependent seedlings of California juniper begin to establish. Tree establishment may also occur in the shelter of boulders and rock outcrops (Pearson and Theimer 2004). Pre-burn communities may take up to 125 to re-establish (Sawyer et al. 2009). This community is an at-risk phase. High biomass of non-native annual grasses, and of native perennial grasses after fire increases the susceptibility of this site to repeat burning. With frequent burning, the fire return interval is too short to allow re-establishment of California juniper and bigberry manzanita. Repeat burning may trigger a transition to an altered state.

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.

Pathway 2.2a
Community 2.2 to 2.1

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

Pathway 2.2b
Community 2.2 to 2.3

This pathway occurs with moderate to 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).

Pathway 2.3a
Community 2.3 to 2.1

This pathway occurs with a long period of time without disturbance (60 - 200 years).

State 3
Repeated fire

This state develops when the fire return interval is less than 30 years. This state has been significantly altered from the natural range of variability found in States 1 and 2. California juniper and bigberry manzanita are lost from the plant community. The loss of the deep-rooted California juniper, and the widely spreading lateral roots of bigberry manzanita may increase soil erosion on these steep slopes. Muller's oak and sandberg bluegrass may continue to be dominant species.

Community 3.1
Perennial grasses/short-lived species/Muller's oak

This community phase develops with time without fire (5-30 years), and is dominated by Sandberg bluegrass, desert needlegrass and a patchy cover of Muller's oak, short-lived shrubs and subshrubs. There is high cover of non-native and native annuals during wet years. This community is at high risk of repeat burning due to high cover of fine fuels.

Community 3.2
Annual/Perennial Grasses

This community phase occurs one to five years post-fire. The community is dominated by non-native annual species including red brome, and cheatgrass, and native forbs, including bristly fiddleneck and pincushion flower (many other native forbs could also be present). Sandberg bluegrass is abundant. Desert needlegrass may be abundant, although if the fire return interval becomes too short, this species may decline in importance relative to non-native annual grass (Sawyer et al. 2009). Native subshrubs including shrubby deervetch and desert globemallow may be abundant. There may be very sparse cover of resprouting shrubs including Muller's oak, desert almond, Parry's jujube, and Nevada ephedra. Seedlings of short-lived shrubs may be present, and may include eastern Mojave buckwheat, burrobrush, and narrowleaf goldenbush. This community is at high-risk of repeat burning due to high fine fuel cover. This community is also susceptible to wind and water erosion, due to the loss of stabilizing shrub cover (Bull 1997).

Pathway 3.1a
Community 3.1 to 3.2

This pathway occurs with fire.

Pathway 3.2a
Community 3.2 to 3.1

This pathway occurs with time without fire (> 5 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.

Transition 2
State 2 to 3

This transition occurs when the fire return interval is less than 30 years.

Restoration pathway 1
State 3 to 2

Restoration of communities severely altered by repeat fire at the landscape scale is extremely difficult, and especially so on the steep, rugged and remote slopes of this ecological site. Methods may include aerial seeding of early native colonizers such as sandberg bluegrass, desert needlegrass, desert globemallow, and deervetch. Increased native cover may help to reduce non-native plant invasion, helps to stabilize soils, provides a source of food and cover for wildlife, and provides microsites that facilitate California juniper establishment. However, the amount of seed required for success is often prohibitive. Stabilization of soils using mulch or straw is sometimes used on severe burns on steep slopes to prevent soil erosion, but the effectiveness of this is not clear, and in National Park lands, the benefits of introducing foreign material into wilderness have to be carefully weighed with the potential benefits. Large-scale planting of both early colonizers and community dominants tends to be more successful than seeding, especially if outplants receive supplemental watering during the first two years. Bigberry manzanita, an obligate fire-seeder with a limited seedbank in desert communities, would need to be outplanted, or seeds heat-treated prior to introduction. Pre-emergent herbicides (Plateau) have been used in the year immediately post-fire to attempt to inhibit or reduce brome invasion. How successful this is on a landscape scale, and the non-target effects have not yet been determined.

Additional community tables

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Tree					
1	**Trees**			90–160	
	Muller oak	QUCO7	*Quercus cornelius-mulleri*	30–200	5–20
	bigberry manzanita	ARGL4	*Arctostaphylos glauca*	25–200	0–6
	California juniper	JUCA7	*Juniperus californica*	90–160	5–25
	Parry's jujube	ZIPA	*Ziziphus parryi*	1–25	0–4
	Parish's goldeneye	VIPA14	*Viguiera parishii*	0–15	0–3
	narrowleaf goldenbush	ERLI6	*Ericameria linearifolia*	0–15	0–1
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	0–10	0–1
	burrobrush	HYSA	*Hymenoclea salsola*	0–8	0–1
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	0–8	0–1
	desert almond	PRFA	*Prunus fasciculata*	0–8	0–1
	Nevada jointfir	EPNE	*Ephedra nevadensis*	0–8	0–1
	Acton's brittlebush	ENAC	*Encelia actonii*	0–5	0–3
Shrub/Vine					
1	**Native shrubs**			180–360	
	Sandberg bluegrass	POSE	*Poa secunda*	60–100	1–7
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–50	0–2
Grass/Grasslike					
2	**Native perennial grasses**			60–100	
	red brome	BRRU2	*Bromus rubens*	0–15	0–1
	cheatgrass	BRTE	*Bromus tectorum*	0–15	0–1
3	**Non-native annual grasses**			0–15	
	pincushion flower	CHFR	*Chaenactis fremontii*	0–60	0–5
	Forb, annual	2FA	*Forb, annual*	0–10	0–1
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0–10	0–1
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–5	0–2
	Bigelow's monkeyflower	MIBI6	*Mimulus bigelovii*	0–4	0–2
	cryptantha	CRYPT	*Cryptantha*	0–1	0–1
	shrubby deervetch	LORI3	*Lotus rigidus*	0–1	0–1
Forb					
4	**Native forbs**			40–70	

Animal community

This ecological site provides habitat for desert bighorn sheep (Ovis canadensis nelsoni), southern mule deer (Odocoileus hemionus fuliginatus), California mountain lion (Felis concolor californica), California ringtail (Bassariscus astutus ocatvus), Desert bobcat (Lynx rufus baileyi) agassizii), and may be home to transient California black bear (Ursus Americanus californianus). A list of the reptiles and mammals likely to be found in this site (based on habitat preferences) includes:

Lizards:
Desert banded Gecko (Coleonyx variegatus variegatus)
Mojave collared lizard (Crotaphytus bicinctores)
Long-nosed leopard lizard (Gambelia wislizenii wislizenii)
Western chuckwalla (Sauromalus ater obesus)

San Diego horned lizard (Phrynosoma coronatum blainvilii)
Great Basin fence lizard (Sceloporus biseriatus longipes)
Western brush lizard (Urosaurus graciosus graciosus)
Desert side-blotched lizard (Uta stansburiana stejnegeri)

Snakes:
Southwestern blind snake (Leptotyphlops humilis humilis_
Desert rosy boa (Lichanura trivirgata gracia)
Mojave glossy snake (Arizona occidentalis eburnata)
Desert night snake (Hypsiglena torquata deserticola)
California kingsnake (Lampropeltis getula californae)
Red coachwhip (Masticophis flagellum piceus)
California striped racer (Masticophis lateralis lateralis)
Western leaf-nosed snake (Phyllorynchus decurtatus perkinsi)
Smith's black-headed snake (Tantilla hobartsmithi)
California lyre snake (Trimorphodon biscutatus vandenburghi)
Southwestern speckled rattlesnake (Crotalus mitchelli Pyrrhus)

Mammals:
Western spotted skunk (Spilogale gracilis gracilis)
Long-tailed weasel (Mustela frenata latirosta)
California desert bat (Myotis californicus stephensi)
Hoary bat (Lasiurus cinereus cinereus)
Spotted bat (Euderma maculatum)
Western mastiff bat (Macrotus californicus)
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 (Odocoileus hemionus fuliginatus)
Desert bighorn sheep (Ovis Canadensis nelsoni)
Southern Desert cottontail (Sylvilagus audobonii arizonae)
Whitetail antelope squirrel (Ammospermphilus leucurus leucurus)
Western Mojave ground squirrel (Spermophilus beecheyi parvulus)
Long-tailed pocket mouse (Chaetodipus formosus mojavensis)
Merriam's kangaroo rat (Dipodomys merriami merriami)
Desert harvest mouse (Reithrodontomys megalotis megalotis)
Eastern dusky-footed wood rat (Neotoma fuscipes simplex)
White-throated wood rat (Neotoma albigula venusta)
Desert wood rat (Neotoma fuscipes simplex)
Desert canyon mouse (Peromyscus crinitus stephensi)
Sonoran deer mouse (Peromyscus maniculatus sonoriensis)
Desert grasshopper mouse (Onychomys torridus pulcher)
Desert shrew (Notiosorex crawfordi crawfordi

Recreational uses

This site offers opportunities for cross-country hiking, although much of the terrain covered by this site is steep, remote, and difficult to access.

Wood products

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

California juniper is used by Native Americans for a variety of medicinal purposes, including cold remedies, cough treatment, anticonvulsive, to induce sweating, for hangovers, for hypotension, fever and as a muscle relaxant for childbirth relief. Berries are eaten fresh, and dried for later use, when they are ground to make porridge or to make bread. Juniper bark is used as a building cover, and wood is used to make arrows and cooking utensils. (http://herb.umd.umich.edu/herb/search.pl?searchstring=Juniperus+californica).

Inventory data references

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

1251503840 (Type location)
1249417508
1249417310

Type locality

Location 1: San Bernardino County, CA	
UTM zone	N
UTM northing	3769362
UTM easting	547317
General legal description	The type location is approximately 1.0 mile southwest (115 degrees) of Morongo Lakes, Morongo Valley, California, outside the western border of Joshua Tree National Park.

Other references

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Approval

Kendra Moseley, 2/18/2025

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	03/12/2025
Approved by	Kendra Moseley
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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:

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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:**
