USDA Natural Resources Conservation Service

Ecological site R030XD006CA
Abandoned Fan

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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.

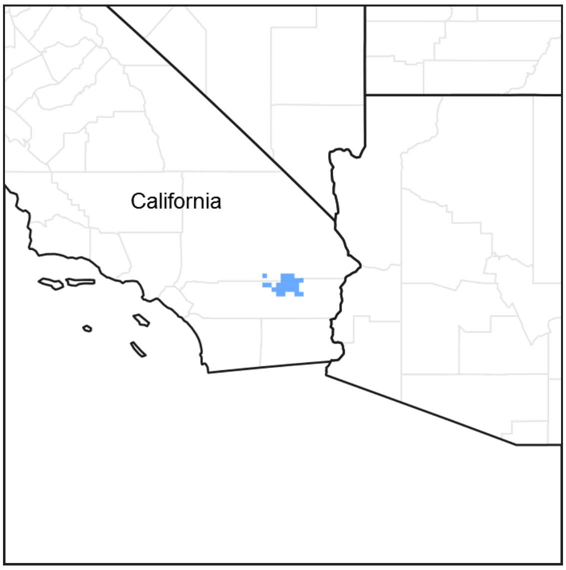

Figure 1. Mapped extent

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

The Mojave Desert Major Land Resource Area (MLRA 30) 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 Mojave Desert is a transitional area between hot deserts and cold deserts where close proximity of these desert types exert enough influence on each other to distinguish these desert types from the hot and cold deserts beyond the Mojave. Kottek et. al 2006 defines hot deserts as areas where mean annual air temperatures are above 64 F (18 C) and cold deserts as areas where mean annual air temperatures are below 64 F (18 C). Steep elevation gradients within the Mojave create islands of low elevation hot desert areas surrounded by islands of high elevation cold desert areas.

The Mojave Desert receives less than 10 inches of mean annual precipitation. Mojave Desert low elevation areas are often hyper-arid while high elevation cold deserts are often semi-arid with the majority of the Mojave being an arid climate. Hyper-arid areas receive less than 4 inches of mean annual precipitation and semi-arid areas receive more than 8 inches of precipitation (Salem 1989). The western Mojave receives very little precipitation during the summer months while the eastern Mojave experiences some summer monsoonal activity.

In summary, the Mojave is a land of extremes. Elevation gradients contribute to extremely hot and dry summers and cold moist winters where temperature highs and lows can fluctuate greatly between day and night, from day to day and from winter to summer. Precipitation falls more consistently at higher elevations while lower elevations can experience long intervals without any precipitation. Lower elevations also experience a low frequency of precipitation events so that the majority of annual precipitation may come in only a couple precipitation events during the whole year. Hot desert areas influence cold desert areas by increasing the extreme highs and shortening the length of below freezing events. Cold desert areas influence hot desert areas by increasing the extreme lows and increasing the length of below freezing events. Average precipitation and temperature values contribute little understanding to the extremes which govern wildland plant communities across the Mojave.

Hyper-Arid Mojave Land Resource Unit (XD)

LRU notes

The Mojave Desert is currently divided into 4 Land Resource Units (LRUs). This ecological site is within the Hyper-Arid Mojave LRU, extremely hot and dry low elevation troughs within the Mojave Desert. The Hyper-Arid Mojave LRU is designated by the 'XD' symbol within the ecological site ID. This LRU is found within the Death Valley/Mojave Central Trough, as well as portions of the Mojave exposed to the Salton Sea Trough and the Colorado River Valley. This LRU is essentially equivalent to the Death Valley/Mojave Central Trough, Arid Valleys and Canyonlands, and associated Mojave Sand Dunes and Mojave Playas of EPA Level IV Ecoregions.

Elevations are predominantly below 1650 feet with precipitation is less than 4 inches per year. Mountain slopes within the watersheds of these low elevation troughs may extend up to approximately 2460 feet (750 m). This LRU is distinguished by its extremely aridity where a nearly barren landscape is occupied by widely spaced shrubs. Vegetation includes creosote bush, burrobush, big galleta grass with many annual species able to take advantage of infrequent precipitation events which occur in this LRU. Playa species such as Mojave seablite and saltbush species are also common in this LRU.

Classification relationships

Mojave Creosote Bush (Holland, 1986)
Larrea tridentata Shrubland Alliance (Sawyer et al. 2009).

Ecological site concept

Ecological Site Concept –

This ecological site occurs on abandoned alluvial fans and fan aprons with soils which are very deep, and are composed of layers of sand, coarse sand and loamy sand with varying amounts of gravel and cobbles. This ecological site tends to occupy distal fan positions, far from sources of run-on, and this site typically has no sheet-flow from flash-flooding events.

Production reference value (RV) is 67 pounds per acre, and ranges from 21 to 191 pounds per acre depending on annual precipitation and annual forb production. Vegetation is sparse, and dominated by low-statured creosote bush (Larrea tridentata). A hyperthermic climate with deep sandy soils with no additional run-on from sheet flooding drives the vegetation community of this ecological site. The deep-rooted creosote bush is the only shrub capable of tolerating the extremely arid conditions.

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

This is a group concept and provisional STM that also covers R030XD042CA.

Associated sites

R030XD039CA	**Coarse Gravelly Fans** This ecological site is found on adjacent occasionally flooded alluvial fans. Creosote bush (Larrea tridenata), burrobush (Ambrosia dumosa) and brittlebush (Encelia farinosa) are dominant.

R030XD004CA	**Low-Production Hyperthermic Hills** This ecological site is found on steep sideslopes of adjacent fan remnants. Sparse vegetation is dominated by creosote bush (Larrea tridentata).
R030XD008CA	**Hyperthermic Sandhill** This ecological site is found on adjacent sandhills. Big galleta (Pleuraphis rigida) and creosote bush (Larrea tridentata) are dominant.
R030XD014CA	**Hyperthermic Sandy Plains** This ecological site is found on adjacent semi-active sandsheets. Big galleta (Pleuraphis rigida) is dominant.
R030XD015CA	**Hyper-Arid Fans** This ecological site is found on adjacent fan aprons with rare surface flooding. Creosote bush (Larrea tridentata) and burrobush (Ambrosia dumosa) dominate.
R030XD025CA	**Hyperthermic Sandsheets** This ecological site is found on adjacent sandsheets. Creosote bush (Larrea tridentata) and big galleta (Pleuraphis rigida) dominate.
R030XD042CA	**Hyperthermic Shallow To Moderately Deep Fan Remnants** This ecological site is found on adjacent very stable fan remnants. Creosote bush (Larrea tridentata) is dominant.
R030XY001CA	**Occasionally Flooded, Hyperthermic, Diffuse Ephemeral Stream** This ecological site is found on adjacent occasionally flooded drainageways. Creosote bush (Larrea tridentata) and Schott's dalea (Psorothamnus schottii) dominate.
R030XY092NV	**DESERT PATINA** This ecological site is found on adjacent fan remnants with desert pavement surface. Very sparse vegetation is dominated by creosote bush (Larrea tridentata).

Similar sites

R030XD015CA	**Hyper-Arid Fans** This ecological site occurs on landform positions receiving more surface flooding. This site is more productive, shrub density is higher, and burrobush (Ambrosia dumosa) is co-dominant with creosote bush (Larrea tridentata).
R030XD042CA	**Hyperthermic Shallow To Moderately Deep Fan Remnants** This ecological site occurs on very stable fan remnants with a high degree of soil horizon development. It has lower production and shrub density.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Larrea tridentata*
Herbaceous	(1) *Plantago ovata*

Physiographic features

This ecological site occurs on alluvial fans and fan aprons at elevations of 670 to 2620 feet, and slopes ranging from 0 to 8 percent. This site typically does not receive flooding, and runoff class is negligible to very low.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Fan apron
Flooding duration	Brief (2 to 7 days)
Elevation	204–799 m
Slope	0–8%
Aspect	Aspect is not a significant factor

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 340 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)	340 days
Freeze-free period (average)	
Precipitation total (average)	127 mm

Influencing water features

Soil features

The soils associated with this ecological site are very deep, somewhat excessively to excessively drained, and formed in alluvium from predominantly granitioid rocks. These soils are sandy or sandy-skeletal in the particle size control section, and permeability is moderately rapid to rapid. Surface textures include fine sand, gravelly loamy fine sand, fine sandy loam. Subsurface horizons (1 to 59 inches) are composed of layers of fine sand and sand textures with gravelly to very gravelly modifiers. Surface gravels (< 3 mm in diameter) range from 30 to 75 percent, and larger fragments range from 0 to 11 percent. Subsurface gravels by volume (for a depth of 0 to 59 inches) range from 1 to 50 percent and larger fragments by volume range from 0 to 25 percent.

This ecological site is associated with Pintobasin soils (mixed, hyperthermic Typic Torripsamments); Carrizo soils (sandy-skeletal, mixed, hyperthermic Typic Torriorthents); and Joetree soils (mixed, hyperthermic Typic Torripsamments). Carrizo soils are sandy and have greater than 35 percent rock fragments in the particle contol section. Joetree and Pintobasin soils are sandy throughout with few rock fragments. The difference between the Joetree and the Pintobasin soils is that Joetree soils have an argillic horizon from 40 to 59 inches with sandy loam or sandy clay loam textures.

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

Mapunit;Mapunit name;Component;Local phase;Component percent
1513;Carrizo-Rubylee complex, 1 to 4 percent slopes;Carrizo; 60
2065;Dalelake-Aquapeak-Coxpin association, 2 to 8 percent slopes;Carrizo; 1
2076;Oldale-Carrizo complex, 2 to 8 percent slopes;Carrizo;30; Pintobasin;very rarely flooded;2
2077;Oldale-Carrizo association, 2 to 8 percent slopes;Carrizo; 25
2060;Joetree-Dalelake-Pintobasin complex, 0 to 2 percent slopes;Joetree;very rarely flooded;35
1514;Carrizo-Pintobasin-Rubylee complex, 0 to 4 percent slopes;Pintobasin;fine sandy loam;30
1515;Pintobasin-Carrizo complex, 2 to 8 percent slopes;Pintobasin; 80

1516;Pintobasin fine sandy loam, 0 to 2 percent slopes;Pintobasin;fine sandy loam;90
1517;Pintobasin-Dalelake complex, 2 to 8 percent slopes;Pintobasin; 65
1522;Pintobasin sand, 1 to 3 percent slopes, rarely flooded;Pintobasin; 5
1525;Pintobasin complex, 2 to 4 percent slopes, 10
1530;Dalelake fine sand, 0 to 4 percent slopes;Pintobasin; 5
2060;Joetree-Dalelake-Pintobasin complex, 0 to 2 percent slopes;Pintobasin;fine sandy loam;25
2068;Aquapeak-Carpetflat-Pintobasin complex, 0 to 4 percent slopes;Pintobasin; 15
2076;Oldale-Carrizo complex, 2 to 8 percent slopes;Pintobasin;very rarely flooded;2
2715;Dalelake-Sheephole-Pintobasin complex, 2 to 8 percent slopes;Pintobasin; 25

Table 4. Representative soil features

Parent material	(1) Alluvium–granite
Surface texture	(1) Fine sandy loam (2) Gravelly loamy fine sand (3) Fine sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	150 cm
Surface fragment cover <=3"	30–75%
Surface fragment cover >3"	0–11%
Available water capacity (0-101.6cm)	2.29–9.65 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6–8.8
Subsurface fragment volume <=3" (Depth not specified)	1–50%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

Abiotic Factors

The abiotic factors driving this site are This ecological site occurs on gently sloping alluvial fans and fan aprons at elevations of 670 to 2620 feet. Soils are very deep, and are composed of layers of sand, coarse sand and loamy sand with varying amounts of gravel and cobbles. This site typically has no sheet-flow from flash-flooding events. A hyperthermic climate with deep sandy soils with no additional run-on from sheet flooding drives the vegetation community of this ecological site. The deep-rooted creosote bush is the only shrub capable of tolerating the extremely arid conditions of this site.

Creosote bush shrublands dominate fan piedmont landscapes at elevations below 4000 feet in the Mojave Desert (Rundel and Gibson 1996). In arid regions, the availability of moisture is the key resource driving the productivity and composition of vegetation (Noy-Meir 1973, McAuliffe 1994, Hamerlynk et al. 2000, Martre et al. 2002, Austin et al. 2004). Where soil temperature regimes are thermic (above approximately 2800 feet) and soil moisture availability is higher, shrub production, cover, density and diversity are higher (Bedford et al. 2009). Where the soil temperature regime is hyperthermic and moisture becomes more limiting such as this ecological site, shrub production, cover, density and diversity decline. When soil moisture becomes even more limiting, due to factors such as very low elevations and hot temperatures, absence of sheet-flow, restrictive surface cover such as desert pavement, or the presence of subsurface horizons that limit infiltration, the shrub community typically becomes even sparser, and is restricted to widely spaced, small creosote bush.

This ecological site tends to occupy distal fan positions, far from sources of run-on. Infrequent precipitation rapidly infiltrates these sandy soils, with minimal loss due to run-off and evaporation (Noy-Meir 1973, Austin et al. 2004), leaving very little water available at near surface depths. Deep, free-draining soils promote dominance by the deep-rooted, long-lived evergreen creosote bush, which can access water held at deep levels (McAuliffe 1994, Hamerlynk et al. 2002, Hamerlynk and McAuliffe 2008). Shallow-rooted species like burrobush (*Ambrosia dumosa*), which is co-dominant with creosote bush in soils or environments with greater moisture availability, cannot survive in the arid conditions of this site.

Disturbance dynamics

The primary disturbances influencing this ecological site are drought, invasion by non-native annual plants, and fire, all of which interact. Drought is an important shaping force in Mojave Desert plant communities (Webb et al. 2003, Bowers 2005, Hereford et al. 2006, Miriti et al. 2007). Short-lived perennial shrubs and perennial grasses demonstrate the highest rates of mortality (Webb et al. 2003, Bowers 2005, Hereford et al. 2006, Miriti et al. 2007), and annual species remain dormant in the soil seedbank (Beatley 1969, 1974, 1976). Long-lived shrubs and trees are more likely to exhibit branch-pruning, and or limited recruitment during drought (e.g. Hereford et al. 2006, Miriti et al. 2007), leading to reduced cover and biomass in drought-afflicted communities.

Non-native annual species such as red brome (*Bromus rubens*), Mediterranean grass (*Schismus barbatus*), redstem stork's bill (*Erodium cicutarium*) and Asian mustard (*Brassica tournefortii*) 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). In lower elevations, where soil temperature regimes are hyperthermic and soil moisture is more limiting, Mediterranean grass is the dominant non-native grass (Brooks and Berry 2006). Like native annuals, nonnative annual cover and production is directly related to winter precipitation (Beatley 1969, Brooks and Berry 2006, Barrows et al. 2009). The fine sand textures that are typical for this ecological site provide preferred habitat for Asian mustard, and this site has a high potential for invasion by this species during wet years.

Invasion by non-native annual grasses has increased the flammability of Mojave Desert vegetation 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). The low potential for high productivity of annual species in this ecological site means that it is relatively resilient to fire. However, after years of extremely high winter precipitation, this site may burn (Brown and Minnich 1986, Brooks et al. 2007).

State and transition model

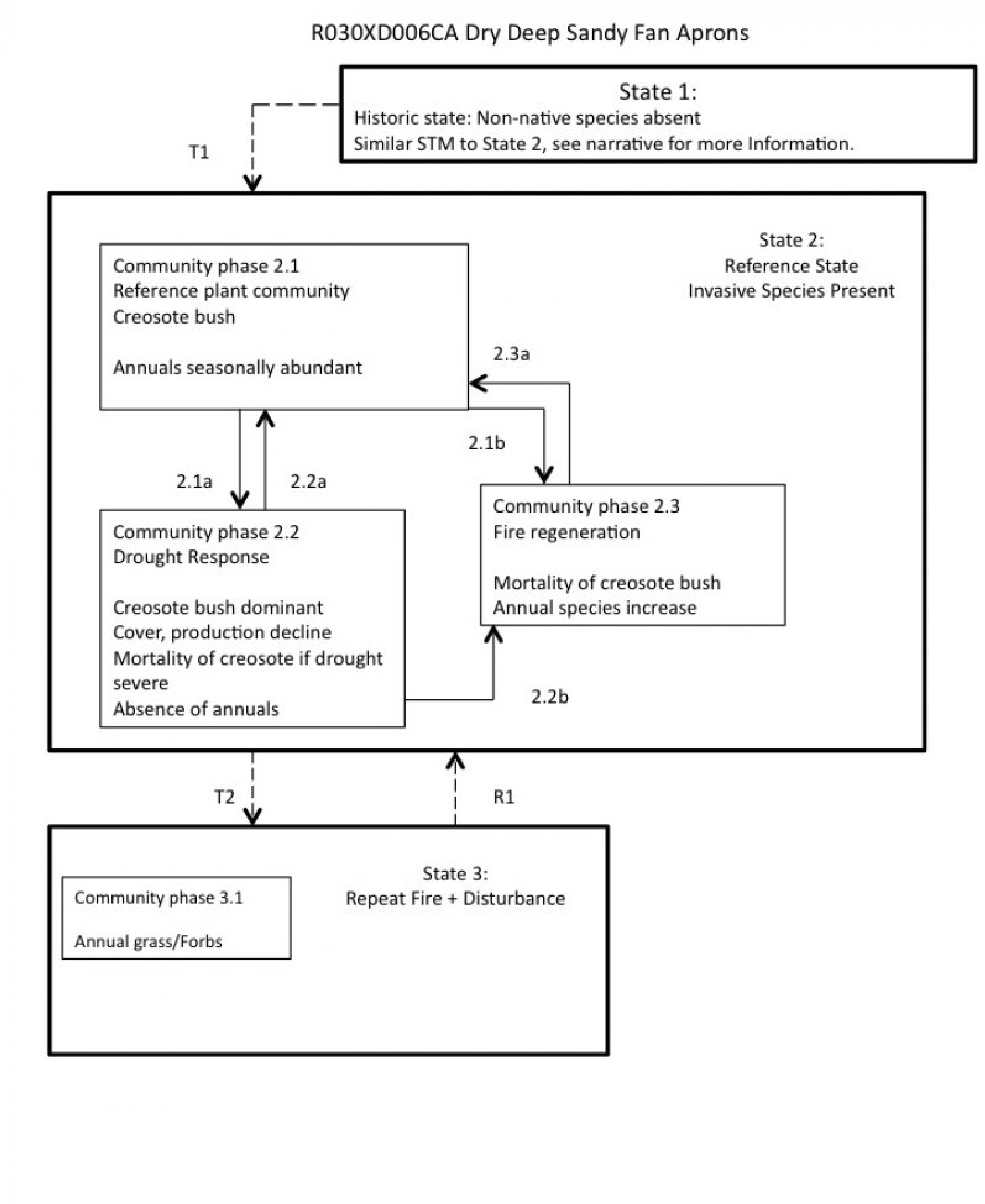

Figure 4. R030XD006CA

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 rare fire were the natural disturbances influencing this ecological site. Fire would have been a very rare occurrence due to the lack of a continuous fine fuel layer between shrubs. Data for this State does not exist, but dynamics and composition 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, red-stem stork's bill, and Asian mustard 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 reference plant community is maintained by periods of average climatic conditions and the absence of fire. It is dominated by creosote bush. There are no important secondary shrubs, though burrobush (*Ambrosia dumosa*) or white ratany (*Krameria grayi*) are occasionally present at trace levels. The perennial bunchgrass big galleta may be present at very low levels. Native annual forbs are seasonally present, and common species include Cryptantha (Cryptantha spp.), smooth desert dandelion (*Malacothrix glabrata*), desert Indianwheat (*Plantago ovata*), and devil's spineflower (*Chorizanthe rigida*). Mediterranean grass and redstem stork's bill are typically present at low levels, and Asian mustard may be present at up to 5 percent cover.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	22	53	128
Forb	1	22	84
Grass/Grasslike	–	–	2
Total	**23**	**75**	**214**

Community 2.2
Drought response

This community phase is characterized by an overall decline in cover due to branch-pruning and lack of recruitment of creosote bush, and lack of emergence of annual forbs and grasses. Creosote bush is an evergreen species capable of utilizing moisture at any time of the year. This ability buffers populations from the effects of drought that occur as the absence of the winter rains (the primary source of moisture for this ecological site). Further, creosote bush germinates in response to moisture during the warm season, so may still recruit if warm season rains occur during winter drought (Hereford et al. 2006). Creosote bush exhibits branch-pruning during severe drought, but mortality during drought in the Mojave Desert is very low (Webb et al. 2003, Hereford et al. 2006). Nevertheless, during severe drought, creosote bush mortality may occur. This community is at reduced risk of burning, and if it is ignited, will experience lower severity, smaller fires because of reductions in annual and perennial biomass (Minnich 2003). However, drought immediately after a period of heavy moisture, results in standing biomass of native fuels that may carry a fire one year post-production (Minnich, 2003), and standing dead biomass of non-native annuals that may provide fuel for 2 -3 years post-fire (Minnich 2003; Rao et al. 2010).

Community 2.3
Fire regeneration community

This community phase is characterized by severe declines in creosote bush. Creosote bush is generally killed by fire, and is slow to re-colonize burned areas due to specific recruitment requirements (Brown and Minnich 1986, Brooks et al. 2007, Steers and Allen 2011). Creosote bush communities in the Mojave Desert may resemble the natural range of variation found in pre-fire conditions in terms of species composition in as little as nineteen years (Engel and Abella 2011), but creosote communities in the Colorado Desert may show little recovery after 30 years (Steers and Allen 2011). The timing and severity of fire, as well as post-fire climate conditions determines trajectories of recovery (Brown and Minnich 1986, Steers and Allen 2011). The post-burn community is dominated by non-native and native annual grasses and forbs, and native subshrubs. Native annuals likely to be present include smooth desertdandelion, pincushion flower, and cryptantha, but many different species could be at a particular site. Subshrubs that often become dominant after fire include desert globemallow (*Sphaeralcea ambigua*), desert trumpet (*Eriogonum inflatum*), and desert marigold (*Baileya multiradiata*). With time, shrub cover increases with colonization by short-lived shrubs from off-site dispersal. Given the extremely arid conditions of this site, burrobrush (*Hymenoclea salsola*) may be the only short-lived shrub capable of colonizing this site. With a long period of time without fire, creosote bush begins to regain dominance (Vasek 1983, Abella 2009, Vamstad 2009). This community is an at-risk phase, as the increased cover and biomass of non-native annual grasses increases the likelihood of repeat burning. Further, the low cover in this ecological site, and the low colonization potential following fire means that the burned community is extremely susceptible to wind erosion, especially if drought follows fire. If the fire return interval is less than 20 years, or if extreme drought or additional disturbance affect the fire regeneration community, this community is very likely to transition to State 3.

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs with prolonged or severe 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 a return to average or above average precipitation.

Pathway 2.2b
Community 2.2 to 2.3

This pathway occurs with moderate to severe fire, and takes place within three years of a very wet period. At longer than three years of drought, the community is at low risk of burning.

Pathway 2.3a
Community 2.3 to 2.1

This pathway occurs with time and the absence of additional disturbance.

State 3

Repeated Fire

This state develops when the fire return interval is less than 20 years, or the fire regeneration community in state 2 is affected by extreme drought or other disturbance (such as off-road vehicle use). This state has been significantly altered from the natural range of variability found in States 1 and 2. Creosote bush is lost, and non-native annual grasses and forbs dominate the community. This state 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 shrub cover (Bull 1997). This can lead to arroyo development near ephemeral drainage channels. Furthermore, the loss of vegetation structure present in the historic and reference state decreases the suitability of this habitat for wildlife (Brooks et al. 2007, Vamstad 2009). Since rodent seed caching is important for the dispersal and establishment of many desert species this can further inhibit recovery.

Community 3.1
Repeat burn community

The community is dominated by Mediterranean grass, red-stem stork's bill, Asian mustard, and native forbs. Desert marigold, desert trumpet, and burrobrush may be abundant.

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. Post-settlement cattle and sheep grazing, as well as dryland farming, helped to spread and facilitate their establishment (Brooks and Pyke 2000, Brooks et al. 2007). Non-natives can alter disturbance regimes significantly from their natural or historic range and change ecological processes therefore creating an unlikely scenario to restore the site back to reference.

Transition 2
State 2 to 3

This transition occurs when the fire return interval is less than 20 years, or when extreme drought or additional disturbance affect the fire regeneration community.

Restoration pathway 1
State 3 to 2

Restoration of communities severely altered by repeat fire at the landscape scale is difficult. Methods may include aerial seeding of early native colonizers such as desert globemallow, burrobrush, threeawns (Aristida spp.), and desert marigold. Increased native cover may help to reduce non-native plant invasion, helps to stabilize soils, provides a source of food and cover for wildlife, including desert tortoise (Gopherus agassizii), and provides microsites that facilitate creosote bush establishment. However, the amount of seed required for success is often prohibitive. Large-scale planting of both early colonizers and community dominants tends to be more successful in terms of plant survival, especially if outplants receive supplemental watering during the first two years. Creosote bush can be successfully propagated and outplanted. 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 (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
1	**Native Shrubs**			11–82	
	creosote bush	LATR2	*Larrea tridentata*	11–78	2–7
	burrobush	AMDU2	*Ambrosia dumosa*	0–2	0–1
	white ratany	KRGR	*Krameria grayi*	0–1	0–1
Forb					
2	**Native annual forbs**			0–28	
	cryptantha	CRYPT	*Cryptantha*	0–22	0
	desert Indianwheat	PLOV	*Plantago ovata*	0–7	0–12
	smooth desertdandelion	MAGL3	*Malacothrix glabrata*	0–6	0–3
	devil's spineflower	CHRI	*Chorizanthe rigida*	0–4	0
	Mojave desertstar	MOBE2	*Monoptilon bellioides*	0–1	0
5	**Non-native annual forbs**			0–67	
	Asian mustard	BRTO	*Brassica tournefortii*	0–67	0–5
Grass/Grasslike					
3	**Non-native annual grasses**			0–2	
	Mediterranean grass	SCHIS	*Schismus*	0–2	0–1
4	**Perennial Grass**			0–1	
	big galleta	PLRI3	*Pleuraphis rigida*	0–1	0

Animal community

This ecological site provides critical habitat for the threatened desert tortoise (Gopherus agassizii agassizii). Creosote bush shrublands provides a home for an abundance of specialist insect species, for example, creosote bush flowers provide nutrition for over twenty species of bees, and the creosote bush grasshopper (Bootettix argentatus) feeds solely on creosote leaves (Pavlik 2008).

Recreational uses

This site is highly valued for open space and those interested in desert ecology. Uses include mountain biking, hiking, bird watching and botanizing. Desert tortoise and annual wildflowers may also attract visitors during the spring.

Other products

Creosote bush is an important medicinal plant for Native Americans. It has a very wide range of uses from treatment for consumption, bowl complaints, and menstrual cramps, to induce vomiting, relief for arthritis, rheumatism, aching bones and sprains, congestion and cold, as an antiseptic and disinfectant, dandruff, antispasmodic, to induce urination, gonorrhea, and to cancer treatment. (This list is not exhaustive). http://herb.umd.umich.edu/herb/search.pl?searchstring=Larrea+tridentata.

Creosote bush stems are used to make weapons, digging tools, and basket handles, and creosote gum is used for knife and awl handles. Creosote bush branches are used as thatch in dwelling construction. http://herb.umd.umich.edu/herb/search.pl?searchstring=Larrea+tridentata.

Inventory data references

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

D1-M (Type location)

1248014701
J5-K
MW-D
PFPR-3
PW-D

Type locality

Location 1: Riverside County, CA	
UTM zone	N
UTM northing	3774342
UTM easting	623922
General legal description	The type location is approximately 1.65 miles east of the intersection of Highway 62 and Ironage Road, 0.12 mile south of Highway 62 on the border of Joshua Tree National Park.

Other references

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

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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	05/12/2025
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:**

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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):**

---

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

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

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

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

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

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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

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:**