USDA Natural Resources Conservation Service

Ecological site R030XD025CA
Hyperthermic Sandsheets

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

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

MLRA notes

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

MLRA Description:

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

LRU Description:

This Land Resource Unit (designated by 'XD') is found on the eastern side of California. Elevations range from 400 to 2200 feet on average, but may be found up to 3600 feet on southern exposures. Precipitation ranges from 1 to 6 inches per year, but averages between 2-4 inches. This LRU is characterized primarily by the extreme aridity, hot temperatures, hyperthermic soil temperatures and low stature of widely spaced vegetation. Temperatures can reach over 110 degrees Fahrenheit for several weeks in July and August. Summer precipitation falls between July and September, ranging from 20-33% in the form of rain, and winter precipitation falls starting in November and ends between February and March, ranging from 56-70%, also mostly in the form of rain. Vegetation is primarily small, widely-spaced, low-producing creosote bush (Larrea tridentata), burrobush (Ambrosia dumosa), and brittlebush (Encelia farinosa).

Ecological Site Concept –

This ecological site is found on stabilized sandsheets and dunes at elevations ranging from 710 to 2460 feet and slopes of 0 to 8 percent. Dominant soils are very deep fine sands that formed from eolian deposits and exhibit no soil development. Soils may have an alluvial influence, but eolian processes dominate.

Hyperthermic soil temperature regimes and stable fine sands drive the vegetation dynamics of this site. Production reference value (RV) is relatively low at 140 pounds per acre, and depending on precipitation and resulting annual forb production, ranges from 40 to 270 pounds per acre. Creosote bush (Larrea tidentata) is dominant, and dyebush (Psorothamnus emoryi), and burrobush (Ambrosia dumosa) are important secondary species. Annual forbs are abundant during years of average to above average precipitation. Stable, deep fine sands with little soil development favors deep-rooted creosote bush, which accesses deep water reserves that rapidly infiltrate through deep sands. Emory’s dyebush is associated with fine sand-dominated substrates.

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

Classification relationships

This ecological site is found within the Larrea tridentata Shrubland Alliance (Sawyer et al. 2009).

Associated sites

R030XD003CA	**Hyperthermic Steep South Slopes** R030XD003CA is found on adjacent hillslopes. Brittlebush (Encelia farinosa) and creosote bush (Larrea tridentata) are dominant.
R030XD004CA	**Low-Production Hyperthermic Hills** R030XD004CA is found on steep sideslopes of adjacent fan remnants. Creosote bush (Larrea tridentata) is dominant.
R030XD006CA	**Abandoned Fan** R030XD006CA is found on adjacent fan aprons. Creosote bush (Larrea tridentata) is dominant.
R030XD008CA	**Hyperthermic Sandhill** R030XD008CA occurs on adjacent steep sandsheets with slopes greater than 8 percent. Creosote bush (Larrea tridentata) and big galleta (Pleuraphis rigida) are dominant.
R030XD014CA	**Hyperthermic Sandy Plains** R030XD014CA is found on adjacent less stable sandsheets. Big galleta (Pleuraphis rigida) is dominant.
R030XD015CA	**Hyper-Arid Fans** R030XD015CA is found on adjacent alluvial fans and fan aprons. Creosote bush (Larrea tridenata) and burrobush (Ambrosia dumosa) are dominant.
R030XY023CA	**Hyperthermic Dissected Shallow Pediment** R030XD023CA is found on adjacent pediments. Mojave indigobush (Psorothamnus arborescens) and desertsenna (Senna armata) are dominant species.
R030XD041CA	**Channeled Warm Alluvial Fans** R030XD041CA is found on adjacent channeled fan remnants. Creosote bush (Larrea tridentata), burrobush (Ambrosia dumosa) and brittlebush (Encelia farinosa) are dominant species.
R030XD042CA	**Hyperthermic Shallow To Moderately Deep Fan Remnants** R030XD042CA is found on adjacent fan remnants. Vegetation is very sparse and is dominated by creosote bush (Larrea tridentata).
R030XY001CA	**Occasionally Flooded, Hyperthermic, Diffuse Ephemeral Stream** R030XY001CA is found on adjacent small, occasionally flooded ephemeral drainageways. Creosote bush (Larrea tridentata) and Schott's dalea (Psorothamnus schottii) are dominant species.

R030XY092NV	**DESERT PATINA** This ecological site is found on adjacent fan remnants covered with desert pavement. Sparse vegetation is dominated by creosote bush (Larrea tridentata).

Similar sites

R030XD008CA	**Hyperthermic Sandhill** R030XD008CA occurs on steeper sandsheets with slopes greater than 8 percent.
R030XD015CA	**Hyper-Arid Fans** R030XD015CA occurs on alluvial fans and fan aprons. Soils do not have an eolian influence. Creosote bush (Larrea tridentata) and burrobush (Ambrosia dumosa) are dominant.
R030XD014CA	**Hyperthermic Sandy Plains** R030XD014CA is found on less stable sandsheets with none to few rock fragments on the surface. It is a more productive site, and big galleta (Pleuraphis rigida) is dominant.
R030XD006CA	**Abandoned Fan** R030XD006CA is found on fan aprons and alluvial fans. Soils do not have an eolian influence. Creosote bush (Larrea tridentata) is dominant, and big galleta (Pleuraphis rigida) is not an important species.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Larrea tridentata* (2) *Psorothamnus emoryi*
Herbaceous	(1) *Plantago ovata* (2) *Chaenactis fremontii*

Physiographic features

This ecological site is found on sand sheets, dunes, and fan aprons overlain by eolian deposits at elevations ranging from 710 to 2460 feet and slopes of 0 to 8 percent. Runoff class is negligible to low.

Table 2. Representative physiographic features

Landforms	(1) Sand sheet (2) Dune
Flooding frequency	None
Ponding frequency	None
Elevation	216–750 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; numbers in square brackets represent relative weights):

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)	0 days
Precipitation total (average)	127 mm

Influencing water features

Soil features

The dominant soils associated with this ecological site are very deep sands that formed from eolian deposits derived from granitoid and igneous parent material. Less commonly, this site is associated with soils that formed in alluvium from igneous and granitoid sources that are overlain with a sandy surface. Surface textures are fine sand with fine sand subsurface textures. Gravel sized (< 3 inch diameter) surface rock fragments range from 0 to 60 percent, with larger fragments typically absent. Subsurface gravel and larger sized fragments by volume range from 0 to 35 percent (for a depth of 0 to 59 inches).

The associated soil series that are 15 percent or greater of any one map unit are: Dalelake (mixed, hyperthermic Typic Torripsamments); and Sheephole (sandy, mixed, hyperthermic Typic Torriorthents). Other soils on which this site is found are typically 5 percent or less of any map unit when associated with this site. They are: Pintobasin (mixed, hyperthermic Typic Torripsamments); and Rubylee (coarse-loamy, mixed, superactive, hyperthermic Typic Haplargids).

The Dalelake soils, which this ecological site is predominately associated with, occur on dunes and sand sheets. . These soils typically have few rock fragments within the soil horizons. The Sheephole soils occur on the sand sheets and fan aprons, but include an alluvial influenced soil horizon with 25 percent gravel-sized and 35 percent larger fragments in the lower part of the soil profile. Pintobasin soils formed in alluvium from dominantly granitoid sources, and are on fan aprons. The Rubylee soils formed in alluvium from igneous rocks and are on fan remnants. The Rubylee soils have an argillic horizon at shallow depths, and 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:

1530;Dalelake fine sand, 0 to 4 percent slopes;Dalelake;fine sand;85
1531;Dalelake-Pintobasin complex, 0 to 4 percent slopes;Dalelake;;60
2718;Dalelake-Sheephole complex, 2 to 4 percent slopes;Dalelake;;55; Sheephole;gravelly surface;45
2060;Joetree-Dalelake-Pintobasin complex, 0 to 2 percent slopes;Dalelake;;30
2718;Dalelake-Sheephole complex, 2 to 4 percent slopes; 1550;Buzzardsprings-Coxpin-Dalelake complex, 2 to 8 percent slopes;Dalelake;;20
1517;Pintobasin-Dalelake complex, 2 to 8 percent slopes;Dalelake;;25
2065;Dalelake-Aquapeak-Coxpin association, 2 to 8 percent slopes;Dalelake;;30
2715;Dalelake-Sheephole-Pintobasin complex, 2 to 8 percent slopes;Dalelake;;35
2716;Dalelake complex, 4 to 30 percent slopes;Dalelake;;20
1516;Pintobasin fine sandy loam, 0 to 2 percent slopes;Dalelake;;3
1522;Pintobasin sand, 1 to 3 percent slopes, rarely flooded;Dalelake;;3
1524;Pintobasin sand, 0 to 2 percent slopes;Dalelake;;2
1526;Pintobasin-Joetree-Joetree complex, 2 to 8 percent slopes;Dalelake;;1
2717;Dalelake-Rock outcrop-Buzzardsprings association, 4 to 30 percent slopes;Dalelake;moderately sloping;5
2825;Rock outcrop-Supplymine-Bolero-Ironage complex, 15 to 60 percent slopes;Dalelake;;5

1510;Carrizo very gravelly sandy loam, 2 to 4 percent slopes;Pintobasin;overblown;4
2100;Perurose-Coxpin-Pintobasin association, 2 to 15 percent slopes;Rubylee;sandy surface;2

Table 4. Representative soil features

Parent material	(1) Eolian deposits–granite
Surface texture	(1) Fine sand
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Rapid
Soil depth	150 cm
Surface fragment cover <=3"	0–60%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	4.32–7.87 cm
Calcium carbonate equivalent (0-101.6cm)	0–1%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–35%
Subsurface fragment volume >3" (Depth not specified)	0–35%

Ecological dynamics

Abiotic Factors

The abiotic factors driving this site are stabilized eolian environments, fine sandy soil textures and hyperthermic soil temperatures. This ecological site occurs on stabilized sandsheets. Sandsheets are extensive, low relief accumulations of eolian sand deposits (Laity 2008). Stable, or dormant sandsheets are those where perennial vegetation cover is well-developed, and current rates of sand movement and deposition are low or absent, but may become active as a result of minor climate change or disturbance (Lancaster 1994). The stability of these landforms means that factors such as burial or abrasion by blowing sand does not restrict vegetation to psammophiles (plants restricted to active eolian environments).

The plant community is strongly dominated by creosote bush, a long-lived, deep-rooted evergreen shrub dominant across vast areas of the North American warm deserts. Dyebush and burrobush are important secondary shrubs, but are only sparsely present. Big galleta (*Pleuraphis rigida*) may also be sparsely present. Native and non-native annual forbs and grasses are abundant in this site with average or above average precipitation, and are absent with low precipitation. Creosote bush maintains its evergreen status by using water held in deep soil layers. The availability of soil water is the critical resource shaping plant communities in arid environments (Noy-Meir 1973, McAuliffe 1994, Martre et al. 2002, Hamerlynk and McAuliffe 2008, Austin et al. 2004). In arid regions, sand textured soils have greater water availability because water quickly infiltrates through sand to depths where it is not lost to evaporation, and because sandy surfaces form a physical crust that further reduces evaporation (Noy-Meir 1973, Hamerlynk et al. 2002). Thus, greater amounts of water are held for a longer duration in deep, sandy soils where there the development of restrictive soil horizons (such as argillic or petrocalcic horizons) has not occurred (Hamerlynk et al. 2002, Hamerlynk and McAuliffe 2008). Shallow-rooted, drought-deciduous shrubs like burrobush are prone to drought-induced mortality in these habitats because of the short duration that water is available at shallow depths (Hamerlynk et al. 2002, Hamerlynk and McAuliffe 2008).

Dyebush is a small, drought-deciduous shrub that reaches highest abundance on sandsheets, dunes and washes, and has a largely Sonoran Desert distribution. Leaves and stems are densely tomentose, which is an adaptation to the extreme heat of open sandy soil surfaces. This ecological site is at the arid extent of the range of dyebush; consequently, it has relatively low density and low production in this site. Big galleta is a highly drought-tolerant C4 grass that occurs on a range of soil types, but is dominant only on sandy soils where soil moisture is most readily available (McAuliffe 1994, Austin et al. 2004). Big galleta colonizes and stabilizes semi-stabilized eolian habitats with rhizomatous growth (Matthews 2000). The stability of the eolian surface of this ecological site, with the aridity of the hyperthermic soil temperatures, limits the abundance of big galleta.

Annual species are an important component of the vegetation community of this ecological site, comprising almost 50 percent of biomass production during years of average or above average precipitation. Annual species, which can complete their life cycle during brief and intermittent periods of high moisture availability, then remain dormant until the next favorable period, are well-adapted to eolian environments.

Disturbance dynamics

Drought, invasion by nonnative species, and wind erosion are the primary disturbance affecting this ecological site.

Drought is an important shaping force in desert plant communities (Webb et al. 2003, Bowers 2005, Hereford et al. 2006, Miriti et al. 2007, Hamerlynk and McAuliffe 2008). The effects of drought may be particularly severe in deep sandy soils with little horizon development. High availability of soil moisture during normal to high precipitation conditions can lead to high growth rates and large individuals whose size cannot be sustained when water is no longer available (Hamerlynk and McAuliffe 2008). Short-lived shrubs and perennial grasses demonstrate the highest rates of drought-induced 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, 1974, 1976). Long-lived species are more likely to exhibit branch-pruning with limited recruitment during drought (Hereford et al. 2006, Miriti et al. 2007).

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). Asian mustard and Russian thistle (*Salsola tragus*) are threats in eolian habiats, with Russian thistle abundant on disturbed areas or active sand, and Asian mustard most abundant on stabilized sand (Barrows et al. 2009). Like native annuals, nonnative annual cover and production is directly related to winter precipitation (Beatley 1969, Brooks and Berry 2006, Barrows et al. 2009). In this ecological site, Mediterranean grass and Asian mustard invasion may be severe.

Wind erosion and deposition is the dominant driver of eolian dynamics. Wind strength, precipitation, vegetation cover and disturbance influence the degree to which sand depositional surfaces are active or stable (Cooke et al. 1993, Lancaster 1994). Severe drought may cause a stabilized sand surface to become active, due to losses in vegetation cover, and the increased erodibility of dry soils (Cooke et al. 1993, Lancaster 1994). Similarly, other disturbances that cause a decline in vegetation cover, such as off-road vehicle use, grazing, and fire can reactivate a stable sand surface.

State and transition model

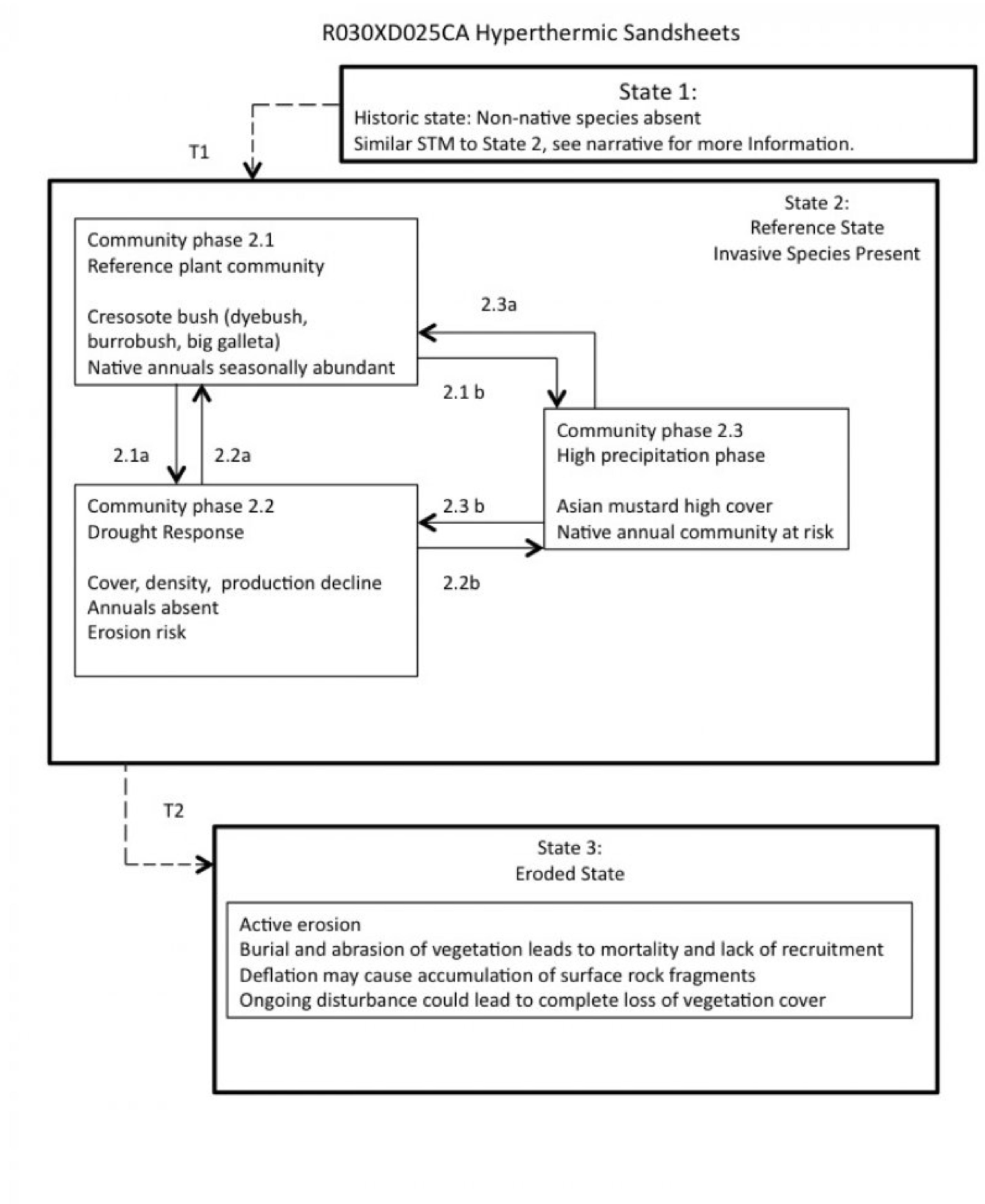

Figure 4. R030XD025CA

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 was the natural disturbance influencing this ecological site. 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 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 characterized by sparse, widely spaced shrub cover that is strongly dominated by creosote bush. Dyebush, burrobush, and big galleta are generally present at low levels, but following periods of drought, these species may be absent. During years of average to above average precipitation, winter annuals are abundant in intershrub spaces; common species include desert Indianwheat (*Plantago ovata*), pincushion flower (*Chaenactis fremontii*), Panamint cryptantha (*Cryptantha angustifolia*), bristly fiddleneck (*Amsinckia tessellata*), and birdcage evening primrose (*Oenothera deltoides*). The non-native annuals Mediterranean grass and Asian mustard may also be abundant with average precipitation, but if precipitation is not extremely high, do not dominate the annual plant community component.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Forb	–	74	146
Shrub/Vine	45	67	90
Grass/Grasslike	–	17	67
Total	**45**	**158**	**303**

Community 2.2
Drought response

Figure 7. Community Phase 2.2

This community phase is characterized by declines in cover and production due to branch-pruning and some low level mortality of creosote bush, branch-pruning and dormancy of dyebush, mortality of burrobush and big galleta, and lack of emergence of annual species. This is an at-risk phase, as the increase in bare ground that occurs during drought increases the susceptibility of this site to wind erosion. Thus, any additional disturbance threatens to transition this community phase to an eroded state, where significant loss of ecological function has occurred.

Community 2.3
High precipitation phase

Figure 8. Community Phase 2.3

This community phase is characterized by dominance of Asian mustard in the annual plant component. Asian mustard was introduced to the Coachella Valley area of California in the 1920s as a contaminant of date palm stock. It has since spread throughout the Mojave and Sonoran Deserts, and is abundant in sandy and disturbed habitats (Minnich and Sanders 2000). It becomes dominant on stabilized sandsheets during years of above average precipitation, during which time is has detrimental affects on the abundance and fecundity of native annuals (Barrows et al. 2009). Asian mustard achieves dominance by its rapid response to precipitation, allowing it to dominate resources before native species become established (Barrows et al. 2009). However, the species is absent during years of low precipitation, and the intermittent drought characteristic of the desert may help to prevent dominance of Asian mustard in this ecological site.

Pathway 2.1a
Community 2.1 to 2.2

Reference plant community **Drought response**

This pathway occurs with prolonged or severe drought.

Pathway 2.1b
Community 2.1 to 2.3

Reference plant community **High precipitation phase**

This pathway may occur with higher than average mean annual precipitation.

Pathway 2.2a
Community 2.2 to 2.1

Drought response **Reference plant community**

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

Pathway 2.2b
Community 2.2 to 2.3

Drought response **High precipitation phase**

This pathway may occur with higher than average mean annual precipitation.

Pathway 2.3a
Community 2.3 to 2.1

High precipitation phase **Reference plant community**

This pathway occurs with a return to average climatic conditions.

Pathway 2.3b
Community 2.3 to 2.2

High precipitation phase

Drought response

This pathway occurs with prolonged or severe drought.

State 3
Eroded State

This State is characterized by the loss of sandsheet stability, with increased rates of wind erosion leading to deflation (the removal of fine soil particles by wind). This state has been significantly altered from the natural range of variability found in States 1 and 2. Increased wind erosion decreases the suitability of this ecological site for vegetation, killing established or recruiting individuals by abrasion and burial (Okin et al. 2001). Ongoing disturbance could result in complete loss of vegetation cover. Sand deflation could result in the accumulation of surface rock fragments, dramatically altering the soil and hydrological characteristics of this ecological site, and decreasing site suitability for annual species and big galleta. This is more of a risk with soils that have an alluvial influence such as the Sheephole series. We do not have data for this State, and further research is necessary to describe the community phases and successional pathways that may exist within the state.

Transition 1
State 1 to 2

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

Transition 2
State 2 to 3

This transition occurs with a loss of vegetation cover, in combination with drought and/or extreme wind conditions and/or anthropogenic disturbance such as off-road vehicle use that increases wind erosion beyond the threshold that will sustain the reference plant community. It is difficult to pinpoint the precise combination of these factors that will trigger this conversion (Cooke et al. 1993).

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**			45–90	
	creosote bush	LATR2	*Larrea tridentata*	39–101	2–11
	dyebush	PSEM	*Psorothamnus emoryi*	0–34	0–2
	burrobush	AMDU2	*Ambrosia dumosa*	0–17	0–1
Grass/Grasslike					
2	**Perennial grasses**			0–11	
	big galleta	PLRI3	*Pleuraphis rigida*	0–11	0–1
4	**Non-native annual grasses**			0–67	
	common Mediterranean grass	SCBA	*Schismus barbatus*	0–67	0–11
Forb					
3	**Native forbs**			0–146	
	desert Indianwheat	PLOV	*Plantago ovata*	0–78	0–20
	pincushion flower	CHFR	*Chaenactis fremontii*	0–45	0–2
	Panamint cryptantha	CRAN4	*Cryptantha angustifolia*	0–34	0–2
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–6	0–1
	birdcage evening primrose	OEDE2	*Oenothera deltoides*	0–1	0–1
5	**Non-native annual forbs**			0–58	
	Asian mustard	BRTO	*Brassica tournefortii*	0–58	0–11

Animal community

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

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

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

Western diamondback snake (Crotalus atrox)
Mojave Desert sidewinder (Crotalus cerastes cerastes)
Colorado Desert sidewinder (Crotalus cerastes laterorepens)

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

Recreational uses

This site may be used for hiking, wildflower viewing, and aesthetic enjoyment.

Other products

Creosote bush is an important medicinal plant for Native Americans. It has a very wide range of uses from treatment for bowl complaints, 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.

Dyebush branches are steeped in water to make a yellow-brown dye for coloring deerskins (Saunders 1976).

Other information

Dyebush is host to the unusual stem parasite Thurber's stemsucker (Pilostyles thurberi).

Inventory data references

Community Phase 2.1:
HELO2-LL (Type location)
E1-G
EOVP-06
F1-F
PFPR-2

VIPA-13

Community Phase 2.3:
F1-E

Type locality

Location 1: San Bernardino County, CA	
UTM zone	N
UTM northing	641073
UTM easting	3760128
General legal description	The type location is located within the Pinto Basin in Joshua Tree National Park, approximately 5.5 miles from the intersection of the MWD Aqueduct Road and the Pinto Wells Road (closed).

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Contributors

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Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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:**

17. **Perennial plant reproductive capability:**