Ecological site R030XB148CA
Sandy Plain

Last updated: 10/21/2024
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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.

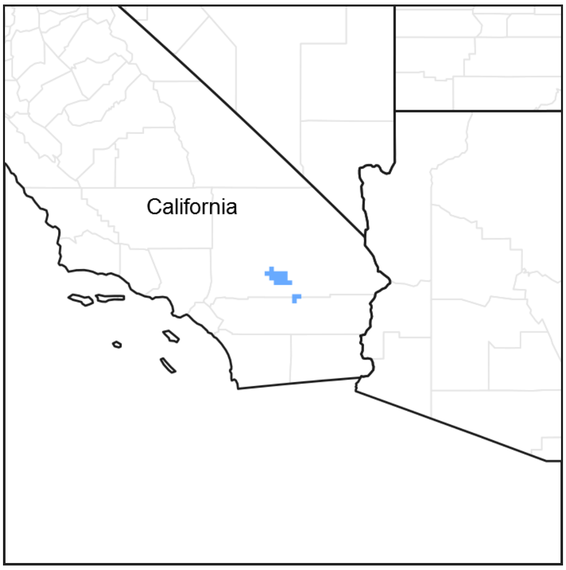


Figure 1. Mapped extent

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.

Arid Eastern Mojave Land Resource Unit (XB)

LRU notes

The Mojave Desert is currently divided into 4 Land Resource Units (LRUs). This ecological site is within the Arid Eastern Mojave LRU where precipitation is bi-modal, occurring during the winter months and summer months. The Arid Eastern Mojave LRU is designated by the 'XB' symbol within the ecological site ID. This LRU is found across the eastern half of California, much of the mid-elevations of Nevada, the southernmost portions of western Utah, and the mid-elevations of northwestern Arizona. This LRU is essentially equivalent to the Eastern Mojave Basins and Eastern Mojave Low Ranges and Arid Footslopes of EPA Level IV Ecoregions

Elevations range from 1650 to 4000 feet and precipitation is between 4 to 8 inches per year. This LRU is distinguished from the Arid Western Mojave (XA) by the summer precipitation, falling between July and September, which tends to support more warm season plant species. The 'XB' LRU is generally east of the Mojave River and the 117 W meridian (Hereford et. al 2004). Vegetation includes creosote bush, burrobush, Nevada jointfir, ratany, Mojave yucca, Joshua tree, cacti, big galleta grass and several other warm season grasses. At the upper portions of the LRU, plant production and diversity are greater and blackbrush is a common dominant shrub.

Classification relationships

The vegetation classification of this ecological site includes the Pleuraphis rigida Herbaceous Alliance (Sawyer et al. 2009), and includes the Pleuraphis rigida/Larrea tridentata Association as well as the Big Galleta Desert Grassland Alliance and Burrobush / Big Galleta Dwarf-shrubland Association (USNVC 2017) .

Ecological site concept

This ecological site occurs on stabilized sand sheets, dunes, sand sheets over fan remnants, fan aprons over fan remnants and fand skirts over fan remnants between 1650 to 3600 feet elevation. Slopes range from 0 to 15 percent but can be steeper when sand sheets are on backslopes or when dunes develop. Soils are highly dynamic and tend to be very deep fine sands that formed from eolian deposits and exhibit very little soil development. Soil surface horizons typically have a single grain structure but the processes of wind and water can cover other soils as well as remove this cover exposing soil surfaces which were once buried. This ecological site is often downwind of a playa but far enough away that salts do not influence on this site. These areas can also be the sheetflow zone of an ephemeral stream where water flow is usually slow enough to cause more sediment deposition than removal.

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 the following ecological sites: R030XA063NV, R030XA069NV, R030XB033NV, R030XB036NV, R030XB122NV, R030XB150CA, R030XB004NV, R030XB034NV, R030XB096NV.

Associated sites

R030XB005NV	**Arid Active Alluvial Fans** This ecological site occurs on adjacent fan aprons. Creosote bush (Larrea tridentata) and burrobush (Ambrosia dumosa) are co-dominant.

R030XB137CA	**Granitic Loam** This ecological site occurs on adjacent sand sheets over fan aprons. Creosote bush (Larrea tridentata), burrobush (Ambrosia dumosa), and big galleta (Pleuraphis rigida) are co-dominant.
R030XB150CA	**Sandhill 3-5" P.Z.** This ecological site occurs on adjacent sand hills. Big galleta (Pleuraphis rigida) and creosote bush (Larrea tridentata) are dominant.

Similar sites

R030XB137CA	**Granitic Loam** This ecological site occurs on more stable landforms. It is less productive, and burrobush is a dominant shrub.
R030XB039NV	**LIMY FAN 5-7 P.Z.** This ecological site occurs on inset fans, and landforms receiving additional moisture.
R030XD014CA	**Hyperthermic Sandy Plains** This ecological site occurs on soils with a hyerthermic soil temperature regime. Indian rice grass is not present.
R030XB150CA	**Sandhill 3-5" P.Z.** This ecological site occurs on steeper slopes, and is less productive.
R030XB122NV	**LIMY SAND 3-5 P.Z.** Essentially the same ecological site concept as R030XB148CA.
R030XB004NV	**SANDY 5-7 P.Z.** Essentially the same ecological site concept as R030XB148CA.
R030XB034NV	**SANDY PLAIN 5-7 P.Z.** Essentially the same ecological site concept as R030XB148CA.
R030XB096NV	**GRAVELLY SAND 3-5 P.Z.** Essentially the same ecological site concept as R030XB148CA.
R030XB221AZ	**Sandy Upland 6-9" p.z.** Essentially the same ecological site concept as R030XB148CA.
R030XA069NV	**LIMY SAND 5-7 P.Z.** Essentially the same ecological site concept as R030XB148CA.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Pleuraphis rigida*

Physiographic features

This site occurs on sand sheets, dunes, sand sheets on fan remnants and fan aprons on fan remnants at elevations of 1650 to 3600 feet, and slopes ranging from 0 to 15 percent.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont > Sand sheet (2) Fan piedmont > Fan remnant (3) Fan piedmont > Fan apron (4) Basin > Dune
Flooding frequency	None
Ponding frequency	None
Elevation	503–1,097 m
Slope	0–15%

Aspect	Aspect is not a significant factor

Climatic features

The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 100 degrees F). The average annual precipitation ranges from 4 to 8 inches with most falling as rain from November to March. Approximately 45% of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 63 to 69 degrees F. The average frost-free period is 240 to 340 days. Freeze-free period was not entered and defaults to zero.

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 dominant soils associated with this ecological site are very deep sandy or loamy soils formed primary by eolian deposits but can also be formed by alluvial deposition especially in areas where eolian and alluvial processes are at work moving material back and forth. Surface textures range from sandy loams to sand with subsurface textures also ranging from sandy loams to sand. Surface gravels (< 3 mm in diameter) typically range from 0 to 10 percent but cover can be up to 40 percent, especially in blowout areas. Subsurface gravels by volume (for a depth of 0 to 59 inches) typically range from 0 to 35 percent. Buried fan remnants can have up to 60 percent subsurface gravels with few larger fragments present. Soils are well to somewhat excessively drained with moderately rapid to rapid permeability.

Table 4. Representative soil features

Parent material	(1) Eolian sands (2) Alluvium–sedimentary rock (3) Alluvium–granite
Surface texture	(1) Sandy loam (2) Fine sand (3) Sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	152 cm
Surface fragment cover <=3"	0–10%
Available water capacity (0-101.6cm)	5.84–9.65 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.2–9

Subsurface fragment volume <=3" (Depth not specified)	0–12%

Ecological dynamics

Abiotic Factors

This ecological site occurs on stabilized sandsheets on soils with a thermic soil temperature regime. 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 perennial grasses. Big galleta is the dominant species; big gallleta 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), and dominance by big galleta on these habitats is an indicator of eolian stability. Big galleta exhibits rapid growth and high productivity in response to temporal high moisture availability in these deep sands (Austin et al. 2004). Indian rice grass is a cool season perennial bunchgrass grass widely distributed throughout the western United States, but also reaches highest abundance on sandy soils (Tirmenstein 1999, Baldwin et al. 2002). It occurs in the thermic soil temperature regime of this ecological site, and disappears when the soil temperature regime transitions to hyperthermic. 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, in desert regions, where the availability of soil water is the critical resource shaping plant communities in arid environments, productivity is highest on sandy soils (Noy-Meir 1973, McAuliffe 1994, Martre et al. 2002, Hamerlynk and McAuliffe 2002, Austin et al. 2004).

Creosote bush is a long-lived, deep-rooted evergreen shrub dominant across vast areas of the North American warm deserts. Creosote bush maintains its evergreen status by using water held in deep soil layers, and once established in this ecological site, individuals are large and productive. Creosote remains a secondary species in this site however, because of soil moisture restrictions and seedling sand abrasion during the establishment phase. Creosote bush establishes in response to warm season moisture; given limited warm season rain in this ecological site, the rapid infiltration of water, rapidly drying soil surfaces during the warm season, and increased erosion and abrasion during the summer, opportunities for successful establishment of creosote seedlings are rare.

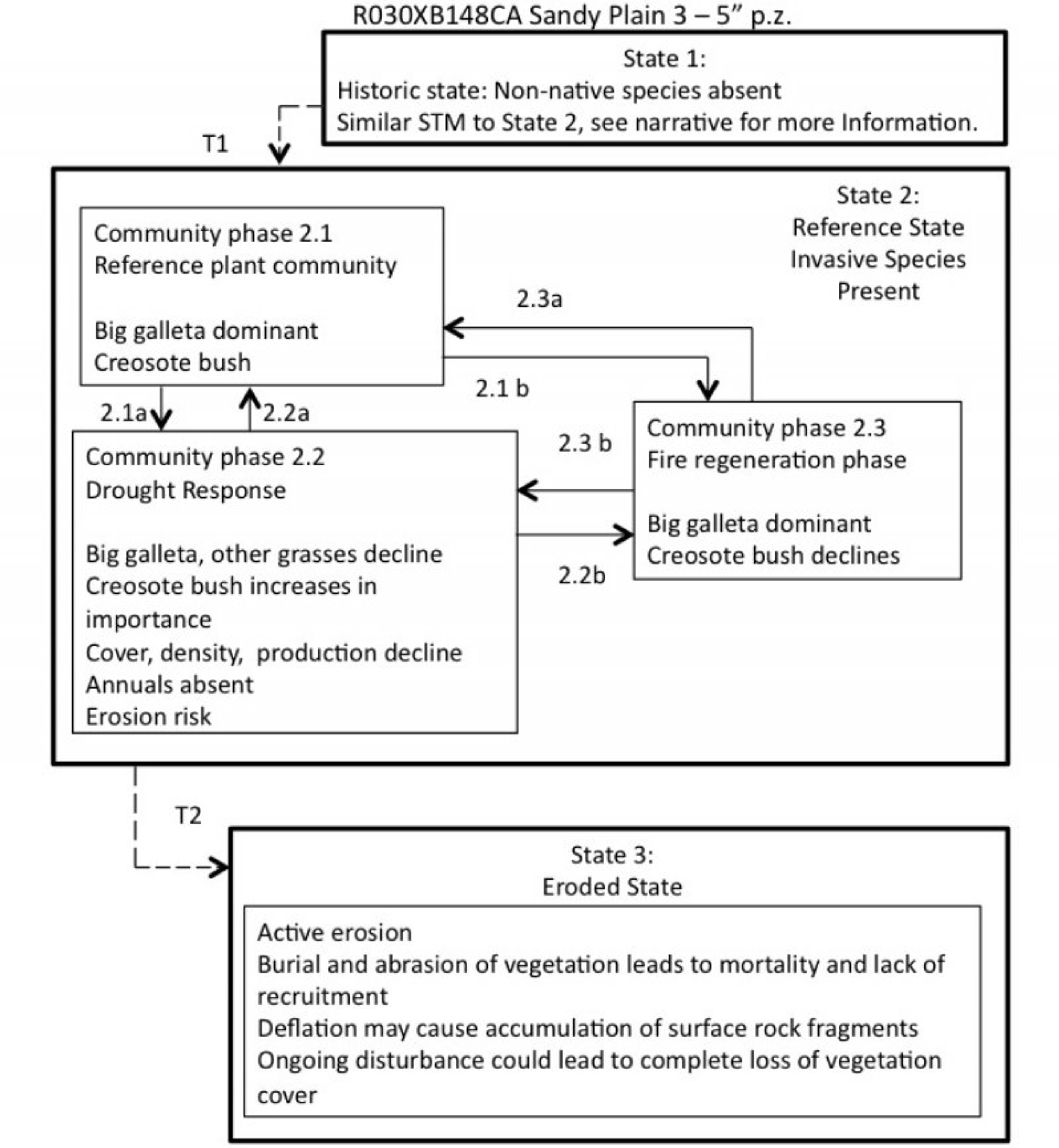
Disturbance dynamics
Drought, invasion by nonnative species, and wind erosion are the primary disturbance affecting this ecological site.

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). Asian mustard and prickly Russian thistle (*Salsola tragus*) are threats in eolian habitats, with prickly 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, Asian mustard and prickly Russian thistle invasion may be severe.

Wind erosion and deposition is the 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, 1997, Musick 1999). 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, Breed and Reheis 1999, Musick 1999). 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



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 red brome, 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 3. Community Phase 2.1

The reference plant community is characterized by an open two-tiered canopy less than 2 meters tall with creosote bush in the upper tier over a dense stand of big galleta and Indian ricegrass. Sand dropseed (*Sporobolus cryptandrus*) may also be present at low levels. Secondary shrubs may include burrobush (*Ambrosia dumosa*), white ratany (*Krameria grayi*), California ephedra (*Ephedra californica*), Wiggins’ cholla (*Cylindropuntia echinocarpa*), Plummer’s baccharis (*Baccharis plummerae*), and rayless goldenhead (*Acamptopappus sphaerocephalus*). The subshrubs California croton (*Croton californicus*) and desert globemallow (*Sphaeralcea ambigua*) are typically present. A spectacular display of annual forbs occurs during years of above-average precipitation. Common species typically include Esteve’s pincushion (Chaenactis steviodes), smooth desertdandelion (*Malacothrix glabrata*), bristly fiddleneck (*Amsinckia tessellata*), and birdcage evening primrose (*Oenothera deltoides*). Non native species that may be present include Asian mustard, prickly Russian thistle, redstem stork's bill, and Mediterranean grass.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	549	785	1098
Forb	–	168	235
Shrub/Vine	118	168	235
Total	**667**	**1121**	**1568**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	2-3%
Grass/grasslike foliar cover	7-14%
Forb foliar cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Figure 5. Plant community growth curve (percent production by month). CA3015, Creosote bush XB. Growth starts in early spring with flowering and seed set occurring by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

Figure 6. Plant community growth curve (percent production by month). CA3022, Indian ricegrass. Growth begins in late winter, flowering and fruiting finished by the hot summer months. Early fall rains can trigger a flush of new growth..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	30	35	5	0	0	5	5	0	0

Figure 7. Plant community growth curve (percent production by month). CA3024, Big galleta. Some green up in spring; dormant May and June; most growth occurs after summer rains..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	10	0	0	15	40	10	0	0	0

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 longer-lived species, mortality of shorter-lived perennials, and lack of emergence of annual forbs and grasses. Big galleta and Indian ricegrass are likely to decline due to drought-induced mortality, while creosote bush remains stable. Big galleta may suffer very high rates of drought-induced mortality (Webb et al. 2003; Hereford et al. 2006); however, big galleta can respond very quickly to brief, intermittent rain during rare summer monsoonal events, which can buffer big galleta populations in the absence of more predictable winter rains. 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, Griffeths et al. 2006). Nevertheless, during severe drought, creosote bush mortality may occur. This is an at-risk community. Reduced cover in this eolian landscape increases the risk of erosion, which can trigger a transition to State 3.

Community 2.3
Fire regeneration community

This community phase is characterized by increased dominance by big galleta and Indian rice grass, severe declines in creosote bush, and an increase in shrub diversity. Fire damage to big galleta varies depending on whether plants are dormant when burned; if plants are dry, damage may be severe because the live center may be burned out (Matthews 2000). However big galleta often increases after fire (Minnich 2003). Indian rice grass is highly fire tolerant, and also increases after fire (Tirmenstein 1999). 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). 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).

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.

Pathway 2.3a
Community 2.3 to 2.1

This pathway occurs with time without fire, adequate precipitation, and no other significant disturbances (e.g. grazing).

State 3
Eroded State

This State is characterized by the loss of sandsheet stability, with increased rates of wind erosion leading to deflation. 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. 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 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).

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 grazing or 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 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Perennial Grasses**			549–1098	
	big galleta	PLRI3	*Pleuraphis rigida*	560–729	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	112–168	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	22–56	–
4	**Native Annual Grasses**			0–56	
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–56	–
5	**Non-native annual grasses**			0–123	
	common Mediterranean grass	SCBA	*Schismus barbatus*	0–123	–
Shrub/Vine					
2	**Native shrubs**			118–235	
	Plummer's baccharis	BAPL	*Baccharis plummerae*	0–224	–
	creosote bush	LATR2	*Larrea tridentata*	56–168	–
	rayless goldenhead	ACSP	*Acamptopappus sphaerocephalus*	22–112	–
	burrobush	AMDU2	*Ambrosia dumosa*	22–112	–
	Wiggins' cholla	CYEC3	*Cylindropuntia echinocarpa*	22–112	–
	California jointfir	EPCA2	*Ephedra californica*	22–112	–
	white ratany	KRGR	*Krameria grayi*	22–112	–
Forb					
3	**Native Forbs**			0–235	
	cryptantha	CRYPT	*Cryptantha*	0–224	–
	milkvetch	ASTRA	*Astragalus*	0–224	–
	browneyes	CACLC3	*Camissonia claviformis ssp. claviformis*	0–224	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–224	–
	birdcage evening primrose	OEDE2	*Oenothera deltoides*	0–224	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–191	–
	California croton	CRCA5	*Croton californicus*	22–90	–
	smooth desertdandelion	MAGL3	*Malacothrix glabrata*	0–67	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	22–56	–
6	**Non-native annual forbs**			0–224	
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0–112	–
	prickly Russian thistle	SATR12	*Salsola tragus*	0–112	–

Animal community

Small mammals occurring on this site include round-tailed ground squirrels, little pocket mice, and Merriam's and desert kangaroo rats. Black-tailed jackrabbits and coyotes are also common.

Reptiles occurring on this site include several species of lizards including Mojave fringe-toed lizards, long-tailed brush lizards, side-blotched lizards, and western whiptails. Common snakes include western shovel-nosed snakes, glossy snakes and sidewinders.

Birds common to this site include horned larks, common ravens, loggerhead shrikes, LeConte's thrashers and several species of sparrows. Raptors observed on this site include northern harriers, sharp-shinned hawks and American kestrels.

LIVESTOCK GRAZING:
Big galleta and Indian ricegrass are highly palatable to cattle and horses. Burrobush is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. Creosote bush is unpalatable to livestock. Domestic sheep use this shrub for shade. During favorable years, annual forbs and grasses provide abundant forage.

Hydrological functions

Recreational uses

This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

Other information

Military Operations - Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and soil structure can result in soil compaction reduced infiltration rates, accelerated erosion, severe soil blowing and barren areas.

Inventory data references

Sampling technique

_1_ NV-ECS-1
_2_ SCS-Range 417
_3_ Other

CA794:
MVAL-07

Type locality

Location 1: San Bernardino County, CA	
Township/Range/Section	T3N R6E S13
UTM zone	N
UTM northing	3800842
UTM easting	564131
General legal description	SE1/4 Sec. 13 T3N R6E Approximately 15 miles north of Joshua Tree, CA Goat Mountain Quadrangle UTM 11S 0564131e 3800842n (Datum=NAS-C) San Bernardino Co., CA

Other references

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Approval

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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	10/03/2018
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	

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):**

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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):**

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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:**
