USDA Natural Resources Conservation Service

Ecological site R030XB221CA
Loamy Fan Remnants And Pediments

Last updated: 10/21/2024
Accessed: 07/11/2025

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.

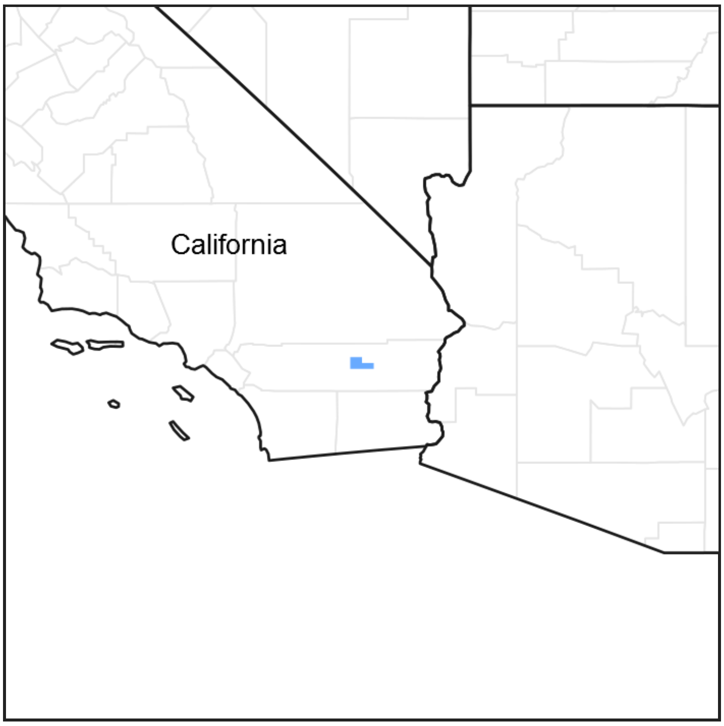

Figure 1. Mapped extent

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 LRU (designated by 'XB') 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. Elevations range from 1800 to 5000 feet and precipitation ranges from 4 to 9 inches per year, but is generally between 5-6 inches. This LRU is characterized primarily by the summer precipitation it receives, ranging from 18 – 35% but averages 25%. Summer precipitation falls between July and September in the form of rain, and winter precipitation falls starting in November and ends between February and March, also mostly in the form of rain; however it does receive between 0 and 3 inches of snow, with an average of 1 inch. The soil temperature regime is thermic and the soil moisture regime is typic-aridic. Vegetation includes creosote bush, burrobush, Nevada jointfir, ratany, Mojave yucca, Joshua tree, chollas, cactus, 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.

This ecological site is found on eroded fan remnants and dissected pediments at elevations of 2230 to 4040 feet. Soils have a warm thermic temperature regime, loamy textures and have a well-developed argillic horizon beginning within 1 to 8 inches of the soil surface that occurs over hard bedrock or a duripan. This site is located close to the MLRA30-31 (Mojave – Lower Colorado Desert) boundary.

Production Reference Value (RV) is 297 pounds per acre and ranges from 195 to 402 pounds per acre depending on annual precipitation. The reference plant community is co-dominated by blackbrush (Coleogyne ramosissima) and burrobush (Ambrosia dumosa), and secondary shrub diversity is high. This ecological site is found at relatively low elevations for blackbrush in the Mojave Desert. A well-developed argillic horizon significantly increases soil moisture holding capacity, which allows blackbrush to be a dominant species despite low elevations. The argillic horizon also enhances habitat for the shallow-rooted burrobush. The transitional climatic location and dissected topography enhances shrub diversity.

Data in the following sections is based on all components (major and minor) correlated with this ecological site.

Ecological site concept

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This is a group concept and provisional STM that also covers R030XB075NV.

Associated sites

R030XB218CA	**Moderately Deep To Very Deep Loamy Fan Remnants** This ecological site is found on adjacent fan aprons on fan remnants. Burrobush (Ambrosia dumosa) and creosote bush (Larrea tridentata) dominate.
R030XB225CA	**Warm Sloping Pediments** This ecological site occurs on adjacent shallow pediments. Burrobush (Ambrosia dumosa) and Hall's shrubby spurge (Tetracoccus hallii) dominate.
R030XB220CA	**Very Shallow Duripan Fan Remnants** This ecological site is found on adjacent fan remnants with very shallow soils to a duripan. Sparse vegetation is dominated by burrobush (Ambrosia dumosa) and lotebush (Ziziphus obtusifolia).

Similar sites

R030XB220CA	**Very Shallow Duripan Fan Remnants** This ecological site occurs on fan remnants with shallow soils to a duripan. Production is lower, blackbrush (Coleogyne ramosissima) is not an important species and burrobush (Ambrosia dumosa) and lotebush (Ziziphus obtusifolia) dominate.

R030XB166CA	**Dissected Pediment, Cool** This ecological site is found on pediments at higher elevations. California juniper (Juniperus californica) is an important species and burrobush (Ambrosia dumosa) is trace if present.
R030XB189CA	**Shallow Cool Hills** This ecological site is found on pediments at higher elevations and is co-dominated by creosote bush (Larrea tridentata).

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima* (2) *Ambrosia dumosa*
Herbaceous	Not specified

Physiographic features

This ecological site occurs on pediments and fan remnants at elevations of 2230 to 4040 feet. Slopes range from 2 to 30 percent. Runoff class is low to medium.

Table 2. Representative physiographic features

Landforms	(1) Pediment (2) Fan remnant
Flooding frequency	None
Ponding frequency	None
Elevation	2,230–4,040 ft
Slope	2–30%
Aspect	Aspect is not a significant factor

Climatic features

The climate on this site is characterized by cool, somewhat moist winters and hot, somewhat moist summers, with approximately 60 percent of precipitation falling as rain between November and March, and approximately 30 percent falling as rain between July and October (slightly higher than the average for the XB LRU). Summer precipitation falls as heavy monsoonal events, while winter precipitation is spread out over a longer time period. The average annual precipitation ranges from 4 to 7 inches. Mean annual air temperature is 63 to 68 degrees F, and the frost free period ranges from 270 to 320 days per year.

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:

44405 Joshua Tree, California (Period of record = 1959 to 2011) [1]

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

49099, Twentynine Palms, California (Period of record = 1935 – 2011) [1]

The data from multiple weather were combined to most accurately reflect the climatic conditions of this ecological site. The Lost Horse and Joshua Tree weather stations have colder temperatures and less summer precipitation than this ecological site. The Twentynine Palms weather station has hotter temperatures and less total precipitation than this ecological site.

Table 3. Representative climatic features

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

Influencing water features

Soil features

The soils associated with this ecological site are shallow to deep, and formed in residuum derived from granitoid, or in alluvium derived from granitoid. Surface textures are gravelly fine sandy loam and sandy loam with loamy subsurface textures. These soils have an argillic horizon beginning at 0.5 to 10 inches below the soil surface. For gravel-sized rock fragments (less than 3 inches in diameter), the percent surface cover range from 15 to 47 percent, and larger fragments are 3 to 7 percent. Subsurface volume of gravel-sized rock fragments (for a depth of 0 to 59 inches) is 5 to 30 percent, and larger rock fragments are 0 to 15 percent.

The soils that are associated with this ecological site are: Grinder (loamy, mixed, superactive, thermic Lithic Haplargids); Pinkcan (fine-loamy, mixed, superactive, thermic Duric Petroargids); and Popups (coarse-loamy, mixed, superactive, thermic Argidic Argidurids).

The Grinder soils occur on pediments, and are very shallow over unweathered, slightly fractured bedrock. An argillic horizon begins at 0.5 inches below the surface, and is 7.5 inches thick. The Pinkcan soils occur on fan remnants and are very deep. An argillic horizon begins at 0.5 to 2.5 inches, and is approximately 24 inches thick. A duripan begins at 40 to 59 inches. The Popups soils also occur on fan remnants, but are moderately deep to a duripan (20 to 40 inches to top of pan). An argillic horizon begins at 8 inches below the soil surface, and is approximately 26 inches thick.

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

4625;Grinder-Pinkcan complex, 4 to 30 percent slopes;Grinder;50; Pinkcan;cool;15
4260;Minhoyt-Corbilt association, 2 to 8 percent slopes;Popups;cool;9

Table 4. Representative soil features

Parent material	(1) Residuum–granite (2) Alluvium–granite
Surface texture	(1) Gravelly fine sandy loam (2) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Very slow to moderate
Soil depth	8–59 in
Surface fragment cover <=3"	15–47%
Surface fragment cover >3"	3–7%
Available water capacity (0-40in)	0.7–5.9 in
Calcium carbonate equivalent (0-40in)	0–1%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	5–30%
Subsurface fragment volume >3" (Depth not specified)	0–15%

Ecological dynamics

Abiotic factors

The abiotic factors driving this site are an eroded fan remnant and dissected pediment landscape, well developed soils with a thick argillic horizon, and warm thermic soil temperatures. This ecological site occurs on eroded fan remnants and dissected pediments at elevations of 2230 to 4040 feet. Soils have a warm thermic temperature regime, loamy textures and have a well-developed argillic horizon beginning within 10 inches of the soil surface that occurs over bedrock or a duripan. This significantly increases soil moisture holding capacity at near surface depths, which allows the shallow-rooted blackbrush to be a dominant species despite a temperature range near the upper limits for blackbrush. Blackbrush does not thrive in these warmer climates, and individuals are stunted and less competitive than in cooler climates, and site diversity is higher than is typical for a blackbrush-dominated community (Brooks and Matchett 2003, Pendleton and Meyer 2004). Since this site represents the warmest extension of the range of blackbrush, it is significant in terms of blackbrush adaptation and response to climate change. At lower elevations warmer temperatures reduce soil moisture so that it is too low to support blackbrush, and temperatures are not cold enough for the cold stratification that blackbrush seeds require for germination (Pendleton et al. 1995, Lei 1997, Pendleton and Meyer 2004). However, blackbrush demonstrates ecotypic variation with seed germination, with plants at warmer sites requiring less time for cold-stratification (Lei 1997, Pendleton and Meyer 2004). This trait has likely allowed blackbrush to expand its range to lower elevations in response to historic climate change (Cole and Webb 1985). Conservation of populations at climate extremes is thus important for facilitating blackbrush adaptation to modern day climate change.

Increased soil moisture holding capacity also enhances habitat for the shallow-rooted burrobush. Burrobush is a short-lived, shallow-rooted, drought-deciduous shrub that co-exists with creosote bush over vast areas of North American Deserts. Burrobush becomes more dominant on older soils with greater horizon development, because well-developed argillic, petrocalcic or duripans impede water infiltration, and increase the temporal availability of water at shallower depths.

This ecological site occurs at the southern edge of the Mojave Desert (the Mojave Desert – Lower Colorado Desert or MLRA30-31 boundary). Thus, it has a relatively warm climate with few frost days, and it represents a transition from a warm desert where winter precipitation is dominant, to a hot desert where summer precipitation is much more significant. Blackbrush is widespread in the Great Basin Desert and at mid-elevations in the Mojave Desert, and burrobush and is widespread species in the Mojave and Colorado Deserts. The transitional climatic position of this ecological site increases shrub diversity, with several species more typical of climates receiving more precipitation than the Mojave Desert are important species in this site, including Hall's shrubby spurge (*Tetracoccus hallii*), lotebush (*Ziziphus obtusifolia*), Parry's beargrass (*Nolina parryi*), and mouse's eye (*Bernardia myricifolia*). Cactus species, which are efficient at utilizing the increased summer moisture received by this ecological site, are prevalent. The topography of the dissected pediment and eroded fan remnant landforms provides contrasting and localized areas of soil erosion and deposition, and run-off and run-on, which further supports a diverse plant community.

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, Hereford et al. 2006). 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 grasses (red brome [*Bromus rubens*], cheatgrass [*Bromus tectorum*] and Mediterranean grass [Schismus species]) have become naturalized throughout the Mojave Desert over the past century (Rickard and Beatley 1965, D'Antonio and Vitousek 1992, Brooks 1999, Reid et al. 2006, Norton et al. 2007). Annual grass cover and production is directly related to winter precipitation (Beatley 1969, Brooks and Berry 2006, Hereford et al. 2006), and several years of drought may reduce the abundance of non-native annuals in the soil sandbank (Minnich 2003). Non-native annual cover and biomass is highest on sandy soils (Rao et al. 2010), because of the higher availability of water in these soils in arid regions (Noy-Meir 1973, Austin et al. 2004). Clay-rich or rocky soils are less susceptible to high biomass loads of non-native annuals, but density of these species may still be significant, which can negatively impact diversity and abundance of native annuals (DeFalco et al. 2003, Allen et al. 2009)

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). Because of the high densities typical of blackbrush-dominated communities, these communities are flammable even without the presence of fine fuels (Brooks et al. 2007). However, where blackbrush is co-dominant with other shrubs, such as in this ecological site, densities are typically lower, which reduces flammability unless fine fuels are present in intershrub spaces.

State and transition model

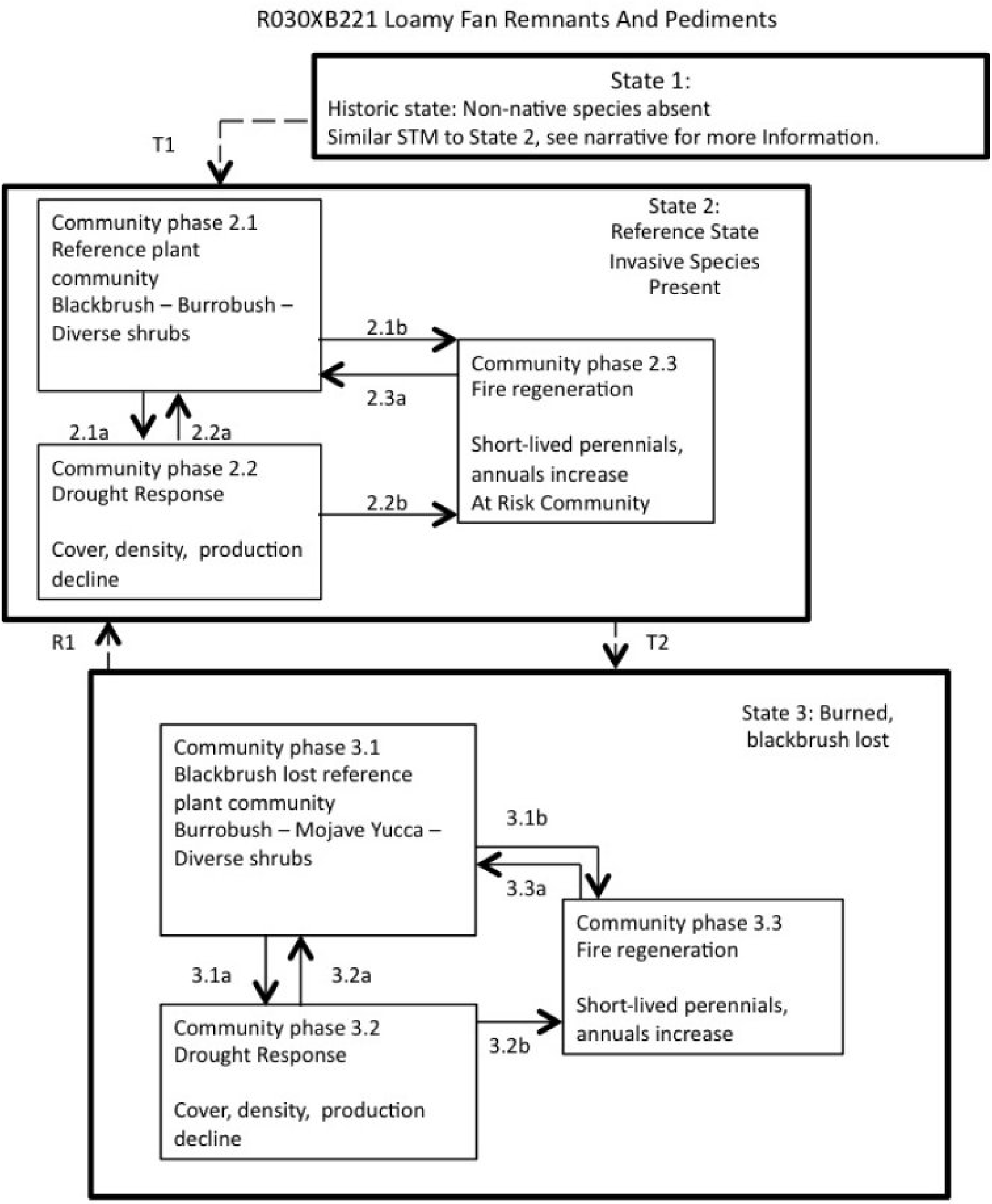

Figure 4. R030XB221CA

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 (Brown and Minnich 1986, Brooks et al. 2007). 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 and red-stem stork's bill 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

Figure 6. Comunity Phase 2.1

The reference plant community is co-dominated by blackbrush, and burrobush, and secondary shrub diversity is high. Hall's shrubby spurge, Mojave yucca (*Yucca schidigera*), Parry's beargrass, Nevada jointfir (*Ephedra nevadensis*), and eastern Mojave buckwheat (*Eriogonum fasciculatum*) are important seconday shrubs. Desertsenna (*Senna armata*), Mojave indigobush (*Psorothamnus arborescens*), lotebush, mouse's eye, waterjacket (*Lycium andersonii*), desert polygala (*Polygala acanthoclada*), and Acton's brittlebush (*Encelia actonii*) may be present. A high diversity of cactus species is typically present, including branched pencil cholla (*Cylindropuntia ramosissima*), golden cholla (*Cylindropuntia echinocarpa*), beavertail pricklypear (*Opuntia basilaris*), cushion foxtail cactus (*Escobaria alversonii*), cottontop cactus (*Echinocactus polycephalus*), and Engelmann's hedgehog cactus (Echinocerus engelmannii). The subshrubs Mojave aster (*Xylorhiza tortifolia*), brownplume wirelettuce (*Stephanomeria pauciflora*), narrowleaf bedstraw (*Galium angustifolium*), wishbone bush (*Mirabilis laevis* var. villosa), and desert pepperweed (*Lepidium fremontii*) are typically present. The annual forb component of this ecological site has low production, but common species that may be present include pygmy poppy (Escholzia minutiflora), spotted hindseed (*Eucrypta chrysanthemifolia*), cryptantha (Cryptantha spp.), and Mojave desertparsley (*Lomatium mohavense*). Red brome and red-stem stork's bill are typically present at low levels.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	195	291	387
Forb	0	5	10
Grass/Grasslike	0	1	5
Total	**195**	**297**	**402**

Community 2.2
Drought response

This community phase is characterized by a decline in cover and production due to branch-pruning of long-lived shrubs (including blackbrush, Hall's shrubby spurge, Nevada jointfir, and Mojave yucca), and mortality of short-lived shrubs, including burrobush, eastern Mojave buckwheat, Acton's brittlebush, desertsenna, and subshrubs. A long-term monitoring study in the reference plant community found long-periods of stability under average conditions and moderate drought, but high rates of mortality resulting from only one year of extreme drought. Following severe drought in 2002, burrobush suffered 68% mortality, Hall's shrubby spurge 58%, and short-lived shrubs and subshrubs up to 100% mortality (Miriti et al. 2007). The increase in bare ground that occurs during drought increases the susceptibility of this site to erosion.

Community 2.3
Fire regeneration community

This community phase is characterized by the loss of blackbrush and mortality of cactus species. Initially the post-burn community is dominated by subshrubs and annuals that are quick to colonize from the seedbank or from off-site seed dispersal, and that exhibit rapid growth. With time, species capable of resprouting after fire become more important, including Mojave yucca, Nevada ephedra, waterjacket, lotebush, and Parry's beargrass. Shrubs capable of quickly colonizing after fire include burrobush, eastern Mojave buckwheat, and Acton's brittlebush. With very long periods of time with no disturbance (e.g. 100 years), blackbrush re-colonizes, and very gradually replaces shorter-lived species. This community is an at-risk phase. The increased cover and biomass of non-native annual grasses increases the likelihood of repeat burning. If the fire return interval is less than 100 years, this community is very likely to transition to State 3. Reduction in shrub cover increases bare ground and increases the risk of erosion.

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs with severe or prolonged drought.

Pathway 2.1b
Community 2.1 to 2.3

This pathway occurs with moderate to severe fire.

Pathway 2.2a
Community 2.2 to 2.1

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

Pathway 2.2b
Community 2.2 to 2.3

This pathway occurs with moderate to severe fire. Although live annuals are largely absent from Community Phase 2.2, standing annual biomass in drought years immediately following a period of heavy precipitation poses a risk for fire.

Pathway 2.3a
Community 2.3 to 2.1

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

State 3
Burned, blackbrush lost

This state is characterized by the loss of blackbrush from the plant community due to severe or recurrent fire. Data does not exist for this state, and community phase composition is based on literature review. The dynamics for this state are assumed to be similar to that described in State 2, except that blackbrush is no longer part of the plant community.

Community 3.1
Blackbrush lost Reference plant community

The reference plant community for this state is dominated by burrobush. Mojave yucca, Nevada ephedra, and eastern Mojave buckwheat are important secondary species. Other shrub species, subshrubs and annuals are likely to remain as described in Community phase 2.1.

Community 3.2
Drought response

This community phase is characterized by a decline in cover and production due to branch-pruning of long-lived shrubs, and mortality of shorter-lived perennials (including eastern Mojave buckwheat, burrobrush, Cooper’s goldenbush, and desert needlegrass), and lack of emergence of annual forbs and grasses. See narrative for Community Phase 2.2 for more information.

Community 3.3
Fire regeneration community

This community phase is as described for Community phase 2.3, except that blackbrush does not return to this plant community. This phase is not at risk for transitioning to an altered state, since the species that dominate the reference plant community are resilient to fire, and given the low potential high biomass of non-native annuals in this site.

Pathway 3.1a
Community 3.1 to 3.2

This pathway occurs in response to prolonged or severe drought.

Pathway 3.1b
Community 3.1 to 3.3

This pathway occurs in response to moderate or severe fire.

Pathway 3.2a
Community 3.2 to 3.1

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

Pathway 3.2b
Community 3.2 to 3.3

This pathway occurs with moderate to severe fire. Although live annuals are largely absent from Community Phase 3.2, standing annual biomass in drought years immediately following a period of heavy precipitation poses a risk for fire.

Pathway 3.3a
Community 3.3 to 3.1

This pathway occurs with time without fire.

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 extensive, severe fire when blackbrush seed sources are not available to colonize burned areas, or with recurrent fire.

Restoration pathway 1

State 3 to 2

Restoration of arid desert communities severely altered by repeat fire at the landscape scale is very difficult (Allen 1993). Reducing invasion of non-native grasses that increase after fire may help promote native plant recovery, and reduce the probability of repeat burning (Fuhrmann et al. 2009, Matchett et al. 2009, Steers and Allen 2010); however, accomplishing this at a landscape scale, for a time period long enough to be effective, has not yet been accomplished. In small-scale trials, Fusilade, a grass-specific herbicide, was successful in reducing invasive grasses in burned creosote bush communities in the Colorado Desert in the initial three years after fire (Steers and Allen 2010). The long-term efficacy of such treatments on a landscape scale, and non-target effects have not yet been determined. The pre-emergent herbicide Plateau was applied in conjunction with aerial seeding of natives after fire in Zion National Park (Fuhrmann et al. 2009, Matchett et al. 2009). Initial results indicate that autumn application of Plateau after fire is most effective for reducing cheatgrass (*Bromus tectorum*), but longer-term monitoring is needed to evaluate long-term and non-target effects. In addition to controlling invasive species, active recovery of native vegetation may be attempted. Methods may include seeding of early native colonizers such as desert globemallow, burrobrush, threeawns (Aristida spp.), and desert marigold (e.g. Abella et al. 2009, Abella et al. 2012). 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 blackbrush 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 (Allen 1993). Blackbrush is difficult to cultivate for outplanting due to susceptibility to fungal pathogens in the greenhouse environment.

Additional community tables

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
1	**Native shrubs**			195–387	
	blackbrush	CORA	*Coleogyne ramosissima*	90–180	2–10
	burrobush	AMDU2	*Ambrosia dumosa*	50–160	1–10
	Mojave indigobush	PSAR4	*Psorothamnus arborescens*	0–35	0–1
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	2–30	0–1
	California juniper	JUCA7	*Juniperus californica*	0–25	0–4
	desertsenna	SEAR8	*Senna armata*	0–25	0–1

	Mojave yucca	YUSC2	*Yucca schidigera*	0–21	1–5
	Bigelow's nolina	NOBI	*Nolina bigelovii*	2–20	0–2
	Nevada jointfir	EPNE	*Ephedra nevadensis*	5–15	1–2
	branched pencil cholla	CYRA9	*Cylindropuntia ramosissima*	1–15	0–1
	Hall's shrubby-spurge	TEHA	*Tetracoccus hallii*	3–10	1–2
	Wiggins' cholla	CYEC3	*Cylindropuntia echinocarpa*	1–8	0–1
	Acton's brittlebush	ENAC	*Encelia actonii*	0–5	0–1
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–5	0–1
	Parry's wirelettuce	STPA3	*Stephanomeria parryi*	0–5	0–1
	desert polygala	POAC2	*Polygala acanthoclada*	0–5	0–1
	water jacket	LYAN	*Lycium andersonii*	0–3	0–1
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	0–3	0–1
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	0–1	0–3
	cushion foxtail cactus	ESAL2	*Escobaria alversonii*	0–1	0–1
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–1	0–1
	cottontop cactus	ECPO2	*Echinocactus polycephalus*	0–1	0–1
	mouse's eye	BEMY	*Bernardia myricifolia*	0–1	0–1
Forb					
2	**Native forbs**			0–10	
	desert pepperweed	LEFR2	*Lepidium fremontii*	0–9	0–1
	Mojave desertparsley	LOMO	*Lomatium mohavense*	0–1	0–1
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	0–1	0–1
	cryptantha	CRYPT	*Cryptantha*	0–1	0–1
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–1	0–1
	pygmy poppy	ESMI	*Eschscholzia minutiflora*	0–1	0–1
	spotted hideseed	EUCH	*Eucrypta chrysanthemifolia*	0–1	0–1
	narrowleaf bedstraw	GAAN2	*Galium*	0–1	0–1

			angustifolium		
3	**Non-native annual forbs**			0–1	
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0–1	0–1
Grass/Grasslike					
4	**Non-native annual grasses**			0–1	
	red brome	BRRU2	*Bromus rubens*	0–1	0–1

Animal community

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 botanizing, wildflower viewing, and aesthetic enjoyment. The plant community represents an interesting assemblage of Mojave and Sonoran Desert species that come together at this transitional area.

Other products

The Kawaiisu used a decoction of blackbrush bark for treating gonorrhea Drug (http://herb.umd.umich.edu/herb/search.pl?searchstring=Coleogyne+ramosissima.

The Havasupai used blackbrush as source of fodder when grass was not available (http://herb.umd.umich.edu/herb/search.pl?searchstring=Coleogyne+ramosissima).

Inventory data references

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

Community Phase 2.1:

POWA63 (Type location)
POWA18
POWA24

Type locality

Location 1: Riverside County, CA	
UTM zone	N
UTM northing	3734940
UTM easting	609080
General legal description	The type location is approximately 500 feet east-northeast from the Cottonwood Visitor's Center in Joshua Tree National Park.

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Contributors

Alice Miller
Marchel M. Munnecke

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	07/11/2025
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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

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

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

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

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

than, greater than, and equal to):

Dominant:

Sub-dominant:

Other:

Additional:

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

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

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

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
