Ecological site R030XY202CA
Very Rarely To Rarely Flooded Thermic Ephemeral Stream

Accessed: 04/25/2024

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 statement:
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.

"XY" LRU:
This LRU is found throughout the Mojave Desert MLRA. This LRU designation is set aside for ecological sites that are ubiquitous throughout the MLRA. These sites are driven by environmental or chemical features that override the climatic designations of the other LRU's or are atypical compared to the surrounding landscape. Common overriding XY characteristics within this MLRA include: ephemeral streams subject to flash flood events, riparian areas or other water features, and soils with strong chemical influence (Na, Ca, etc).

Ecological Site Concept:
This ephemeral stream ecological site occurs on first order channels and stream terraces on upper alluvial fans. There is a rarely flooded narrow active channel with a very rarely flooded associated stream terrace or inset fan.

This site has developed in response to infrequent flash flood events. The soils are very deep, with sand surface textures and sandy subsurface textures. The soil moisture regime is aridic or aridic bordering on xeric, with a thermic soil temperature regime. The site is dominated by California jointfir (Ephedra californica), burrobrush (*Hymenoclea salsola*), and Mojave indigobush (Psorothamnus arborescens). Joshua tree (*Yucca brevifolia*) may be present in stable areas. Flood events on deep sandy soils promote California ephedra. Burrobrush is a generalist that will establish with any soil disturbance and brief moisture availability. Mojave indigobush is more abundant where additional run-on is available. Water inputs in this site are not enough to support xeroriparian plants such as desert willow (*Chilopsis linearis*) or catclaw acacia (Acacia greggii). Elevations range from 3280 to 5250 feet, and slopes range from 2 to 8 percent.

Data ranges in the physiographic data, climate data, water features, and soil data sections of this Ecological Site Description are based on major and minor components, since it is often only associated with minor components.

Associated sites

R030XB166CA	**Dissected Pediment, Cool** This site is on adjacent pediments with open blackbrush and California juniper.
R030XB168CA	**Cool Deep Sandy Fans** This ecological site on the alluvial fans with blackbrush, California juniper and Joshua tree.
R030XB172CA	**Warm Gravelly Shallow Hills** This ecological site is on stony hills with Parish's goldeneye and creosote bush.
R030XB189CA	**Shallow Cool Hills** This ecological site is on hills with dense blackbrush and California juniper.
R030XE196CA	**Sandy Xeric-Intergrade Slopes** This ecological site is on steeper hills and mountains with chaparral species. Soils have an aridic bordering on xeric moisture regime.
R030XE200CA	**Xeric Very Deep Sandy Fan Aprons On Pediments** This ecological site is on hills with Muller's oak, California juniper, and blackbrush. Soils have an aridic bordering on xeric moisture regime.

Similar sites

R030XB187CA	**Rarely Flooded Warm Thermic Ephemeral System** This ephemeral wash is at lower elevations and is dominated by creosote bush and burrobrush.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Ephedra californica* (2) *Hymenoclea salsola*
Herbaceous	Not specified

Physiographic features

This ecological site occurs on channels, stream terraces, and inset fans on alluvial fans or fan aprons over pediment. Elevations range from 3280 to 5250 feet. Slopes range from 2 to 8 percent

Table 2. Representative physiographic features

Landforms	(1) Channel (2) Stream terrace (3) Inset fan
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	None to rare
Elevation	3,280–5,250 ft

Slope	2–8%
Aspect	Aspect is not a significant factor

Climatic features

The climate is arid with hot, dry summers and warm, moist winters. The mean annual precipitation is 101 to 250 millimeters (4 to 10 inches) and the mean annual air temperature is 12.7 to 20 degrees C (55 to 68 degrees F.). The frost-free season is 210 to 270 days, and the freeze-free season is 240 to 300 days.

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

Table 3. Representative climatic features

Frost-free period (average)	270 days
Freeze-free period (average)	0 days
Precipitation total (average)	10 in

Influencing water features

This ecological site is influenced by very rare or rare flash flood events.

Soil features

This ecological site is associated with the Morongo and Thunderclap soil series, and only exists as a 8 percent or less component within a mapunit. These soils are very deep with sand surface textures, and sand, coarse sand, gravelly sand, loamy sand, and gravelly loamy sand subsurface textures (for a depth of 2 to 59 inches). For rock fragments less than 3 inches in diameter, the percent surface cover ranges from 10 to 60 percent, and subsurface volume ranges from 2 to 10 percent (for a depth of 2 to 59 inches). Rock fragments greater than 3 inches in diameter, are generally absent in surface and subsurface horizons. These soils are somewhat excessively drained with rapid permeability.

The Morongo soils are classified as mixed, thermic Typic Torripsamments. They have a typic-aridic soil moisture regime, and developed in very deep alluvium from granitoid and/or gneissic rocks.

The Thunderclap soils are mixed, thermic, Xeric Torripsamments. They have a soil moisture regime of aridic bordering xeric, and have formed in alluvium over residuum in fan aprons over pediments from granitoid and/or gneissic rocks. Contact with weathered bedrock occurs between 60 and 75 inches.

This ecological site has been correlated with the following map units and soil components in the Joshua Tree National Park Soil Survey (CA794):

Mapunit, Component Local phase, Percent
3679, Morongo rarely flooded, 2
3682, Morongo rarely flooded, 2
3685, Morongo rarely flooded, 2
3679, Morongo very rarely flooded, 3
3682, Morongo very rarely flooded, 6
3685, Morongo very rarely flooded, 8
3292, Thunderclap rarely flooded, 4
4630, Thunderclap rarely flooded, 2

Table 4. Representative soil features

Parent material	(1) Alluvium–granite (2) Residuum–gneiss
Surface texture	(1) Sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained
Permeability class	Rapid
Soil depth	60–80 in
Surface fragment cover <=3"	10–60%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	1.6–3.1 in
Calcium carbonate equivalent (0-40in)	0–1%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–4
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	2–10%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This ephemeral stream ecological site occurs in headwaters and first order drainageways on channels and stream terraces on upper fan piedmonts. There is a rarely flooded (1 to 5 times in 100 years) narrow active channel with an associated very rarely flooded (surface flooding may occur 1 in 100 years) broad stream terrace or inset fans. This site has developed in response to infrequent flash flood events, which form sheet flow across the broad flat areas. Headwater streams are hydrologically connected with lower stream reaches, which may be the mid-sized Thermic to Hyperthemic Ephemeral Stream (R030XY186CA) or the Large, Sandy, Thermic Ephemeral Stream (R030XY167CA). The headwater and upper watershed first order drainageways may accumulate nutrients and organic matter during moderate storm events. During dry periods these areas may accumulate organic matter. The organic matter and nutrients are mobilized during large storm events to lower reaches of the drainageway. These nutrients can influence downstream productivity (Levick et al. 2008). The soils are very deep and sandy with very little cohesive structure. They are easily redistributed with flood events. The soil moisture regime is aridic or aridic bordering on xeric, with a thermic soil temperature regime. This ecological site has cooler temperatures and more moisture than the other ephemeral stream ecological sites within Joshua Tree National Park. Drought and fire are also important drivers of plant community succession and hydrological dynamics.

This site is in broad, low lying, headwater positions which accumulate surface and groundwater flow. The drought-tolerant vegetation that exists on ephemeral streams is referred to as xeroriparian vegetation. It is distinct from the surrounding landforms due to a difference in species composition, size, and production (Johnson et al. 1984, Levick et al. 2008). Xeroriparian vegetation is present because of the increased availability of water and flood disturbances in these drainageways. This site does not provide a deep water source for phreatophytes that rely primarily on deep water source, so species like desert willow (*Chilopsis linearis*) are absent from this site. The active channel is generally bare of vegetation. Along the channel margins, California jointfir, peach thorn (*Lycium cooperi*), and desert almond (*Prunus fasciculata*) can be relatively productive. California jointfir, Mojave indigo bush, burrobrush, peachthorn, desert almond, Joshua tree (*Yucca brevifolia*), and California juniper (California juniper) form an open mosaic on broad terraces. Collectively, all of these plant communities are part of the xeroriparian vegetation, and provide xeroriparian habitat.

California jointfir is a long lived shrub, often associated with ephemeral drainages in arid and semi-arid regions. It is a gymnosperm, reproducing by wind dispersed pollen and bearing seed in cones (Anderson 2004). It only produces abundant seeds during years of ample precipitation. The seeds have a short dormancy period, and will germinate only after the dormancy period and sufficient moisture. Once established, California jointfir is fairly drought tolerant. Desert almond and peachthorn are also long lived shrubs. They produce seeds that are dispersed by animals, by gravity, or by water. Sheet flow disperses the heavier seeds of these long lived shrubs, which germinate in moist soil after floods. Burrobrush is a shorter lived shrub that will establish with any disturbance and brief moisture availability. Mojave indigobush is most abundant in habitats where additional run-on is available.

Other disturbances such as drought, fire, and human hydrologic alterations can affect the community composition and/or hydrologic process of this site. Drought is common in the desert, and can cause mortality or die-back of vegetation. Decreased vegetative cover can lead to increased erosion and change sediment deposition patterns.

Historically fire was very uncommon in these ephemeral drainages; however the presence of continuous and flashy fuels from non-native grasses can increase the possibility of fire. Invasion by non-native annual grasses has increased the flammability of desert vegetation communities (Brooks 1999, Brooks et al. 2004), and after fire, Mojave Desert ecosystems appear to be more susceptible to invasion by exotic grasses, leading to a grass-fire cycle (D'Antonio and Vitousek 1992). The abundance and biomass of these grasses is highest on sandy soils where nitrogen deposition from air pollution from adjacent urban areas is high (Rao et al. 2010). This ecological site is susceptible to high biomass loads of non-native annual grasses due to its sandy soils and proximity to the greater Los Angeles area. Very wet (El Nino) years followed by severe drought produce conditions where large areas of desert scrub may burn (Brown and Minnich 1986).

State and transition model

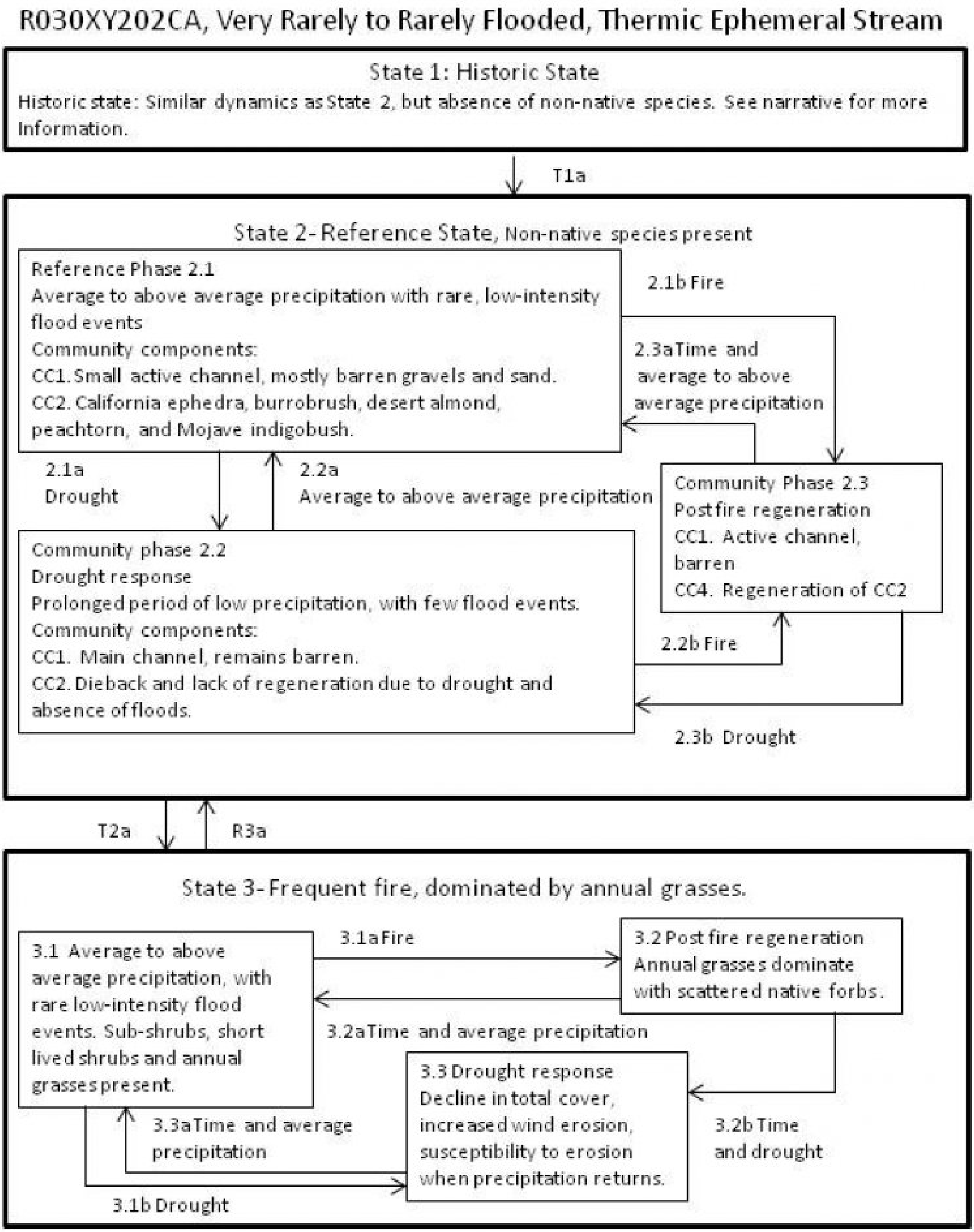

Figure 4. R030XY202CA Model

State 1
Historic State

State 1 represents the historic-natural condition for this ecological site. This state no longer exists due to the ubiquitous naturalization of non-native species in the Mojave Desert. If we were to include dynamics for this state it would be the same as displayed in State 2. The presence of non-native species is significant in State 2, but has not yet altered the hydrology or fire frequency. Historically, stand-replacing fire was probably very rare in this ecological site due to the absence of non-native grasses to fuel fires (Sawyer et al. 2009). When fire did occur, it was probably low severity surface fire that promoted regeneration of short-lived species (Sawyer et al. 2009).

State 2
Reference State

This state represents the most common and most ecologically intact condition for this ecological site at the present time.

Community 2.1
Reference Phase

Figure 5. CT 2.1 California jointfir - burrobrush

Figure 6. CT 2.1 California jointfir - burrobrush

This community phase is dependent upon unimpaired hydrologic function and average to above average precipitation. There may be spatially distinct plant communities within these ephemeral drainages, but they have not been identified and data was not collected for different communities. Two community components are present, including: Community Component 1 (CC1): Barren active channel. Community Component 2 (CC2): This community dominates, and is present on broad, very rarely flooded stream terraces and inset fans. The increased run-on and rare floods provide additional moisture and surface disturbance, which enable species such as California jointfir, burrobrush, peachthorn, desert almond, and Mojave indigo bush to establish. Joshua tree and California juniper (*Juniperus californica*) are present in some areas. Forbs are abundant in years of high rainfall, but may be patchily present every year due to run-on. Common forbs include woolly easterbonnets (*Antheropeas wallacei*), pincushion flower (*Chaenactis fremontii*), cryptantha (Cryptantha spp.), miniature woollystar (*Eriastrum diffusum*), whitedaisy tidytips (*Layia glandulosa*), golden linanthus (*Leptosiphon aureus* ssp. aureus), distant phacelia (*Phacelia distans*), and chia (*Salvia columbariae*). One or multiple years of heavy winter precipitation such as occurs during El Niño events (Hereford et al. 2006) leads to a heavy standing crop of non-native and native annuals in intershrub spaces, providing a continuous fine fuel layer that puts this community at high risk of fire.

Native annuals may fuel fire (Brown and Minnich 1986, Minnich 2003), but pose a threat only in the first dry year following a wet year (Minnich 2003). The thatch created from non-native annual grasses is much slower to break down, and can create high-risk fire conditions for several years following heavy precipitation (Minnich 2003, Brooks and Minnich 2006, Brooks et al. 2007, Rao et al. 2010). Unlike the historic state, where fire return intervals were long enough to allow for recovery of burned communities, fire in the reference state may trigger a cycle of increased fire frequency, resulting in a transition to a new state characterized by non-native annual grasslands, with scattered native species.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	50	360	500
Shrub/Vine	160	240	320
Forb	0	25	35
Total	**210**	**625**	**855**

Community 2.2
Drought Response

This community develops with prolonged or severe drought. It is difficult to determine the exact duration or intensity of drought that will cause this change, but a one to two year severe drought (of approximately 60 percent or less of average precipitation) can cause severe mortality in short lived perennials (Bowers 2005, Hereford et al. 2006, Miriti et al. 2007). Long-lived shrubs may have severe branch die back, or mortality depending upon severity and duration of the drought. Long lived shrubs, affected by previous drought are more likely to succumb during a second drought (Hereford et al. 2006). Seed development, germination, and seedling survival are negatively affected during drought years. In the absence of flood events, seeds are not dispersed by sheet flow, and moisture is lacking in the soil to initiate germination. Some shrubs, such as California jointfir, only produce seed in years of normal or higher than average precipitation. Seedling survival is dependent upon adequate moisture during the early stages of development. The plant community components remain similar to those described in Community Phase 2.1, but show a decline in overall health, cover, regeneration, and production due to drought. Shorter lived species such as Cooper's dogweed (*Adenophyllum cooperi*), Wiggins' cholla (*Cylindropuntia echinocarpa*), Mojave rabbitbrush (*Ericameria paniculata*), yucca buckwheat, (*Eriogonum plumatella*), burrobrush (*Hymenoclea salsola*), may suffer high mortality. Longer lived species may have branch die back, or mortality depending upon the severity of drought. With prolonged or severe drought, canopy cover declines leaving more open spaces susceptible to erosion during the next flood event. Over time, drought shift species dominance to the long-lived drought tolerant species. Since this site is in areas of water accumulation, it may be slower to respond to drought than the surrounding drier terrain. During moderate droughts it could harbor species for seed dispersal to more drought prone areas when average precipitation returns.

Community 2.3
Post-fire Regeneration

Figure 8. 11 years post-fire

There may be high variability in the species response in the post-fire regeneration phase. The composition of the post-fire regeneration community depends upon the species present before the fire, fire intensity, precipitation patterns, and time since last fire. Initially annuals and short-lived perennials will dominate. The longer lived shrubs, California jointfir, peachthorn, and desert almond, may resprout vigorously after low to moderate intensity fires. Joshua tree may also, resprout, but still typically suffers high mortality after fire due to increased herbivory and other factors. Short-lived shrubs capable of quickly colonizing after fire include burrobrush, Cooper's dogweed, Mojave rabbitbrush, and yucca buckwheat, among others. The photo above was taken 11 years after the Juniper Complex fire in Joshua Tree National Park. It is in area with less run on, compared to other locations where this ecological site is found. This location is heavily dominated by peachthorn, desert almond, and giant woollystar (*Eriastrum densifolium*). Community component 4 (CC4) represents CC2 post-fire. This data is from one plot, 11 years post fire. Data from before the burn is not available. It is assumed California jointfir would be a part of this community in other sites. This was a high intensity fire, with high mortality of all species (Minnich 2003). Recovery after fire, to pre-fire conditions, will take decades.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	400	450	520
Grass/Grasslike	120	190	260
Forb	50	70	85
Total	**570**	**710**	**865**

Pathway 2.1a
Community 2.1 to 2.2

This pathway is caused by a prolonged or severe drought.

Pathway 2.1b
Community 2.1 to 2.3

Reference Phase

Post-fire Regeneration

This pathway is caused by moderate to severe fire

Pathway 2.2a
Community 2.2 to 2.1

This pathway occurs with the return of average to above average precipitation and associated flood events.

Pathway 2.2b
Community 2.2 to 2.3

This pathway occurs as a result of fire. Given low cover of annuals during drought, this pathway is unlikely except in periods immediately following heavy precipitation years.

Pathway 2.3a
Community 2.3 to 2.1

Post-fire Regeneration

Reference Phase

This pathway occurs in response to the passing of time with average to above average precipitation and associated flood events.

Pathway 2.3b
Community 2.3 to 2.2

This pathway occurs in response to the passing of time with drought conditions and absence of flooding

State 3
Frequent Fire

This state develops when the fire return interval is less than 20 years. This state has been significantly altered from the natural range of variability found in States 1 and 2. Frequent fire intervals favor the non-native annual grasses, and reduce the cover and regeneration of longer lived shrubs, which need more time to reestablish after fire. Competition with non-native grasses for water, nutrients and sunlight reduces seedling survival of native species. Data was not collected for this state, it is based on literature review and the observation that the high cover of non-native grasses present in extensive areas of this site create a high risk for a conversion to a grass-fire cycle.

Community 3.1
Average precipitation

This community phase develops with time without fire (5-20 years). It may be dominated by annual grasses with a diversity of short-lived shrubs, subshrubs, and longer-lived shrubs that have resprouted. The presence and cover of long-lived shrubs such as peachthorn, desert almond, and catclaw acacia are dependent upon the fire history and intensity. California ephedra is most likely reduced in importance, and the mosaic of diverse shrubs will not recover, because the fire return interval is too short for these shrubs to regain former dominance. With the normal precipitation cycle, very rare to rare flood events will sheet flow across these flats and flow down the channels. Non-native grasses have poor canopy cover protection from wind or rain, and their roots are not as extensive as capable of holding soil as the more deep rooted and laterally extensive roots of many native species. As diversity and cover of native species increases, the more stability they can provide for surface erosion.

Community 3.2
Post-fire Regeneration

This community phase occurs one to five years post-fire. Cheatgrass and red brome are quick to reestablish after fire. Native forbs such as bristly fiddleneck, chia and pincushion flower (many other native forbs could also be present). There may be very sparse cover of resprouting shrubs such as peachtorn, catclaw acacia, or desert almond. Seedlings of short-lived shrubs may be present, and may include burrobrush, Cooper's dogweed, and Mojave rabbitbrush. This community is at high-risk of repeat burning due to high fine fuel cover. This community is also susceptible to wind and water erosion, due to the loss of stabilizing shrub cover (Bull 1997).

Community 3.3
Drought Response

This community develops with prolonged or severe drought. Drought will cause high mortality to the short lived perennials during this phase. The non-native annual grasses will have low production and cover during drought. This phase is extremely susceptible to wind and water erosion. When the next sheet flood occurs, large volumes of loose sandy sediment will be mobilized downstream.

Pathway 3.1a

Community 3.1 to 3.2

This pathway occurs as a result of fire.

Pathway 3.1b
Community 3.1 to 3.2

This pathway is caused by drought.

Pathway 3.2a
Community 3.2 to 3.1

This pathway occurs with the return to average or above average precipitation and associated flood events.

Pathway 3.2b
Community 3.2 to 3.3

This pathway is caused by drought.

Pathway 3.3a
Community 3.3 to 3.1

This pathway occurs with the return of average to above average precipitation and associated flood events.

Transition 1
State 1 to 2

This transition occurs with the introduction of non-native species. Cheatgrass and red brome were most likely introduced into this area in the late 19th century, during active mining and grazing activities. The introduction of non-native species was localized at first, and may have been kept from spreading by a mid-century dry spell. Since the 1970's precipitation has increased and these annual grasses have been spreading to new areas and increasing in cover and density (Salo, 2005, Brooks et. al., 2003).

Transition 2a
State 2 to 3

This transition occurs when the fire return interval is less than 20 years.

Restoration pathway R3a
State 3 to 2

Restoration of communities severely altered by repeat fire at the landscape scale is difficult. Methods may include aerial seeding of early native colonizers such desert globemallow and burrobrush. Increased native cover may help to reduce non-native plant invasion, helps to stabilize soils, provides a source of food and cover for wildlife, including desert tortoise (Gopherus agassizii), and provides microsites that facilitate creosote bush establishment. However, the amount of seed required for success is often prohibitive. Large-scale planting of both early colonizers and community dominants tends to be more successful in terms of plant survival, especially if outplants receive supplemental watering during the first two years. Creosote bush and burrobush can be successfully propagated and outplanted. Pre-emergent herbicides (Plateau) have been used in the year immediately post-fire to attempt to inhibit or reduce brome invasion. How successful this is on a landscape scale, and the non-target effects have not yet been determined.

Additional community tables

Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
1	**Native shrubs**			160–320	
	burrobrush	HYSA	*Hymenoclea salsola*	65–200	5–10
	desert almond	PRFA	*Prunus fasciculata*	0–100	0–3
	California jointfir	EPCA2	*Ephedra californica*	8–80	1–10
	Mojave indigobush	PSAR4	*Psorothamnus arborescens*	12–40	3–8
	peach thorn	LYCO2	*Lycium cooperi*	2–40	1–2
	yucca buckwheat	ERPL3	*Eriogonum plumatella*	0–25	0–1
	Mojave rabbitbrush	ERPA29	*Ericameria paniculata*	0–15	0–3
	California juniper	JUCA7	*Juniperus californica*	0–10	0–1
	catclaw acacia	ACGR	*Acacia greggii*	0–10	0–1
	Cooper's dogweed	ADCO2	*Adenophyllum cooperi*	0–3	0–1
	Wiggins' cholla	CYEC3	*Cylindropuntia echinocarpa*	0–2	0–1
	Joshua tree	YUBR	*Yucca brevifolia*	0–1	1–2
Forb					
2	**Native forbs**			0–35	
	pincushion flower	CHFR	*Chaenactis fremontii*	0–20	0–1
	cryptantha	CRYPT	*Cryptantha*	0–1	0–1
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–1	0–1
	whitedaisy tidytips	LAGL5	*Layia glandulosa*	0–1	0–1
	golden linanthus	LEAUA3	*Leptosiphon aureus ssp. aureus*	0–1	0–1
	distant phacelia	PHDI	*Phacelia distans*	0–1	0–1
	chia	SACO6	*Salvia columbariae*	0–1	0–1
	woolly easterbonnets	ANWA	*Antheropeas wallacei*	0–1	0–1
Grass/Grasslike					
3	**Non-native grasses**			50–420	
	cheatgrass	BRTE	*Bromus tectorum*	25–300	1–35
	red brome	BRRU2	*Bromus rubens*	10–300	1–30

Table 8. Community 2.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
1	**Shrubs**			400–520	
	peach thorn	LYCO2	*Lycium cooperi*	350–450	16–18
	desert almond	PRFA	*Prunus fasciculata*	50–70	4–5
Forb					
2	**Native Forbs**			50–85	
	giant woollystar	ERDE2	*Eriastrum densifolium*	50–60	5–6
	golden linanthus	LEAUA3	*Leptosiphon aureus ssp. aureus*	0–15	0–2
	fiddleneck	AMSIN	*Amsinckia*	0–5	0–1
	California suncup	CACA32	*Camissonia californica*	0–5	0–1
Grass/Grasslike					
3	**Native grasses**			30–35	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	30–35	1
4	**Non-native grasses**			90–225	
	cheatgrass	BRTE	*Bromus tectorum*	75–200	5–13
	red brome	BRRU2	*Bromus rubens*	15–25	1–2

Animal community

Desert Coyote (Canis latrans mearnsi), Desert Kit Fox desert (Vulpes macrotis arsipus), Southern Desert Cottontail (Sylvilagus audubonii arizonae), Desert Blacktail Jackrabbit (Lepus californicus deserticola) and several species of snakes, lizards, and rodents, utilize this ecological site. Large shrubs create structural diversity that may help support a higher diversity of fauna, and ephemeral drainages provide important wildlife migration corridors.

Hydrological functions

This ephemeral stream has a small channel for sediment transport and a broad flat for overflow allowing energy dispersion, and water, sediment and nutrient storage.

Recreational uses

This site provided open low sloped flats for trails and wildlife viewing.

Other products

California ephedra is made into tea by Native Americans. It contains the chemical Ephedrine, which is used to treat asthma and as a decongestant among other things. It has been restricted to a prescription drug, due to adverse reactions or misuse.

The peachthorn fruits were eaten by Native Americans (Thompson 2007)

Inventory data references

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

Community Phase 2.1:
1249810214
1249810219B (Modal for ecological site)

1251503847, heavily invaded by non-native annual grasses. (Soil modal, but poor vegetation)

Community Phase 2.3
1249806946 (Soil modal, but burned) Perennial and forb production based on line intercept cover of plot and interpretation from 2.1 production.

Type locality

Location 1: San Bernardino County, CA	
UTM zone	N
UTM northing	3769445
UTM easting	556354
General legal description	The Type locality is about 1.25 miles South-South east of Black Rock Campground, west of the Burnt Hill Trail.

Other references

Anderson, M. D. 2004. Ephedra nevadensis. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory

Bowers, J. E. 2005. Effects of drought on shrub survival and longevity in the northern Sonoran Desert. Journal of the Torrey Botanical Society 132:421-431.

Brooks, M. L. 1999. Habitat invasibility and dominance by alien annual plants in the western Mojave Desert. Biological Invasions 1:325-337.

Brooks, M. L., C. M. D'Antonio, D. M. Richardson, J. B. Grace, J. E. Keeley, J. M. DiTomaso, R. J. Hobbs, M. Pellant, and D. Pyke. 2004. Effects of invasive alien plants on fire regimes. Bioscience 54:677-689.

Brooks, M. L., T. C. Esque, and T. Duck. 2007. Creosotebush, blackbrush, and interior chaparral shrublands. RMRS-GTR-202.

Brooks, M. L. and J. R. Matchett. 2006. Spatial and temporal patterns of wildfires in the Mojave Desert, 1980-2004. Journal of Arid Environments 67:148-164.

Brown, D. E. and R. A. Minnich. 1986. Fire and Changes in Creosote Bush Scrub of the Western Sonoran Desert, California. American Midland Naturalist 116:411-422.

Bull, W. B. 1997. Discontinuous ephemeral streams. Geomorphology 19:227-276.

D'Antonio, C. M. and P. M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annual Review of Ecology and Systematics 23:63-87.

Hereford, R., R. H. Webb, and C. I. Longpre. 2006. Precipitation history and ecosystem response to multidecadal precipitation variability in the Mojave Desert region, 1893-2001. Journal of Arid Environments 67:13-34.

Levick, L., J. .Fonseca, D. Goodrich, M. Hernandez, D. Semmens, J. Stromberg, R. Leidy, M. Scianni, D. P. Guertin, M. Tluczek, and W. Kepner. 2008. The ecological and hydrological significance of ephemeral and intermittent streams in the arid and semi-arid American Southwest.

Minnich, R. A. 2003. Fire and dynamics of temperature desert woodlands in Joshua Tree National Park. Contract, Joshua Tree National Park.

Miriti, M. N., S. Rodriguez-Buritica, S. J. Wright, and H. F. Howe. 2007. Episodic death across species of desert shrubs. Ecology 88:32-36.

Rao, L. E., E. B. Allen, and T. M. Meixner. 2010. Risk-based determination of critical nitrogen deposition loads for fire spread in southern California deserts. Ecological Applications 20:1320-1335.

Sawyer, J. O., T. Keeler-Woolf, and J. M. Evans. 2009. A manual of California vegetation. 2nd edition. California Native Plant Society, Sacramento, California.

Thompson, J. 2007. Plants of Death Valley and Amargosa Valley used by Native Americans. Beatty Museum & Historical Society in Beatty, Nevada. , Beatty, NV.

Contributors

Allison Tokunaga
Marchel 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	
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:**