Ecological site R030XY219CA
Ustic Ephemeral Drainageway Order 3

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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.

MLRA notes

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

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 and dry. Hyperthermic and thermic soil temperature regimes are common with exceptions at higher elevations (generally above 5000 feet) where mesic, cryic and frigid soil temperature regimes may occur. Typic aridic soil moisture regimes are common and widespread throughout the MLRA. 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. The "XY" LRU is found throughout the Mojave Desert 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).

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Classification relationships

Ericameria paniculata Shrubland Alliance (Sawyer et al. 2009). Chilopsis linearis/Ericameria paniculata Association (Sawyer et al. 2009). Prunus fasciculata/Ambrosia eriocentra Association (Sawyer et al. 2009).

Ecological site concept

This site occurs on large sized (typically order 3) ephemeral drainageways with braided channels at elevations of approximately 4,000 to 6,000 feet. These drainageways run through eroded fan remnants, and occur close to the mountain front that supplies the major source of run-on and sediment. Soils are very deep sands formed from limestone, sedimentary, igneous and metamorphic rock. They have an ustic aridic soil moisture regime. Drainageways are 100 to several hundred feet wide and have approximately 10-foot banks. The site is a complex of landforms and vegetation communities that are dictated by flooding intensity and frequency. It encompasses very rarely to rarely flooded stream terraces, rarely to occasionally flooded inset fans, bars and stream margins, and frequently flooded stream margins and channels. The most frequently flooded positions are occupied by a Mojave rabbitbrush (Ericameria paniculata) community, with patches of desert willow (Chilopsis linearis). Occasionally flooded positions are occupied by a woolly fruit bur ragweed (Ambrosia eriocentra), desert almond (Prunus fasciculata) and purple sage (Salvia dorrii) community, with a high diversity of other shrubs, forbs and grasses. Rarely to very rarely flooded positions are occupied by a perennial grass dominated community, with black grama (Bouteloua eriopoda), big galleta (Pleuraphis rigida) and galleta (Pleuaphis jamesii), and a mixture of short-lived shrub species. Mojave rabbitbrush is supported by the large drainage size, with frequently occurring and relatively high intensity flooding. These drainages provide a relatively consistent deep-water source, which supports desert willow communities.

Associated sites

R030XB014NV	**SHALLOW GRAVELLY LOAM 7-9 P.Z.** Occurs on adjacent fan remnants with very deep loamy soils. Reference plants include blackbrush (Coleogyne ramosissima), black grama (Bouteloua eriopoda), and big galleta (Pleuraphis rigida).
R030XB015NV	**SHALLOW GRAVELLY SLOPE 7-9 P.Z.** Occurs on adjacent steep fan remnants and mountain slopes with shallow soils. Reference plants include blackbrush (Coleogyne ramosissima), black grama (Bouteloua eriopoda), and big galleta (Pleuraphis rigida).
R030XY220CA	**Ustic Ephemeral Drainageways Order 2** Occurs on adjacent smaller sized drainageways. Desert willow is not present, and vegetation communities are not as ecological complex.
R030XY222CA	**Typic Aridic Ephemeral Drainageway Order 3 4-7" p.z.** Occurs on lower elevation large ephemeral drainageways. Black grama (Bouteloua eriopoda) is not present and creosote bush (Larrea tridenata) is an important species.

Similar sites

R030XB051NV	**UPLAND WASH** This site occurs over a lower elevation range on soils that have a predominately typic aridic soil moisture regime. The size of the drainageways that it occurs on is unknown. Mojave rabbitbrush and desert willow are not listed as occurring on the site. Black grama is a minor species.
R030XY220CA	**Ustic Ephemeral Drainageways Order 2** Occurs on smaller sized drainageways. Desert willow (Chilopsis linearis) is not present and ecological complexity is reduced.
R030XY222CA	**Typic Aridic Ephemeral Drainageway Order 3 4-7" p.z.** Occurs at lower elevations on soils with a typic aridic soil moisture regime. Black grama (Bouteloua eriopoda) is not present and creosote bush (Larrea tridentata) is an important species.

Table 1. Dominant plant species

Tree	(1) *Chilopsis linearis*
Shrub	(1) *Ericameria paniculata* (2) *Ambrosia eriocentra*
Herbaceous	(1) *Bouteloua eriopoda* (2) *Pleuraphis rigida*

Physiographic features

This ecological site is found on large (typically order 3) braided ephemeral streams and associated landforms. Elevations range from 4,150 to 5,870 feet, and slopes range from 1 to 8 percent, but slopes of 1 to 4 percent are typical. The site is a complex dictated by flash flooding intensity and frequency, and encompasses very rarely flooded stream terraces, rarely to occasionally flooded inset fans and stream margins, and frequently flooded stream margins and channels.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Inset fan
Flooding frequency	Very rare to frequent
Elevation	1,270 – 1,790 m
Slope	0 – 10 %

Climatic features

The climate of this ecological site is characterized by hot temperatures, aridity, and a bimodal precipitation pattern. Precipitation falls as rain, with 40 percent falling in summer between July and October, and 49 percent falling in winter between November and March. The mean annual precipitation is 10.5 inches and mean annual air temperature ranges from 55 to 63 degrees F.

Table 3 Representative climatic features

Frost-free period (average)	250 days
Freeze-free period (average)	310 days
Precipitation total (average)	250 mm

- (1) MITCHELL CAVERNS [USC00045721], Baker, CA
- (2) SEARCHLIGHT [USC00267369], Searchlight, NV

Influencing water features

This ecological site is associated with large sized ephemeral stream systems, and includes associated channels, bars, stream terraces, and inset fans.

Soil features

The soils associated with this ecological site are moderately to very deep, excessively drained sands that formed in alluvium from limestone, igneous, sedimentary and metamorphic rock. The soil moisture regime is ustic-aridic. Surface textures are loamy sand, very gravelly loamy sand, gravelly, extremely and very gravelly sand and loamy fine sand. Subsurface horizon textures (1 to 59 inches) include loamy sand, very gravelly sand, cemented loamy sand and cemented very gravelly loamy sand, gravelly sand, fine sand and extremely gravelly coarse sand. Surface rock fragments less than 3 inches in diameter range from 19 to 70 percent cover, and larger fragments range from 1 to 11 percent cover. Subsurface percent by volume of rock fragments less than 3 inches ranges from 10 to 38, and larger fragments range from 0 to 1.

Soils associated with this ecological site include Rocksalad (Sandy-skeletal, mixed, thermic Ustic Torriorthents), Boomerang (Sandy, mixed, thermic Ustic Torriorthents), and a minor component of Ustic Torripsamments. Rocksalad and Boomerang are associated with all vegetation community components, while the Ustic Torripsamments are associated with rarely flooded terraces.

This ecological site is correlated with the following map units and soil components in the Mojave National Preserve Soil Survey: (Map unit number; Map unit name; Component; phase; component percent)
4306; Stonekey-Rosshorse complex, 2 to 8 percent slopes; Rocksalad; occasionally flooded; 5
4305; Stonekey-Sagamore complex, 2 to 8 percent slopes; Rocksalad; frequently flooded; 1; Rocksalad; occasionally flooded; 1; Ustic Torripsamments; rarely flooded; 1
4300; Sagamore-Stonekey complex, 4 to 30 percent slopes; Rocksalad; frequently flooded; 2
4310; Fairlan sandy loam, 2 to 8 percent slopes; Boomerang; very rarely flooded; 2
4310; Fairlan sandy loam, 2 to 8 percent slopes; Boomerang; frequently flooded; 1
103; Willowspring-Parched complex, 15 to 50 percent slopes; Rocksalad; occasionally flooded; 1

Table 4. Representative soil features

Parent material	(1) Alluvium – limestone (2) Alluvium – basalt (3) Alluvium – granite
Surface texture	(1) Loamy sand (2) Very gravelly loamy sand (3) Gravelly sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained
Permeability class	Rapid
Soil depth	60 cm
Surface fragment cover <=3"	20 – 70 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	1.02 – 8.13 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified

Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 10
Subsurface fragment volume <=3" (Depth not specified)	10 – 40 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

This site describes the dynamics of a large sized (typically order 3) eastern Mojave ephemeral sream system. drainageways with braided channels at elevations of approximately 4,000 to 6,000 feet. Drainageways run through eroded fan remnants, and occur close to the mountain front that supplies the major source of run-on and sediment. Soils are very deep sands formed from limestone, sedimentary, igneous and metamorphic rock. They have a typic aridic bordering on ustic soil moisture regime. Drainageways are 100 to several hundred feet wide and have approximately 10-foot banks. The site is a complex of landforms and vegetation communities that are dictated by flooding intensity and frequency; it encompasses very rarely to rarely flooded stream terraces, rarely to occasionally flooded inset fans, bars and stream margins, and frequently flooded stream margins and channels.

The most frequently flooded positions are occupied by a Mojave rabbitbrush community, with patches of desert willow. Occasionally flooded positions are occupied by a woolly fruit bur ragweed, desert almond and purple sage community, with a high diversity of other shrubs, forbs and grasses. Rarely to very rarely flooded positions are occupied by a perennial grass dominated community, with black grama, big galleta and galleta, and a mixture of short-lived shrub species. Mojave rabbitbrush is supported by the large drainage size, with frequently occurring and relatively high intensity flooding. These drainages provide a relatively consistent deep-water source, which supports desert willow communities. Desert almond is a long-lived deep-rooted species diagnostic of episodic flooding (Stein et al. 2011). In the eastern Mojave Desert it is associated with the cooler temperatures and higher precipitation of upper fan piedmont positions, and gravelly soils (Evens 2000, Sawyer et al. 2009). Purple sage and woolly fruit bur ragweed are shorter-lived, shallow-rooted species also diagnostic of episodic disturbance (Stein et al. 2011). Relatively high summer precipitation supports woolly fruit bur ragweed and black grama. Higher elevations and intermittent disturbance support purple sage. The relative composition of these communities across the drainageway is determined by time since disturbance and the intensity of disturbance events.

Although ephemeral stream processes are much more variable than perennial streams, a properly functioning ephemeral drainageway will provide similar hydrological and biological functions as perennial streams (Hild et al. 2007, Levick et al. 2008, Vyverberg 2010). Ephemeral streams maintain water quality by allowing energy dissipation during high water flow. They transport nutrients and sediments, store sediments and nutrients in deposition zones, provide temporary storage of surface water, and longer duration storage of subsurface water. They also support a disproportionate share of biodiversity (Hild et al. 2007, Levick et al. 2008, Vyverberg 2010). The drought-tolerant vegetation that occurs within 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 vegetation protects soils from erosion and influences flow by providing bank and channel roughness, and initiates formation and maintenance of channel bars (Levick et al. 2008, Vyverberg 2010, Stein et al. 2011). The structure and forage provided by xeroriparian vegetation, and the availability of water, although brief, significantly increases animal abundance along ephemeral streams relative to upland areas. The open channels provide important migration corridors for wildlife (Levick et al. 2008).

Soil disturbance from flash flood events is the primary driver of plant community dynamics within this ecological site. Ephemeral streams flow only in response to rainfall events, and flow may last only minutes or days (Bull 1997, Levick et al. 2008, Vyverberg 2010). Extreme and rapid variations in flooding regime, and a high degree of temporal and spatial variability in hydrologic processes is characteristic (Bull 1997, Stanley et al. 1997, Levick et al. 2008, Shaw and Cooper 2008, Vyverberg 2010). Episodic high magnitude events that may occur only a few times a decade or century function to ‘reset’ vegetation and channel form (Levick et al. 2008, Stein et al. 2011). Smaller more frequent flood events deposit sediment, leading to channel infilling and eventually channel avulsion (defined as the “diversion of the majority of the surface flow to a different channel, with total or partial abandonment of the original channel” (Field 2001) dynamics. As sediment deposits in the main channel of the depositional zone, and as vegetation colonizes stream channels, banks and bars, the likelihood of channel avulsion increases because of decreased channel volume (Levick et al. 2008).

Extreme temporal and spatial variability in disturbance events, water availability, sediment flux, and channel migrations result in a dynamic complex of hydrologically and disturbance determined plant communities that does not conform to an equilibrium model of vegetation community dynamics (Vyverberg 2010, Stein et al. 2011). Physical disturbance of soils and vegetation as a result of flash flooding makes predictability of temporary channel development and configuration very low except when considered at a coarse scale. Typical runoff events may result in an apparently stable mosaic of plant species distribution and channel configuration, while more extreme events may completely reconfigure the mosaic and establish the foundation of a new or modified plant community mosaic until the next extreme runoff event occurs. Vegetation communities reflect the time in the recurrence interval, or time between large magnitude ‘reset’ events. Early on in the recurrence interval there is lower diversity in the communities present, with dominance by short-lived species. For the majority of the interval, a mixture of long-lived and short-lived species is present. The late phase of the cycle is characterized by abundant vegetation with narrowing of the channel, making it more susceptible to resetting by a large flood as flow capacity diminishes.

Other disturbances such as drought, climate change, fire, grazing, mining, and land development can affect community composition and/or hydrologic processes. Cycles of drought are inherent to the desert, and can cause significant mortality or die-back of vegetation (e.g. Hereford et al. 2006). Decreased vegetative cover can lead to an increase in erosion and change sediment deposition patterns, possibly increasing the chance of channel migration. Global climate change models for the desert southwest predict increased drought intensity, increased warming and drying, and greater variability in precipitation (Levick et al. 2008). These changes could lead to a decline in xeroriparian vegetation with greater intensity floods and erosion.

Large fires are likely to have been more common near this ecological site than at lower elevation sites (Brooks et al. 2007). The loss of vegetation cover in adjacent hills can contribute to increased flooding and sediment deposition in this ecological site. This could have a number of effects, including increased scouring of xeroriparian vegetation within the drainage channels; widening of channels, which would increase the complexity of plant communities in the ecological site (areas receiving different flooding intensity or frequency would be dominated by different suites of species); and sediment deposition and channel avulsion.

Livestock grazing has also impacted this ecological site. Ranching was established in the eastern Mojave desert in approximately 1875 (Nystrom 2003). Grazing occurred unregulated in the area until the passage of the Taylor Grazing Act in 1934, which divided public land into allotments that were regulated by the Bureau of Land Management (BLM), and among other things, called for fenced ranges and multiple developed water sources (http://www.blm.gov/wy/st/en/field_offices/Casper/range/taylor.1.html). The Federal Land Policy and Management Policy Act of 1976 (FLPMA) brought further regulations, including 10-year grazing permits. In 1994 the California Desert Protection Act created the Mojave National Preserve, and the National Park Service took over management of grazing allotments in much of the eastern Mojave.

Most of the area occupied by this ecological site within the Mojave National Preserve was retired from grazing in 2000, and ecological communities are still recovering. Cattle and burros preferentially use riparian habitat because of access to water, shade, and productive vegetation (e.g. Kauffman and Kruegger 1984, Kie and Boroski 1996, Belsky et al. 1999). Livestock grazing can alter riparian vegetation by altering species composition by selective grazing, plant cover removal, trampling stream banks, and compacting soil (e.g. Kauffman and Kruegger 1984, Trimble and Mendel 1995, Belsky et al. 1999). Increased runoff resulting from compacted soil and/or loss of vegetation may lead to channel incision, more intense erosion during flood events, and a loss of sheet flow, leading to the decline and potential loss of xeroriparian communities. Grazing in adjacent upland communities may further increase runoff, erosion, and incision (Trimble and Mendel 1995, Belsky et al. 1999). Although these ephemeral streams rarely have water present, they do support productive xeroriparian vegetation. Since ungrazed examples or detailed historical data of this system do not exist, it is not possible to quantify these impacts.

Altered hydrological processes such as surface flow diversions, ground water depletion, and loss of the xeroriparian vegetation can have irreversible impacts such as headward erosion, increased flooding and sediment deposition, and/or channel abandonment (Nishikawa et al. 2004, Levick et al. 2008, and Stein et al. 2011). Impermeable surfaces (such as pavement, homes, malls, etc.) reduces soil water infiltration, creates higher runoff, greater peak flows, and more frequent high intensity flooding events (Levick et al. 2008). Stream channelization also increases flood intensity and sediment transport within some reaches, while reducing flow to other reaches. Dams and improperly constructed roads and railroads can cause aggradation and flooding upstream, channel incision and channel abandonment downstream (Levick et al. 2008). Channel abandonment, incision and/or significant reductions in flow can convert xeroriparian vegetation communities to upland communities by altering traditional flow patterns. Channel incision may also scour channel features and lead to more frequent high intensity floods, reduce channel vegetation diversity and create a community dominated by short-lived species that can withstand the new flooding regime.

When disturbances such as those describe above affect the hydrologic function of this ephemeral stream system, this ecological site has the potential to transition to hydrologically altered states (States 2 and 3). Data are not available to describe State 2, and it is described in general terms as provisional states in the state-and-transition model.

All tabular data listed for a specific community phase within this ecological site description represent a summary of one or more field data collection plots taken in communities within the community phase. Although such data are valuable in understanding the phase (kinds and amounts of ground and surface materials, canopy characteristics, community phase overstory and understory species, production and composition, and growth), it typically does not represent the absolute range of characteristics nor an exhaustive listing of species for all the dynamic communities within each specific community phase.

State and transition model

Figure 5. R030XY219CA

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Tree					
2	**CC2 Trees**			0-39	
3	**CC3 Trees**			0-28	
4	**CC4 Trees**			73-280	
Shrub/Vine					
2	**CC2 Shrubs**			163-325	
	Mojave rabbitbrush	ERPA29	*Ericameria paniculata*	112-258	10-18
	woolly fruit bur ragweed	AMER	*Ambrosia eriocentra*	22-67	1-6
	desert willow	CHLI2	*Chilopsis linearis*	0-39	0-2
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0-28	0-1
	sixweeks grama	BOBA2	*Bouteloua barbata*	0-17	0-10
	bush muhly	MUPO2	*Muhlenbergia porteri*	0-17	0-1
	purple sage	SADO4	*Salvia dorrii*	0-11	0-1
	desert almond	PRFA	*Prunus fasciculata*	0-9	0-1
	Stansbury cliffrose	PUST	*Purshia stansburiana*	0-6	0-2
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	0-6	0-1
	burrobrush	HYSA	*Hymenoclea salsola*	0-6	0-1
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0-6	0-1
	Darrow's buckwheat	ERDA	*Eriogonum darrovii*	0-6	0-1
	Palmer's buckwheat	ERPA11	*Eriogonum palmerianum*	0-6	0-1
	arid tansyaster	MAAR5	*Machaeranthera arida*	0-6	0-1
	manybristle chinchweed	PEPA2	*Pectis papposa*	0-6	0-1
	desert penstemon	PEPS	*Penstemon pseudospectabilis*	0-6	0-1
	Fendler's groundcherry	PHHEF	*Physalis hederifolia var. fendleri*	0-6	0-1
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0-6	0-1
	northwestern Indian paintbrush	CAAN7	*Castilleja angustifolia*	0-6	0-1
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	0-6	0-1
	threadstem sandmat	CHRE4	*Chamaesyce revoluta*	0-6	0-1
	Wright's prairie clover	DAWR	*Dalea wrightii*	0-6	0-1
	spike dropseed	SPCO4	*Sporobolus contractus*	0-3	0-1
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0-3	0-1
	squirreltail	ELEL5	*Elymus elymoides*	0-3	0-1
3	**CC3 Shrubs**			1065-1457	
4	**CC4 Shrubs**			252-504	
Grass/Grasslike					
2	**CC2 Grasses**			17-34	
	Stansbury cliffrose	PUST	*Purshia stansburiana*	0-280	0-12

	desert almond	PRFA	*Prunus fasciculata*	56-275	3-7
	woolly fruit bur ragweed	AMER	*Ambrosia eriocentra*	17-263	3-8
	purple sage	SADO4	*Salvia dorrii*	11-224	1-9
	yellow rabbitbrush	CHVIV4	*Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus*	0-78	0-2
	bush muhly	MUPO2	*Muhlenbergia porteri*	22-67	3-9
	burrobrush	HYSA	*Hymenoclea salsola*	4-67	1-4
	Nevada jointfir	EPNE	*Ephedra nevadensis*	1-50	1-4
	Mojave rabbitbrush	ERPA29	*Ericameria paniculata*	22-34	2-3
	Utah juniper	JUOS	*Juniperus osteosperma*	0-28	0-1
	singleleaf pinyon	PIMO	*Pinus monophylla*	0-28	0-1
	Joshua tree	YUBR	*Yucca brevifolia*	0-28	0-1
	sixweeks grama	BOBA2	*Bouteloua barbata*	0-22	0-25
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0-22	0-1
	spike dropseed	SPCO4	*Sporobolus contractus*	0-17	0-2
	big galleta	PLRI3	*Pleuraphis rigida*	0-17	0-1
	water jacket	LYAN	*Lycium andersonii*	0-17	0-1
	black grama	BOER4	*Bouteloua eriopoda*	0-17	0-1
	desert trumpet	ERIN4	*Eriogonum inflatum*	0-17	0-1
	desert polygala	POAC2	*Polygala acanthoclada*	0-17	0-1
	curvenut combseed	PERE	*Pectocarya recurvata*	0-11	0-1
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0-11	0-1
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	0-11	0-1
	red brome	BRRU2	*Bromus rubens*	0-6	0-3
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0-6	0-1
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0-6	0-1
	desert Indianwheat	PLOV	*Plantago ovata*	0-6	0-1
	Palmer's buckwheat	ERPA11	*Eriogonum palmerianum*	0-6	0-1
	Parish's bedstraw	GAPA4	*Galium parishii*	0-6	0-1
	arid tansyaster	MAAR5	*Machaeranthera arida*	0-6	0-1
	tufted evening primrose	OECA10	*Oenothera caespitosa*	0-6	0-1
	desert marigold	BAMU	*Baileya multiradiata*	0-6	0-1
	sacred thorn-apple	DAWR2	*Datura wrightii*	0-6	0-1
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0-6	0-1
	Davidson's buckwheat	ERDA4	*Eriogonum davidsonii*	0-6	0-1
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0-6	0-1
	Fremont's mahonia	MAFR3	*Mahonia fremontii*	0-6	0-1
	Mexican bladdersage	SAME	*Salazaria mexicana*	0-6	0-1
	banana yucca	YUBA	*Yucca baccata*	0-6	0-1
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	0-6	0-1
	buck-horn cholla	CYAC8	*Cylindropuntia acanthocarpa*	0-6	0-1
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0-6	0-1
	floating bur-reed	SPFL	*Sparganium fluctuans*	0-6	0-1
	Sonoran sandmat	CHMI7	*Chamaesyce micromera*	0-6	0-1
3	**CC3 Grasses**			84-168	
4	**CC4 Grasses**			359-729	
Forb					

2	**CC2 Forbs**			12-25	
	black grama	BOER4	*Bouteloua eriopoda*	0-465	0-15
	big galleta	PLRI3	*Pleuraphis rigida*	0-448	0-22
	James' galleta	PLJA	*Pleuraphis jamesii*	0-336	0-15
	Apache plume	FAPA	*Fallugia paradoxa*	0-336	0-10
	Utah juniper	JUOS	*Juniperus osteosperma*	0-280	0-10
	burrobrush	HYSA	*Hymenoclea salsola*	4-224	1-6
	desert almond	PRFA	*Prunus fasciculata*	17-196	1-5
	Nevada jointfir	EPNE	*Ephedra nevadensis*	0-163	0-5
	bush muhly	MUPO2	*Muhlenbergia porteri*	0-151	0-7
	Joshua tree	YUBR	*Yucca brevifolia*	0-112	0-5
	Stansbury cliffrose	PUST	*Purshia stansburiana*	0-90	0-3
	red brome	BRRU2	*Bromus rubens*	0-56	0-13
	singleleaf pinyon	PIMO	*Pinus monophylla*	0-56	0-2
	water jacket	LYAN	*Lycium andersonii*	0-34	0-4
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0-34	0-2
	Mexican bladdersage	SAME	*Salazaria mexicana*	0-28	0-5
	purple sage	SADO4	*Salvia dorrii*	0-22	0-2
	desert trumpet	ERIN4	*Eriogonum inflatum*	0-20	0-4
	banana yucca	YUBA	*Yucca baccata*	0-17	0-3
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0-13	0-3
	woolly fruit bur ragweed	AMER	*Ambrosia eriocentra*	0-11	0-2
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	0-6	0-3
	Cooper's goldenbush	ERCO23	*Ericameria cooperi*	0-6	0-1
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0-6	0-1
	spike dropseed	SPCO4	*Sporobolus contractus*	0-6	0-1
	spreading fleabane	ERDI4	*Erigeron divergens*	0-6	0-1
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	0-6	0-1
3	**CC3 Forbs**			9-16	
4	**CC4 Forbs**			28-56	

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Tree					
1	**CC6 Trees**			0-11	
	woolly fruit bur ragweed	AMER	*Ambrosia eriocentra*	263-532	13-26
	purple sage	SADO4	*Salvia dorrii*	28-213	1-7
	sixweeks grama	BOBA2	*Bouteloua barbata*	0-112	0-10
	bush muhly	MUPO2	*Muhlenbergia porteri*	22-67	1-3
	desert almond	PRFA	*Prunus fasciculata*	0-67	0-2
	burrobrush	HYSA	*Hymenoclea salsola*	0-62	0-4

	spike dropseed	SPCO4	*Sporobolus contractus*	0-28	0-3
	red brome	BRRU2	*Bromus rubens*	0-17	0-7
	Sonoran sandmat	CHMI7	*Chamaesyce micromera*	0-11	0-3
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0-11	0-3
	Mojave rabbitbrush	ERPA29	*Ericameria paniculata*	0-11	0-2
	desert willow	CHLI2	*Chilopsis linearis*	0-6	0-2
	Joshua tree	YUBR	*Yucca brevifolia*	0-6	0-2
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	0-6	0-1
	grizzlybear pricklypear	OPPOE	*Opuntia polyacantha var. erinacea*	0-6	0-1
	banana yucca	YUBA	*Yucca baccata*	0-6	0-1
	southwestern mock vervain	GLGO	*Glandularia gooddingii*	0-6	0-1
	Colorado four o'clock	MIMU	*Mirabilis multiflora*	0-6	0-1
	Cooper's goldenbush	ERCO23	*Ericameria cooperi*	0-6	0-1
	Nevada jointfir	EPNE	*Ephedra nevadensis*	0-6	0-1
	silkcotton purslane	POHA5	*Portulaca halimoides*	0-6	0-1
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0-6	0-1
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0-6	0-1
	Cooper's dogweed	ADCO2	*Adenophyllum cooperi*	0-6	0-1
	fringed amaranth	AMFI	*Amaranthus fimbriatus*	0-6	0-1
	northwestern Indian paintbrush	CAAN7	*Castilleja angustifolia*	0-6	0-1
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	0-6	0-1
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	0-6	0-1
	black grama	BOER4	*Bouteloua eriopoda*	0-6	0-1
	buck-horn cholla	CYAC8	*Cylindropuntia acanthocarpa*	0-6	0-1
	Virgin River brittlebush	ENVI	*Encelia virginensis*	0-6	0-1
Shrub/Vine					
1	**CC6 Shrubs**			404-807	
Grass/Grasslike					
1	**CC6 Grass**			78-157	
Forb					
1	**CC6 Forbs**			17-39	

Animal community

Small animals live in this ecological site. Animal diversity in this ecological site is likely high relative to upland areas due to the heterogeneity of the site and the availability of forage and water. Streambanks provide habitat for burrows. Ephemeral drainages are important wildlife migration corridors.

Hydrological functions

Ephemeral drainages provide some similar hydrologic functions as perennial streams. A properly functioning system will maintain water quality by allowing energy dissipation during high water flow. These systems transport nutrients and sediments, and store sediments and nutrients in deposition zones. Ephemeral drainages provide temporary storage of surface water, and longer duration storage of subsurface water (Levick et al. 2008).

Recreational uses

These drainageways provide open travel corridors for cross-country hiking. Wildflower displays may be abundant after adequate precipitation.

Inventory data references

High intensity sampling (Caudle et al. 2013) was used to describe this ecological site. Site characteristics such as aspect, slope, elevation and UTMS were recorded for each plot, along with complete species inventory by ocular percent cover. The line-point intercept method was used to measure foliar cover, groundcover, and vegetation structure. At either 300 or 100 points along a 600- or 400-foot step transect, ground cover and intercepted plant species were recorded by height. The first hit method (Herrick et al. 2009) was used to generate the foliar cover values entered in the community phase composition tables. Annual production was estimated using the double-weight sampling method outlined in the National Range and Pasture Handbook and in Sampling Vegetation Attributes (NRCS 2003 and Interagency Technical Reference 1999 pgs. 102 - 115). For herbaceous vegetation, ten 9.6 square foot circular sub-plots were evenly distributed along a 200 foot transect. For woody and larger herbaceous species production was estimated in four 21’X21’ square plots along the same transect. Weight units were collected for each species encountered in the production plots. The number of weight units for each species is then estimated for all plots. Community Phase 1.1 CC2 11CA795140-Freq 11CA795150 11CA795214 2011CA795002-Freq 2012CA795166-Freq CC3 11CA795140-Occ 2011CA795002-Occ 2012CA795166-Occ CC4 11CA795140-Rare 11CA795263 2011CA795002-Rare State 3 2011CA795038-Freq 2011CA795038-Rare 11CA795150

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Approval

Sarah Quistberg, 2/24/2025

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	08/27/2026
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:

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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:**
