Ecological site R030XB005NV
Arid Active Alluvial Fans

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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

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 and dry with mostly hyperthermic and thermic soil temperature regimes and typic-aridic soil moisture regimes. Mean annual air temperatures are between 59-68 degrees F (15-20 C) with average summer maximum temperatures between 100-115 degrees F (38-46 C) and average winter minimum temperatures between 32-59 degrees F (0-15 C). This MLRA is within the arid climate zone however steep elevational gradients contribute to microclimates where semi-arid [mean annual precipitation is greater than 8 inches (200mm)] and hyper-arid [mean annual precipitation is less than 4 inches (100mm)] islands exist. Elevations range from below sea level to over 12,000 feet (3650 meters) in the higher mountain areas. Generally above 5,000 feet, soil temperature regimes can be mesic, cryic and frigid with soil moisture regimes being xeric or ustic. Orographic effects and low elevations can create hyper-arid conditions where the soil moisture regime is aridic-aridic. Due to the extreme elevational range found within this MLRA, land resource units (LRUs) were designated to group areas within the MLRA into similar land units. LRU Description: The arid climate zone (XB in ESD ID) LRU is found across the eastern half of California, much of the mid-elevations of Nevada, the southernmost portions of western Utah, and the mid-elevations of northwestern Arizona. Elevations range from 1800-5000 feet and precipitation ranges from 4-8 inches/year. Precipitation is bi-modal for most of the Mojave with precipitation occurring in winter and summer. Areas west of the 117 degree W meridian near Barstow, CA receive precipitation mainly during the winter months (Hereford et al. 2004). The soil temperature regimes are hyperthermic and thermic with a typic-aridic soil moisture regime. Vegetation includes creosote bush (Larrea tridentata), burrobush (Ambrosia dumosa), Mojave yucca (Yucca schidigera) Joshua tree (Yucca brevifolia), chollas, cactus, big galleta grass (Pleuraphis rigida) and several other warm season grasses. At the upper portions of the LRU, where the mean annual precipitation is between 6 to 8 inches (150-200 mm), plant production and diversity are greater and blackbrush (Coleogyne ramosissima) is a common dominant shrub.

Classification relationships

U.S. National Vegetation Classification (USNVC): 3 Desert and Semi-Desert, 3.A Warm Semi-Desert Scrub and Grassland, 3.A.1 Warm Semi-Desert Scrub and Grassland, D039 North America Warm Desert Scrub and Grassland, M088 Mojave-Sonoran Semi-Desert Scrub, G295 Sonoran-Mojave Creosotebush- White Bursage Desert Scrub Group, CEGL000956 Ambrosia dumosa – Larrea tridentata var. tridentata Dwarf-shrubland.

Ecological site concept

This site is extensive in the Mojave Desert and typically occurs on fan piedmonts, broad alluvial fans and fan remnants on all exposures. Slopes range from 2 to 30 percent, but slope gradients of 2 to 15 percent are typical. Elevations are 1200 to 4800 feet. The soils associated with this site are typically shallow to moderately deep. The soils typically have a calcic horizon shallow to the surface. Soil depth to a layer restrictive to root development, such as a petrocalcic horizon, is greater than ten inches. Limy soils found within this site generally have low organic matter, high alkalinity and a coarse texture. This white bursage-creosotebush plant community is extensive throughout the Mojave Desert and consists of both long and short-lived perennial species. This is a group concept and provisional STM that also covers the following ecological sites: R030XA058NV, R030XA071NV, R030XA073NV, R030XB156CA, R030XF028CA, R030XY110UT.

Associated sites

R030XB001NV	**LIMY HILL 5-7 P.Z.**
R030XB004NV	**SANDY 5-7 P.Z.**
R030XB019NV	**Eroded Fan Remnant Pavette 4-6 P.Z.**
R030XB039NV	**LIMY FAN 5-7 P.Z.**
R030XB079NV	**GYPSIC SLOPE 3-5 P.Z.**

Similar sites

R030XY110UT	**Desert Loam (Creosotebush)** Essentially the same ecological site concept as R030XB005NV.
R030XB039NV	**LIMY FAN 5-7 P.Z.** More productive site; PLRI3 dominant plant
R030XB205AZ	**Sandy Loam Upland 6-10" p.z. Limy Subsurface, Gravelly** Essentially the same ecological site concept as R030XB005NV.
R030XB075NV	**GRAVELLY FAN 5-7 P.Z.** More productive site; PLRI3 dominant plant
R030XB004NV	**SANDY 5-7 P.Z.** PLRI3-ACHY codominant grasses; sandy soils
R030XB019NV	**Eroded Fan Remnant Pavette 4-6 P.Z.** Less productive site; LATR2 dominant shrub
R030XB074NV	**COBBLY LOAM 5-7 P.Z.** MESP2 common shrub

R030XA121AZ	**Limy Fan 3-6" p.z. Sandy** Essentially the same ecological site concept as R030XB005NV.
R030XB156CA	**Limy 5-7" p.z. (Low Production)** Essentially the same ecological site concept as R030XB005NV.
R030XB211AZ	**Limy Fan 6-9" p.z.** Essentially the same ecological site concept as R030XB005NV.
R030XA105AZ	**Limy Fan 3-6" p.z.** Essentially the same ecological site concept as R030XB005NV.
R030XB017NV	**LIMY HILL 3-5 P.Z.** Less productive site; occurs on steep slopes
R030XB102NV	**GRAVELLY LOAM 5-7 P.Z.** KRLA2 major shrub
R030XB227AZ	**Clay Loam Upland 6-9" p.z.** Essentially the same ecological site concept as R030XB005NV.
R030XB001NV	**LIMY HILL 5-7 P.Z.** Less productive site; occurs on steep slopes
R030XA058NV	**LIMY 5-7 P.Z.** Essentially the same ecological site concept as R030XB005NV.
R030XB206AZ	**Cobbly Limy Upland 6-9" p.z. Deep** Essentially the same ecological site concept as R030XB005NV.
R030XB226AZ	**Sandy Loam Upland 6-9" p.z. Fine** Essentially the same ecological site concept as R030XB005NV.

Table 1. Dominant plant species

Tree	Not specified

Shrub	(1) *Ambrosia dumosa* (2) *Larrea tridentata*
Herbaceous	(1) *Pleuraphis rigida*

Physiographic features

This site is extensive in the Mojave Desert and typically occurs on fan piedmonts, broad alluvial fans and fan remnants on all exposures. Slopes range from 2 to 30 percent, but slope gradients of 2 to 15 percent are typical. Elevations are 1200 to 4800 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Alluvial fan (3) Fan remnant
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	None to very rare
Ponding frequency	None
Elevation	370 – 1,460 m
Slope	0 – 30 %
Aspect	Aspect is not a significant factor

Climatic features

The climate of the Mojave Desert has extreme fluctuations of daily temperatures, strong seasonal winds, and clear skies. The climate is arid and is characterized with cool, moist winters and hot, dry summers. Most of the rainfall falls between November and April. Summer convection storms from July to September may contribute up to 30 percent of the annual precipitation. The relative humidity is low, evaporation is high, the percentage of sunshine is high, and the daily and seasonal range in temperature is wide. Average annual precipitation is 5 to 8 inches. Mean annual air temperature is 56 to 65 degrees F. The average growing season is about 190 to 240 days.

Average annual precipitation in inches at the Searchlight Climate station is as follows:
Jan. 0.92, Feb. 0.96, Mar. 0.77, Apr. 0.40, May 0.20, Jun. 0.11, Jul. 0.91, Aug. 1.08, Sept. 0.61, Oct. 0.52, Nov. 0.43, Dec. 0.79.

Average annual snowfall in 1.3 inches occurring during Jan 0.7, Feb. 0. Mar. 0.1, Nov. 0.1 and Dec. 0.4.

Table 3 Representative climatic features

Frost-free period (average)	240 days
Freeze-free period (average)	

Precipitation total (average)	200 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are typically shallow to moderately deep. The soils typically have a calcic horizon shallow to the surface. Soil depth to a layer restrictive to root development, such as a petrocalcic horizon, is greater than ten inches. Limy soils found within this site generally have low organic matter, high alkalinity and a coarse texture. Available water capacity is typically very low to low and runoff is typically low to medium. Soil series associated with this site include: Anthony, Arada, Arrolime, Bard, Baseline, Bitter Spring, Blackmesa, Cave, Colorock, Crosgrain, Dalian, Filaree, Flattop, Gila, Glendale, Grapevine, Gypwash, Heleweiser, Hiller, Ireteba, Knob Hill, Mesabase, Monger, Mormon Mesa, Naye, Nickel, Riverbend, Sandpan, Seaman, Searchlight, Threelakes, Tonopah, Toquop, Upperline, Vace, Wechech, and Weiser.

Table 4. Representative soil features

Surface texture	(1) Very gravelly fine sandy loam (2) Very gravelly loamy sand (3) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	30 – 100 cm
Surface fragment cover <=3"	10 – 90 %
Surface fragment cover >3"	0 – 30 %
Available water capacity (0-101.6cm)	2.29 – 11.94 cm
Calcium carbonate equivalent (0-101.6cm)	20 – 60 %
Electrical conductivity (0-101.6cm)	0 – 10 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	0 – 30
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 10
Subsurface fragment volume <=3" (Depth not specified)	0 – 70 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

This white bursage-creosotebush plant community is extensive throughout the Mojave Desert and consists of both long and short-lived perennial species. In stable, old communities, creosotebushes or clones may attain ages of several thousand years. Defoliation and death of creosotebush branches may occur as a result of long periods of intense moisture stress. Surface disturbance on this site may reduce plant cover, density and diversity and increase erosion. These changes can be very subtle or extremely obvious depending on the intensity and rate of use and an assortment of environmental factors (topography, rainfall, soil type). White bursage generally dominates more developed soils with the ability to hold moisture in the upper soil profile. The shallow roots of white bursage are able to effectively use moisture stored in the upper horizons when it is available and survive for extended periods of time when it is not (Hamerlynck et al. 2002). White bursage is not able to dominate the deep, weakly developed, coarse textured soils that store water deep in the profile, which is ideal for creosotebush. The spatial distribution of soils allows white bursage and creosotebush to share dominance on this ecological site. They will share dominance throughout the successional process, although the relative abundance is likely to change (Marshall 1994). Creosotebush commonly uses white bursage as a nurse plant, young creosotebushes are frequently found rooted beneath mature white bursage plants (Marshall 1995). White bursage is well adapted to the desert environment but prolonged periods of drought will result a reduction of biomass and possibly kill the plant. Under historically stable conditions, low available fuel and a longer fire return interval allowed the establishment of long-lived desert perennial communities.

Nutrient availability in the Mojave Desert is characterized by resource pulses. High temperatures and relatively small rainfall events allow nutrients to accumulate during extended dry periods when plant and microbial growth is restricted. When rainfall events do occur, they trigger biological activities including plant growth and nutrient uptake (Collins et al. 2008). Resource pulse availability is strongly correlated to the presence of microbiotic crusts in arid systems. Microbiotic crusts fix both carbon and nitrogen, and can be considered functional resource reserves. These reserves have lower activation thresholds in relation to water availability than plants, creating nonlinear ecosystem interactions (Collins et al. 2008). This relationship facilitates plant growth in arid environments and allows plants to utilize nutrients that would otherwise remain unavailable during small precipitation events.

The frost-free season can last for the better part of a year: however, vegetation is limited by nutrient availability. Nutrient concentrations in this shrub community are spatially variable. Nutrient resources are concentrated under the shrub canopy relative to the interspaces, called islands of fertility (Kieft et al. 1998). Fine, sandy alluvium on these sites provides material that the wind redistributes to mound-like coppice dunes beneath creosotebush canopies. Heights of coppice dunes increase as a function of creosotebush cover and are tallest on young alluvial surfaces. Moisture absorbed by and stored in the coppice dune enhances plant performance, in turn contributing to the plant’s effectiveness as a windbreak allowing for further deposition of eolian sands (McAuliffe et al 2007).

Destructive impacts such as land clearing can reduce long-lived creosotebush. The opportunistic perennials such as white bursage, rayless goldenhead (ACSP), white burrobush (HYSA), and wire lettuce species (STEPH) will increase. With a loss of perennial cover, non-native annual grasses and forbs such as red brome (BRRU2), Mediterranean grass (SCBA), and redstem filaree (ERCI6) will readily invade this site.

Fire Ecology:

Prior to Euro-American settlement, fire regimes in Mojave Desert shrub communities were characterized by relatively infrequent, stand-replacing fires. Mojave Desert communities are usually unaffected by fire due to low fuel loading, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. Plant species, native to the Mojave Desert, produce very little biomass, and communities generally have large interspaces, characteristics which are not conducive for carrying fire across the landscape. An altered fire regime can be detrimental to native plants that are not adapted to a frequent fire return interval. Fire can increase resource availability by reducing the amount of resources (moisture, nutrients) used by resident vegetation through mortality or injury (Zouhar et al. 2008). This increased resource availability can make the ecosystem more susceptible to invasions. Relative

competitive ability post-fire controls the invasibility of a system. Often non-natives have superior competitive ability for resources such as water, nutrients and light. When fires do occur, the effect on the ecosystem may be extreme due to the harsh environment and the slow rate of recovery. White bursage and creosotebush possess limited sprouting ability, thus can be killed by fire. White bursage, however, can rapidly re-establish from off-site seed. Range ratany is top killed by fire and resprouts from the root crown post-fire. Nevada ephedra is top killed by fire, but commonly resprouts and may increase in cover. Damage to big galleta from fire varies. If big galleta is dry, damage may be severe. However, when plants are green, fire will tend to be less severe and damage may be minimal, with big galleta recovering quickly. The loss of native vegetation can be followed by invasion of non-native annual forbs and grasses.

State and transition model

Figure 3. STM

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			1-27	
	big galleta	PLRI3	*Pleuraphis rigida*	1-27	–
2	**Secondary Perennial Grasses**			1-27	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	1-10	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	1-10	–
	threeawn	ARIST	*Aristida*	1-10	–
3	**Annual**			1-34	
	sixweeks grama	BOBA2	*Bouteloua barbata*	1-10	–
Forb					
4	**Perennial**			1-27	
	threeawn	ARIST	*Aristida*	0-7	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1-7	–
5	**Annual**			1-67	
	desert trumpet	ERIN4	*Eriogonum inflatum*	1-7	–
Shrub/Vine					
6	**Primary Shrubs**			124-303	
	burrobush	AMDU2	*Ambrosia dumosa*	84-168	–
	creosote bush	LATR2	*Larrea tridentata*	34-84	–
	littleleaf ratany	KRER	*Krameria erecta*	7-34	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	1-17	–
7	**Secondary Shrubs**			17-50	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	1-10	–
	brittlebush	ENCEL	*Encelia*	1-10	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	1-10	–
	desert-thorn	LYCIU	*Lycium*	1-10	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	1-10	–
	Mojave yucca	YUSC2	*Yucca schidigera*	1-10	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 2.1 plant community composition

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

Table 8. Community 2.2 plant community composition

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

Table 9. Community 2.3 plant community composition

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

Table 10. Community 3.1 plant community composition

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

Table 11. Community 3.2 plant community composition

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

Animal community

Livestock Interpretations: This site is suitable for spring grazing by sheep and cattle where water is available. White bursage is an important browse species. Browsing pressure on white bursage is particularly heavy during years of low precipitation, when production of winter annuals is low. White bursage is of intermediate forage value. It is fair to good forage for horses and burros, and fair to poor for cattle and sheep. However, because there is often little other forage where white bursage grows, it is often highly valuable to browsing animals. Nutrient content of white bursage fluctuates seasonally, thereby causing browsing pressure to also fluctuate seasonally. Studies have shown crude protein to be the highest in the late winter, at 10 percent and declining the rest of the year to 4 to 7 percent (Hanley et al. 1977). Many animals bed in or under creosotebush. Domestic sheep dig shallow beds under creosotebush because it provides the only shade available in the desert scrub community. Creosotebush is unpalatable to livestock. The leaves of creosotebush contain antimicrobial phototoxins that provide a defense against a variety of damaging agents. Toxicity of these chemicals is enhanced by exposure to light (Downum et al. 1989). Consumption of creosotebush may be fatal to sheep. Big galleta is considered a valuable forage plant for cattle and domestic sheep. Its coarse, rigid culms make it able to withstand heavy grazing and trampling. Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate, fine-tuned by the client through adaptive management throughout the year and from year to year. Wildlife Interpretations: A large compliment of wildlife species, including many bird, small mammal and reptile species depend on or at least partially utilize Mojave Warm Desert Scrub habitat. This key habitat is critical to the survival of the federal and state threatened desert tortoise in Nevada. Desert tortoises often place their burrows directly under creosote bushes, taking advantage of the substrate stability created by the creosote roots. Similarly, large kit fox den complexes are often found in association with creosote habitat for the same reason. Desert reptiles, amphibians and other wildlife use creosotebush as a food source, a perch site and hibernate or estivate in burrows under it. The burrows provide a place to raise young and also allow wildlife to avoid predators and excessive daytime temperatures. A host of additional heat-tolerant reptile species are also dependent on this habitat; lizards include the desert iguana, desert horned lizards, western whiptails, zebra-tailed lizards and side blotched lizards. Snakes include the spotted leafnosed snake, rosy boa, Western diamondback, Mojave and sidewinder rattlesnakes. The rocky slopes of many of southern Nevada’s mountain ranges within the Mojave/Sonoran Warm Desert Scrub are critical to the survival of the Nelson bighorn sheep subspecies. Mammalian predators common to this site include the American badger, bobcat, coyote, kit fox and the occasional mountain lion (cougar); all of which utilize small mammals and other wildlife as a source of prey. Small mammals common to this site include antelope ground squirrels; Merriams, Panamint, and desert kangaroo rats; grasshopper and deer mice; black-tailed jackrabbits. Desert kangaroo rats and the desert pocket mouse depend on wind-blown sandy areas associated with this habitat type. Creosote seeds make up a large part of the desert pocket mouse’s diet. These small mammals, and others, are an important prey source for snakes as well as various bird species; including the burrowing owl and loggerhead shrike. Additional avian predators such as the American kestrel, great horned owls, and Ferruginous-legged and red-tail hawks are found throughout the area. Sparsely vegetated creosote and saltbush areas are home to the Le Conte’s thrasher. Other birds occurring on this site include common ravens, horned larks, rock wrens, great roadrunners, black-throated and sage sparrows and raptors. White bursage is an important browse species for wildlife. Browsing pressure may be particularly heavy in years of low precipitation, when availability of winter annuals is limited. Mule deer browse range ratany year-long with seasonal peaks. Mule deer peak use is from February to April and from August to October. The intricately branched round shape of range ratany also provides valuable shelter for small mammals and birds. Insects associated with this ecological site provide a significant foraging resource for bats. Typical bat species include: Allen’s big eared, big brown, California leaf-nosed, California myotis, fringed myotis, spotted, hoary, Townsend’s big eared, Western pipistrelle, Western small footed myotis, as well as, other bat species which are seasonally present. Bats utilize caves and crevices in rock formations, along with old mining shafts and tunnels for roost sites. Seasonal use of roost structures may depend on temperature and elevation. However, this site does not provide a significant source of roosting sites. Drastic changes in the plant community composition, soil properties and disturbance regimes associated with this ecological site may affect the limited perennial water sources found in the Mojave desert. These water sources provide habitat for a variety fish species unique to the Mojave. The introduction of non-native fish species and the decreasing availability of perennial water have already impacted these fish.

Hydrological functions

Typically, runoff is low to medium and permeability is moderate to moderately rapid. Water flow patterns and rills are none to few in areas recently subject to intense summer rainfall and on steep slopes. Pedestals are rare with occurrence typically limited to areas within water

flow patterns. Sparse shrub canopy and associated litter break provide some protection from raindrop impact and aid in infiltration.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study.

Other products

This site is located within the home territory of the Moapa Southern Paiute American Indians. Plants play a large role in many different types of Southern Paiute Indians ceremonial and non-ceremonial activites. Creosotebush has been highly valued for its medicinal properties by American Indians. It has been used to treat at least 14 illnesses, including colds. Twigs and leaves may be boiled as tea, steamed, pounded into a powder, pressed into a poultice, or heated into an infusion. White bursage is a host for sandfood (Pholisma sonorae), a parasitic plant with a sweet, succulent, subterranean flowerstalk. Sandfood was a valuable food supply for American Indians. A list of some traditional plants identified by Stoffle et al. (2011) that may be considered culturally sensitive can be found on this ecological site.

Other information

Creosotebush and white bursage may be used to rehabilitate disturbed environments in southwestern deserts. Once established, these species may improve sites for annuals and other perennials that grow under their canopies by trapping fine soil, organic matter, and symbiont propagules. Water infiltration and storage may also increase. Big galleta clumped growth form may help stabilize blowing sands.

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T25 R59 S17
UTM zone	N
UTM northing	3959211
UTM easting	644927
Latitude	35° 45′59″
Longitude	115° 23′48″
General legal description	Section 17, T25S, R59E MDBM. About 5 miles southwest of Jean, on west side of I15, Ivanpah Valley, Clark County, Nevada. This site also occurs in southern Lincoln County, Nevada.

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Approval

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Rangeland health reference sheet

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

Author(s)/participant(s)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/20/2006

Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** **Rills are none to rare and may be evident in areas recently subject to intense summer rainfall and on steep slopes.**

2. **Presence of water flow patterns:** **Water flow patterns none to rare and may be evident in areas recently subject to intense summer rainfall and on steeper slopes.**

3. **Number and height of erosional pedestals or terracettes:** **Pedestals are none to rare with occurrence typically limited to areas within water flow patterns.**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** **Bare Ground up to 50% depending on amount of surface rock fragments; shrub canopy to 15%; basal area for perennial herbaceous plants up to 5%.**

5. **Number of gullies and erosion associated with gullies:** **None**

6. **Extent of wind scoured, blowouts and/or depositional areas:** **None**

7. **Amount of litter movement (describe size and distance expected to travel):** **Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length (<10 ft) during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** **Soil stability values should be 1 to 4 on most soil textures found on this site. (To be field tested.)**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** **Surface structure is typically moderate medium and thin to strong very thick platy or singled grained. Soil surface colors are light and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent. (lab characterization data)**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse shrub canopy and associated litter provide some protection from raindrop impact. Perennial herbaceous plants slow runoff and increase infiltration.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Platy or massive sub-surface horizons, subsoil calcic or argillic horizons are not to be interpreted as compacted layers.

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

    Dominant: Mojave Desert shrubs

    Sub-dominant: deep-rooted, warm-season, bunchgrasses > perennial forbs > deep-rooted, cool-season, bunchgrasses > annual forbs > shallow-rooted grasses

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 35% of total woody canopy; mature bunchgrasses commonly (±25%) have dead centers

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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces 15-25% and depth (<¼-inch)

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season ±300 lbs/ac. Favorable years ±500 lbs/ac and unfavorable years ±200 lbs/ac

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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:** Potential invaders on this site include red brome, filaree, annual mustards, and Mediterranean grass.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years. Little growth or reproduction occurs in extreme drought or extended drought periods.
