

Ecological site R030XB104NV COARSE SILTY 5-7 P.Z.

Last updated: 3/10/2025

Accessed: 07/09/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

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

The Mojave Desert Major Land Resource Area (MLRA 30) is found in southern California, southern Nevada, the extreme southwest corner of Utah and northwestern Arizona within the Basin and Range Province of the Intermontane Plateaus. The Mojave Desert is a transitional area between hot deserts and cold deserts where close proximity of these desert types exert enough influence on each other to distinguish these desert types from the hot and cold deserts beyond the Mojave. Kottek et. al 2006 defines hot deserts as areas where mean annual air temperatures are above 64 F (18 C) and cold deserts as areas where mean annual air temperatures are below 64 F (18 C). Steep elevation gradients within the Mojave create islands of low elevation hot desert areas surrounded by islands of high elevation cold desert areas.

The Mojave Desert receives less than 10 inches of mean annual precipitation. Mojave Desert low elevation areas are often hyper-arid while high elevation cold deserts are often semi-arid with the majority of the Mojave being an arid climate. Hyper-arid areas receive less than 4 inches of mean annual precipitation and semi-arid areas receive more than 8 inches of precipitation (Salem 1989). The western Mojave receives very little precipitation during the summer months while the eastern Mojave experiences some summer monsoonal activity.

In summary, the Mojave is a land of extremes. Elevation gradients contribute to extremely hot and dry summers and cold moist winters where temperature highs and lows can fluctuate greatly between day and night, from day to day and from winter to summer. Precipitation falls more consistently at higher elevations while lower elevations can experience long intervals without any precipitation. Lower elevations also experience a low

frequency of precipitation events so that the majority of annual precipitation may come in only a couple precipitation events during the whole year. Hot desert areas influence cold desert areas by increasing the extreme highs and shortening the length of below freezing events. Cold desert areas influence hot desert areas by increasing the extreme lows and increasing the length of below freezing events. Average precipitation and temperature values contribute little understanding to the extremes which govern wildland plant communities across the Mojave.

Arid Eastern Mojave Land Resource Unit (XB)

LRU notes

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

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

Ecological site concept

This ecological site is found on eroded fan remnants in the upper fan piedmont between 3100 and 3600 feet elevation. Soils do not have an argillic subsurface diagnostic horizon but do have either a calcic or petrocalcic horizon within the top 25 cm of the soil profile or an accumulation of secondary carbonates for a shallow soil. Gypsum is also present in the soil profile.

This is a group concept and provisional STM that also covers R030XB079NV

Associated sites

R030XB075NV	GRAVELLY FAN 5-7 P.Z.
-------------	------------------------------

R030XB102NV	GRAVELLY LOAM 5-7 P.Z.
R030XB004NV	SANDY 5-7 P.Z.
R030XB034NV	SANDY PLAIN 5-7 P.Z.

Similar sites

R030XB053NV	SHALLOW HILL 5-7 P. Z. AMDU2-KRLA2 codominant
R030XB075NV	GRAVELLY FAN 5-7 P.Z. KRLA2 minor species, if present
R030XB044NV	COBBLY CLAYPAN 5-7 P.Z. More productive site; KRLA2 minor species, if present
R030XB224AZ	Gypsum Fan 6-9" p.z. Essentially the same ecological site concept.
R030XB080NV	STONY LOAM 5-7 P.Z. More productive site; surface rock >50 percent
R030XB102NV	GRAVELLY LOAM 5-7 P.Z. AMDU2-KRLA2 codominant

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Krascheninnikovia lanata</i>
Herbaceous	(1) <i>Pleuraphis rigida</i> (2) <i>Achnatherum hymenoides</i>

Physiographic features

This site occurs on broad alluvial fans, alluvial plains and piedmont slopes. Slopes range from 0 to 8 percent, but slope gradients of 0 to 4 percent are most typical. Elevations are 3100 to 3600 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Alluvial flat
Elevation	2,900–3,800 ft
Slope	0–8%

Climatic features

The climate is hot and arid, with mild winters and very hot summers. Precipitation is greatest in the winter with a lesser secondary peak in summer, typical of the Mojave Desert. Average annual precipitation is 5 to 7 inches. Mean annual air temperature is 56 to 65 degrees F. The average growing season is about 190 to 240 days.

Table 3. Representative climatic features

Frost-free period (average)	240 days
Freeze-free period (average)	
Precipitation total (average)	7 in

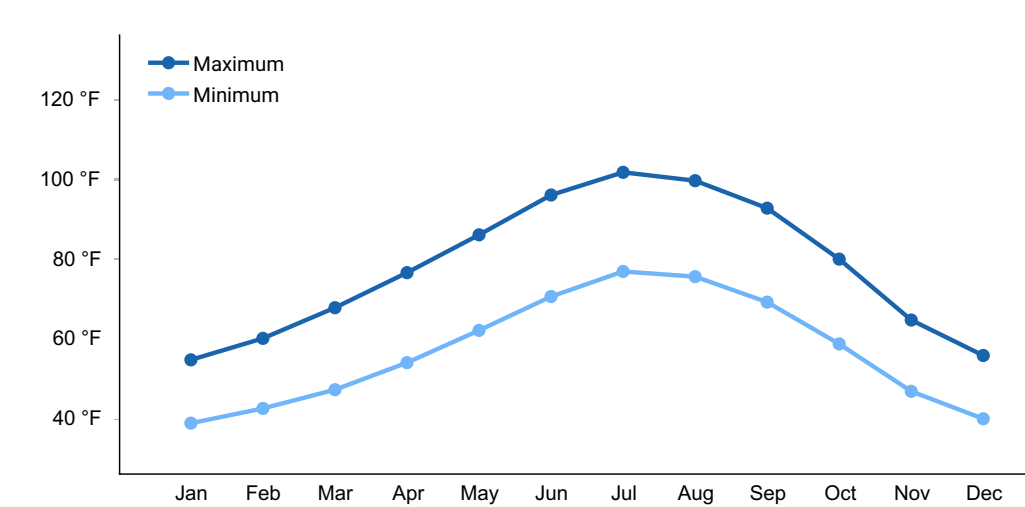


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soil associated with this site are generally moderately deep to very deep, well drained, and have formed in mixed alluvium. Surface textures are generally a very fine sandy loam, a fine sandy loam or a sandy loam. A surface cover of gravel-sized rock fragments is less than 35 percent. Soils have slow to medium runoff and are moderately permeable. Many areas receive additional moisture as run-in from higher landscapes.

Table 4. Representative soil features

Permeability class	Moderate
--------------------	----------

Ecological dynamics

As ecological condition declines, perennial grasses are reduced as creosotebush,

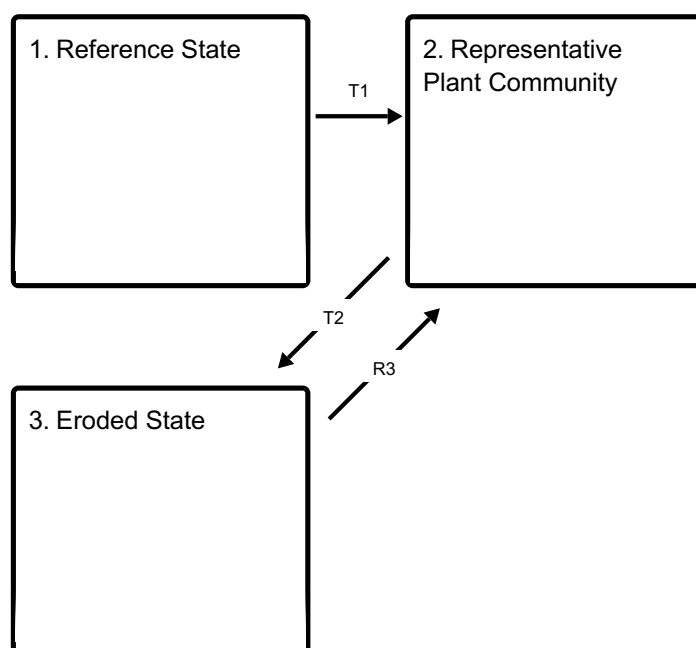
wolfberry, and white bursage increase. With continued site degradation, winterfat may be lost to the site with annual grasses and forbs the only vegetation found under a creosotebush-white bursage overstory. Spiny hopsage is most prevalent in areas that have been subject to wildfire more than 20 to 40 years before present.

Fire Ecology:

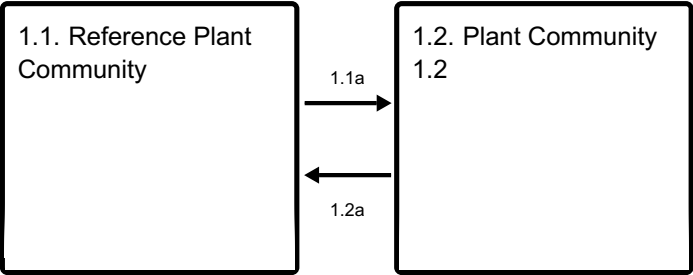
Fires in the Mojave desert are infrequent and of low severity because production of annual and perennial herbs seldom provides a fuel load capable of sustaining fire. Fire generally kills white bursage. However, most white bursage plants burned because their canopies contained numerous small branches in proximity to herbaceous fuels. Winterfat is either killed or top-killed by fire, depending on fire severity. Severe fire can kill the perennating buds located several inches above the ground surface and thus kills the plant. In addition, severe fire usually destroys seed on the plant. Low-severity fire scorches or only partially consumes the aboveground portions of winterfat and thus does not cause high mortality. Fires in spiny hopsage sites generally occur in late summer when plants are dormant, and sprouting generally does not occur until the following spring. Spiny hopsage is considered to be somewhat fire tolerant and often survives fires that kill sagebrush. Mature spiny hopsage generally sprout after being burned. Spiny hopsage is reported to be least susceptible to fire during summer dormancy. Fire most likely top-kills big galleta. Big galleta sprouts from rhizomes following fire. Damage to big galleta from fire varies, depending on whether big galleta is dormant when burned. 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. Indian ricegrass can be killed by fire, depending on severity and season of burn. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas.

State and transition model

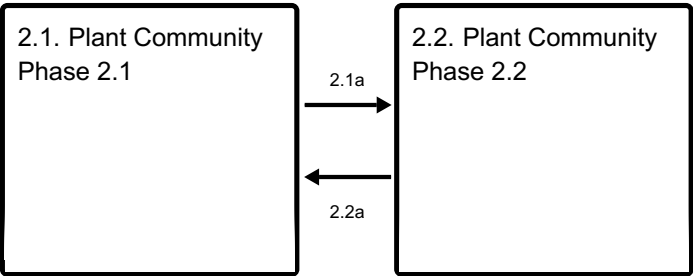
Ecosystem states



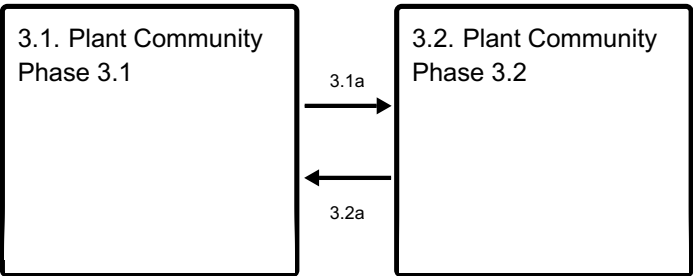
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Reference State

The reference state is representative of the natural range of variability under pristine conditions. It is maintained by periodic flooding in response to heavy rainfall events and has increased available moisture and nutrients. Fire is rare in this system. This ecological site experiences seasonal flooding and is important for redistributing moisture and nutrients throughout the landscape. Timing of disturbances combined with weather events determines plant community dynamics.

Community 1.1
Reference Plant Community

The reference plant community is dominated by winterfat. Big galleta and Indian ricegrass are other important species associated with this site. Potential vegetative composition is about 20% grasses, 5% annual and perennial forbs and 75% shrubs. Approximate ground cover (basal and crown) is 15 to 25 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	47	97	188
Forb	3	3	12
Total	50	100	200

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	15-20%
Grass/grasslike foliar cover	0%
Forb foliar cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	7-10%
Grass/grasslike basal cover	0%
Forb basal cover	1-2%
Non-vascular plants	0%
Biological crusts	0%
Litter	1-2%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 8. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	—	1-3%
>0.5 <= 1	—	1-2%	—	—
>1 <= 2	—	3-5%	—	—
>2 <= 4.5	—	3-5%	—	—
>4.5 <= 13	—	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

Community 1.2

Plant Community 1.2

This plant community is characteristic of a post-disturbance plant community phase. Initially, it is heavily dominated by herbaceous vegetation and short-lived perennials. Sprouting shrubs quickly recover and provide a favorable environment for establishment of shrub seedlings. This plant community is ‘at-risk’ of invasion by non-natives. Non-native species are able to take advantage of increased availability of critical resources following disturbances.

Pathway 1.1a

Community 1.1 to 1.2

Drought, wildfire, disease or insect attack or other event which reduces vegetation cover

Pathway 1.2a

Community 1.2 to 1.1

Absence from disturbance and natural regeneration over time.

State 2

Representative Plant Community

The Representative Plant Community is characterized by the presence of non-native species in the understory. A biotic threshold is crossed with the introduction of non-natives that are difficult to remove from the system and have they potential to significantly alter disturbance regimes from their historic range of variation. Non-native annuals will persist once introduced into the plant community, due to their annual growth form, abundant seed

production and long term seed viability. Non-native annuals such as red brome and cheatgrass are potential invaders on this ecological site. These non-native annuals are highly flammable and promote wildfires where fires historically have been infrequent.

Community 2.1

Plant Community Phase 2.1

Species composition is similar to the reference plant community. Ecological processes have not been compromised at this time, however, ecological resilience is reduced by the presence of non-natives. This plant community phase will respond differently following disturbance, when compared to the reference plant community. Management focused on decreasing the amount of anthropogenic disturbance is important for maintaining the health of perennial native species that protect the site against erosion.

Community 2.2

Plant Community Phase 2.2

This plant community is characteristic of a post-disturbance plant community. It is dominated by herbaceous vegetation, which may or may not be non-native, woody perennials are increasing. Nevada ephedra, desert almond and desert willow commonly sprout from rhizomes following disturbance. Sprouting species provide favorable sites for germination of species such as brittlebush, ratany, and bursage which reproduce sexually and are prolific seed producers. This plant community is 'at-risk' of increased erosion due to reduction of deep rooted perennials and increased non-native annuals.

Pathway 2.1a

Community 2.1 to 2.2

Drought, wildfire, disease or insect attack or other event which reduces vegetation cover

Pathway 2.2a

Community 2.2 to 2.1

Absence of disturbance and natural regeneration over time.

State 3

Eroded State

This state is characterized by reduced cover of woody perennials. Bare ground is increasing, leading to increased erosion, decreased infiltration and loosening of the soil surface causing channeling. An abiotic threshold has been crossed preventing the natural repair of this plant community. Feedbacks keeping this state stable include reduced perennial vegetative cover causing increased runoff and decreased infiltration preventing the establishment of desirable perennial vegetation.

Community 3.1

Plant Community Phase 3.1

This plant community is characteristic of a short disturbance return interval. Long-lived woody perennials are decreasing. The ability of this site to dissipate energy during large flow events is severely reduced contributing to ecological damage downstream.

Community 3.2

Plant Community Phase 3.2

This plant community is characterized by the loss of long-lived woody perennials. Ecological processes have been altered including connectivity within the watershed, ground water recharge and habitat quality. Soil and soil nutrients are being redistributed down stream, leading to down cutting and channel widening.

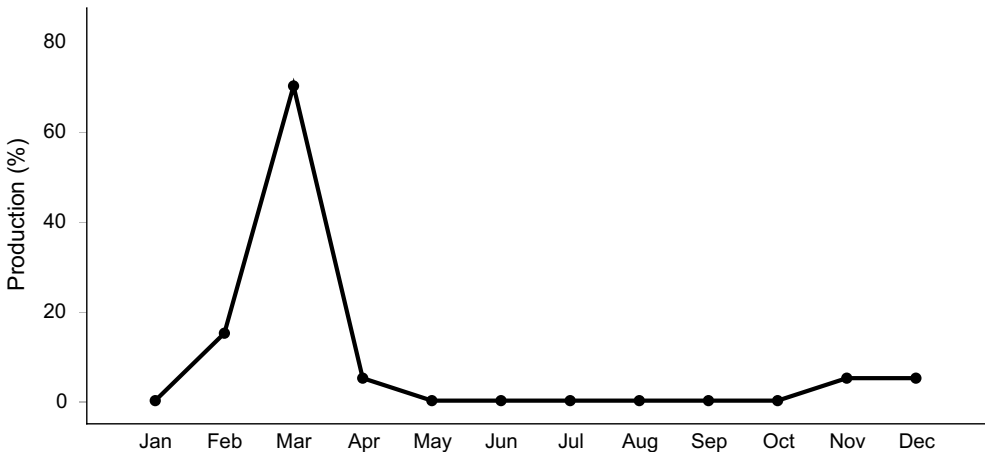


Figure 3. Plant community growth curve (percent production by month). CA1503, Annual rangeland (Unfavorable Production Year). Growth curve for an unfavorable production year resulting from the production year starting in October and extending through May. Growth curve is for oak-woodlands and associated annual grasslands..

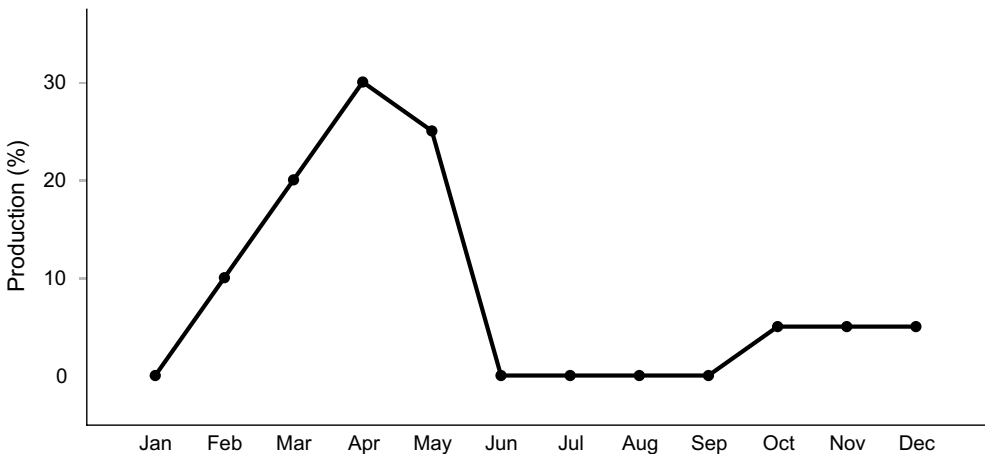


Figure 4. Plant community growth curve (percent production by month). CA1502, Annual rangeland (Favorable Production Year). Growth curve for a favorable production year resulting from the production year starting in October and extending through May. Growth curve is for oak-woodlands and associated annual grasslands..

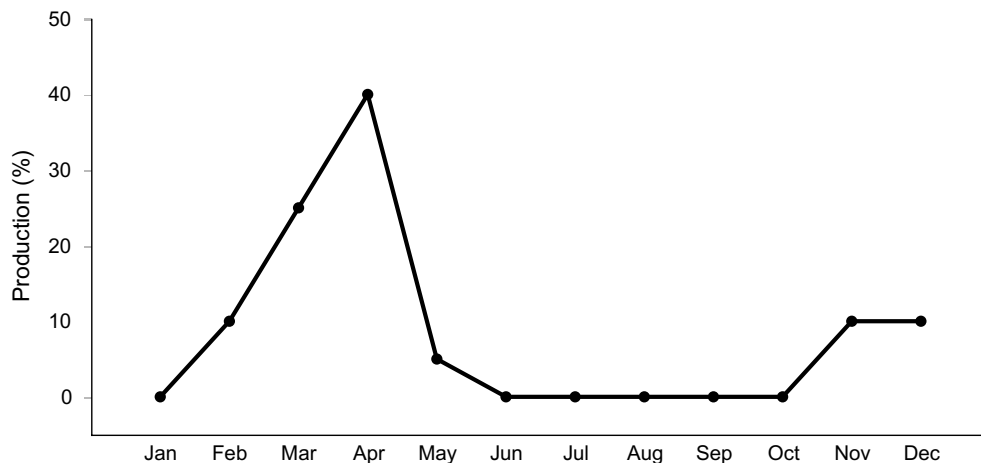


Figure 5. Plant community growth curve (percent production by month). CA1501, Annual rangeland (Normal Production Year). Growth curve for a normal (average) production year resulting from the production year starting in November and extending into early May. Growth curve is for oak-woodlands and associated annual grasslands..

Pathway 3.1a **Community 3.1 to 3.2**

Seasonal flooding, drought, wildfire, disease, insect attack or other mechanism which reduces vegetation cover.

Pathway 3.2a **Community 3.2 to 3.1**

Absence from disturbance and natural regeneration over time, allow some perennials to return to the system increasing stability.

Transition T1 **State 1 to 2**

Introduction of non-native species due to a combination of factors including; surface disturbance, changes in the kinds of animals and their grazing patterns, drought, changes in fire history or any other type of vegetation removal. Non-natives can alter disturbance regimes significantly from their natural or historic range and change ecological processes therefore creating an unlikely scenario to restore the site back to reference.

Transition T2 **State 2 to 3**

Large scale reoccurring disturbance, natural or anthropogenic.

Restoration pathway R3 **State 3 to 2**

Ecological processes can be restored to the site, but non-natives remain. Possible restoration techniques include stabilizing the site by reestablishing native perennials and the use of artificial rip-rap to dissipate energy and reestablish the flood plain.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
1	Shrubs			47–188	
	California broomsage	LESQ	<i>Lepidospartum squamatum</i>	40–160	–
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	3–14	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	2–4	–
	burrobrush	HYSA	<i>Hymenoclea salsola</i>	1–4	–
	desertsenna	SEAR8	<i>Senna armata</i>	1–2	–
	burrobush	AMDU2	<i>Ambrosia dumosa</i>	0–2	–
Forb					
2	Annual forbs			3–12	
	flatspine bur ragweed	AMAC2	<i>Ambrosia acanthicarpa</i>	1–2	–
	brittle spineflower	CHBR	<i>Chorizanthe brevicornu</i>	1–2	–
	pincushion flower	CHFR	<i>Chaenactis fremontii</i>	1–2	–
	common pussypaws	CIMO4	<i>Cistanthe monandra</i>	0–1	–
	Bigelow's tickseed	COBI	<i>Coreopsis bigelovii</i>	0–1	–
	flatcrown buckwheat	ERDE6	<i>Eriogonum deflexum</i>	0–1	–
	pygmy poppy	ESMI	<i>Eschscholzia minutiflora</i>	0–1	–
	chia	SACO6	<i>Salvia columbariae</i>	0–1	–
	Booth's evening primrose	CABO7	<i>Camissonia boothii</i>	0–1	–

Animal community

Livestock Interpretations:

This site is suitable for livestock grazing. Big galleta is considered a valuable forage plant for cattle and domestic sheep. Its coarse, rigid culms make it relatively resistant to heavy grazing and trampling. Indian ricegrass is highly palatable to all classes of livestock in both green and cured condition. It supplies a source of green feed before most other native grasses have produced much new growth. Winterfat is an important forage plant for livestock in salt-desert shrub rangeland and subalkaline flats. Winterfat palatability is rated as good for sheep, good to fair for horses, and fair for cattle. Abusive grazing practices have reduced or eliminated winterfat on some areas even though it is fairly resistant to browsing. Grazing season has more influence on winterfat than grazing intensity. Early winter grazing may actually be beneficial. Spiny hopsage as being browsed by livestock in the fall, winter, and spring. Spiny hopsage is used as forage to at least some extent by domestic sheep and goats. The large quantities of seeds produced are valuable for fattening domestic sheep. Spiny hopsage readily establishes and increases on overgrazed and denuded ranges. White bursage is of intermediate forage value. It is fair to good forage for horses 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 and is sensitive to browsing.

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 that is fine tuned by the client by adaptive management through the year and from year to year.

Wildlife Interpretations:

Winterfat is an important forage plant for wildlife in salt-desert shrub rangeland and subalkaline flats. Animals that browse winterfat include mule deer, Rocky Mountain elk, desert bighorn sheep, and pronghorn antelope. Spiny hopsage provides a palatable and nutritious food source for big game, particularly during late winter through spring. White bursage is an important browse species for wildlife. Indian ricegrass is eaten by pronghorn in "moderate" amounts whenever available. In Nevada it is consumed by desert bighorns. A number of heteromyid rodents inhabiting desert rangelands show preference for seed of Indian ricegrass. Indian ricegrass is an important component of jackrabbit diets in spring and summer. In Nevada, Indian ricegrass may even dominate jackrabbit diets during the spring through early summer months. Indian ricegrass seed provides food for many species of birds. Doves, for example, eat large amounts of shattered Indian ricegrass seed lying on the ground.

Hydrological functions

Soils have slow to medium runoff and are moderately permeable. Many areas receive additional moisture as run-in from higher landscapes.

Other products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used

seed as a reserve food source. Some Native American peoples traditionally ground parched seeds of spiny hopsage to make pinole flour. White bursage is a host for sandfood, a parasitic plant. Sandfood was a valuable food supply for Native Americans.

Other information

Big galleta's clumped growth form stabilizes blowing sand. Spiny hopsage has moderate potential for erosion control and low to high potential for long-term revegetation projects. It can improve forage, control wind erosion, and increase soil stability on gentle to moderate slopes. Spiny hopsage is suitable for highway plantings on dry sites in Nevada. White bursage may be used to revegetate disturbed sites in southwestern deserts.

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T25S R60E S8
General legal description	About 1000 feet west of Jean Lake on north side of main graveled road leading to the playa from the west (I-15), Clark County, Nevada.

Other references

Fire Effects Information System (Online; <http://www.fs.fed.us/database/feis/plants/>).

Hereford, R., R.H. Webb and C. I. Longpre. 2004. Precipitation history of the Mojave Desert region, 1893-2001 (No. 117-03).

Kottek, M., Grieser, J., Beck, C., Rudolf, B., & Rubel, F. (2006). World map of the Köppen-Geiger climate classification updated. *Meteorologische Zeitschrift*, 15(3), 259-263.

Salem, B. B. (1989). Arid zone forestry: a guide for field technicians (No. 20). Food and Agriculture Organization (FAO).

USDA-NRCS Plants Database (Online; <http://www.plants.usda.gov>).

Contributors

BLS/GKB

Dustin Detweiler

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an

assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	07/09/2025
Approved by	Sarah Quistberg
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:**
-