USDA Natural Resources
Conservation Service

Ecological site R030XB002NV
LOAMY HILL 5-7 P.Z.

Last updated: 2/18/2025
Accessed: 05/13/2025

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, southern Nevada, southwest Utah, and 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. The Eastern Mojave

receives more than 25% of the mean annual precipitation during July through September (Hereford et. al 2004) which tends to support more warm season plant species than the Western Mojave. Vegetation in the Eastern Mojave 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

The Loamy Hill ecological site is found on mountain slopes between 3800 and 4300 feet (1150 - 1300 m) elevation. Soils formed in colluvium and residuum weathered from limestone and dolomite, are very shallow with a high amount of gravel cover and less than 15% cobble, stones and boulder cover.

This is a group concept and provisional STM that also covers the following ecological sites: R030XA002NV, R030XA006NV, R030XY044NV

Associated sites

R030XB005NV	**Arid Active Alluvial Fans**
R030XB006NV	**LOAMY 5-7 P.Z.**

Similar sites

R030XA006NV	**SHALLOW LIMESTONE SLOPE 5-7 P.Z.** Essentially the same ecological site concept as R030XB002NV.
R030XB127NV	**SHALLOW SANDSTONE SLOPE 3-5 P.Z.** PSFR major shrub
R030XB114NV	**SODIC LOAM 3-5 P.Z.** ATCO-SUAED dominant shrubs
R030XB126NV	**GRAVELLY PEDIMENT 5-7 P.Z.** PSFR-ATCO-AMDU2 codominant shrubs
R030XB006NV	**LOAMY 5-7 P.Z.** More productive site
R030XB106NV	**GRAVELLY SLOPE 5-7 P.Z.** Much greater production; PLRI3 dominant grass
R030XY040NV	**SODIC TERRACE** ATPO-ATCA2-LYCIU important shrubs
R030XY049NV	**BREAKS 3-7 P.Z.** PRJU important species
R030XB125NV	**CHANNERY HILL 3-5 P.Z.** ATCO-AMDU2 codominant shrubs
R030XB010NV	**LOAMY SLOPE 5-7 P.Z.** More productive
R030XA002NV	**LIMESTONE HILL 5-7 P.Z.** Essentially the same ecological site concept as R030XB002NV.
R030XB131NV	**CALCAREOUS PEDIMENT 3-5 P.Z.** ATCO-AMDU2 codominant shrubs

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex confertifolia*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Pleuraphis rigida*

Physiographic features

This site occurs on hills and lower mountain sideslopes on all exposures. Slopes range from 8 to 75 percent, but slope gradients of 15 to 50 percent are most typical. Elevations are 3800 to about 4300 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope
Elevation	1,158–1,311 m
Slope	8–75%
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, characterized by cool, moist winters and hot, dry summers. Most of the rainfall falls between November and April. Summer convection storms from July to September may contribue up to 25 precent of the annual precipitation. Average annual precipitation is about 5 to 7 inches. Mean annual air temperature is 60 to 68 degrees F. The average growing season is about 180 to 290 days.

Table 3. Representative climatic features

Frost-free period (average)	290 days
Freeze-free period (average)	
Precipitation total (average)	178 mm

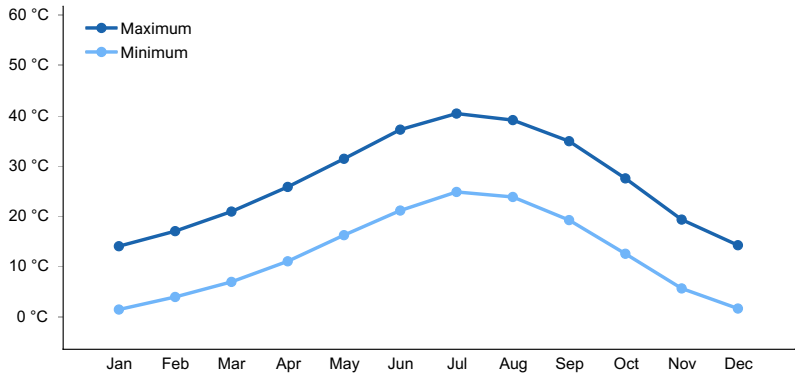


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils of this site are very shallow to shallow and well drained. They are derived from colluvium and residuum from limestone and dolomite. Surface soils are typically medium to moderately coarse textured. The soil surface has high amounts of gravel, cobbles, or stones. Water intake rate is moderate, available water capacity is very low, and runoff is high. The soils have a typic aridic soil moisture regime and an ochric epipedon. Soil series correlated to this site includes Birdspring, a loamy-skeletal, carbonatic, thermic, Lithic Torriorthent.

Table 4. Representative soil features

Parent material	(1) Colluvium–dolomite (2) Residuum–limestone
Surface texture	(1) Very gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained
Permeability class	Moderately rapid
Soil depth	10–25 cm
Surface fragment cover <=3"	50–70%
Surface fragment cover >3"	0–6%
Available water capacity (0-101.6cm)	0.38–0.71 cm
Calcium carbonate equivalent (0-101.6cm)	40–60%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	8.2–8.4
Subsurface fragment volume <=3" (Depth not specified)	50–64%
Subsurface fragment volume >3" (Depth not specified)	0–6%

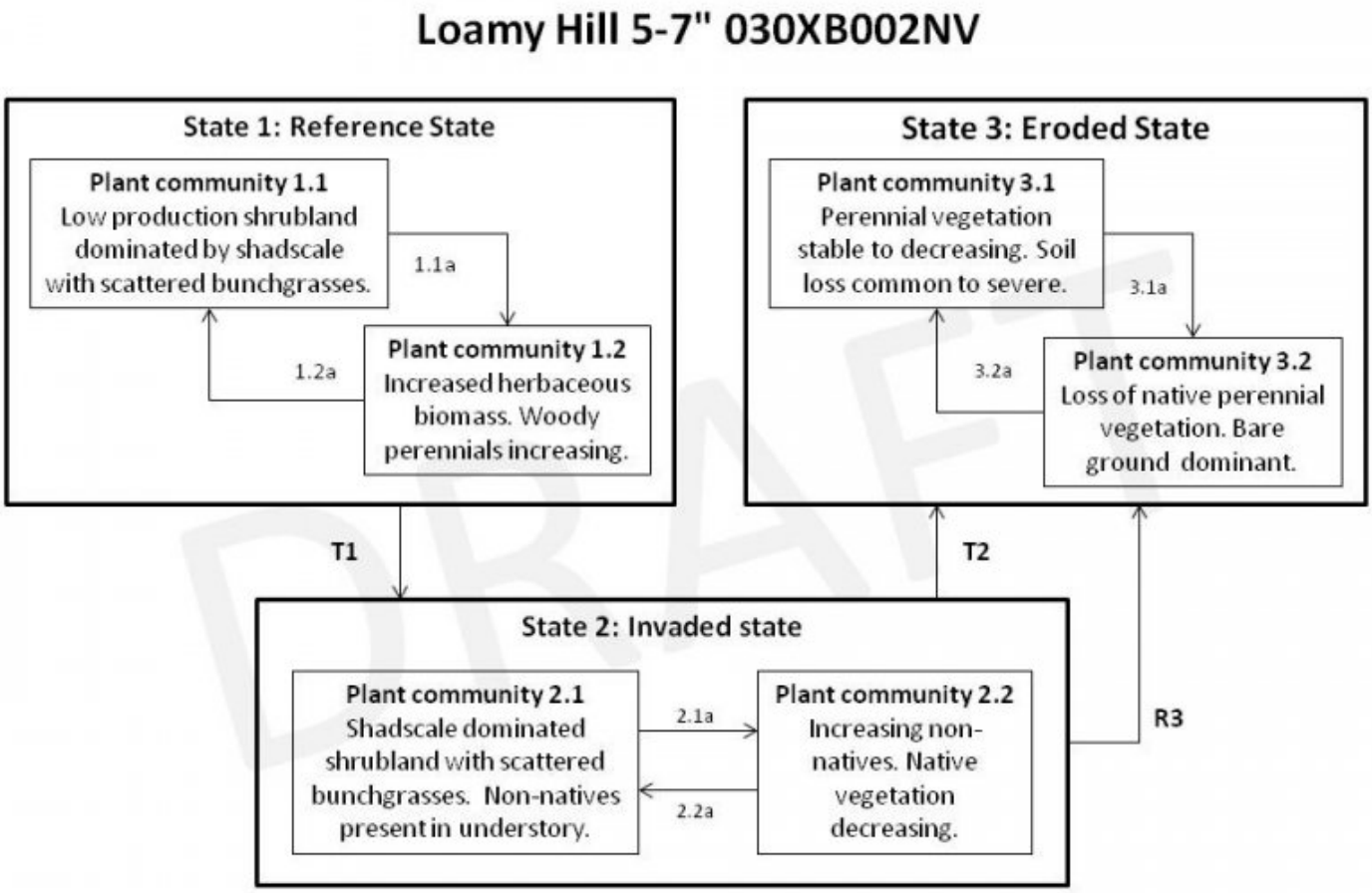
Ecological dynamics

The plant communities of this site are dynamic in response to changes in disturbance regimes and weather patterns. Community phase changes are primarily driven by long term drought. Historically wildfire was infrequent and patchy, due to widely spaced vegetation and low herbaceous production.
Shadscale is a partially deciduous, short-lived shrub and is tolerant of alkaline conditions and relatively high pH, however, germination can be reduced if salt concentrations become too high. Reproduction occurs solely through seed and prolonged drought can result in high mortality of shadscale. Periods of greater than normal precipitation can also lead to increased mortality. Long periods of high soil moisture leave shadscale susceptible to insect attack and diseases (Simonin 2001). Shadscale has extreme drought resistance, surviving more than a week at -6Megapascals of water potential. Tolerance to drought is achieved through the shedding of some leaves, which reduces water loss (Simonim 2001).
The spatial distribution of vegetation of this site impacts runoff, infiltration, sediment redistribution and nutrient cycling. Patches of vegetation increase fine sediment deposition and reduce runoff, producing positive feedback dynamics in the plant community. Shrub canopies shield the soil from radiation and rainfall (Puigdefabregas 2005). Shrubs partition the rainfall into interception, throughfall and stem flow. Interception diminishes net rainfall, while stemflow concentrates the water and results in deeper infiltration (Puigdefabregas 2005).

Fire Ecology:
Fires in the Mojave Desert are infrequent and of low severity due to widely spaced shrubs and low fuel production. The historic mean fire return interval for shadscale communities ranges from 35 to 100+ years. Fire generally kills white bursage and shadscale. Reestablishment occurs primarily via off-site seed sources. Nevada ephedra is top-killed by fire. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. Nevada ephedra generally sprouts after fire damages aboveground vegetation and may increase in plant cover. Torrey’s ephedra has medium fire tolerance and is similar to Nevada ephedra. Fire kills many creosotebush. Creosotebush is poorly adapted to fire because of its limited sprouting ability. Creosotebush survives some fires that burn patchily or are of low severity. 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. Desert needlegrass has persistent dead leaf bases, which make it susceptible to burning. Fire removes the accumulation; a

rapid, cool fire will not burn deep into the root crown and surviving tufts will resprout. Fire most likely top-kills big galleta and will sprout 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.

State and transition model



State 1
Reference State

The reference state is representative of the natural range of variability under pristine conditions. Community phase changes are primarily driven by long-term drought and infrequent wildfire. Wildfire is infrequent due to low fuel loading and widely spaced shrubs, resulting in long-lived stable shadscale plant communities. Timing of disturbance combined with weather events determines plant community dynamics.

Community 1.1
Reference Plant Community

Figure 2. Loamy Hill

The reference plant community is dominated by shadscale. Indian ricegrass, big galleta and ephedra are important associated species. Potential vegetative composition is about 10 percent grasses, 5 percent forbs and 85 percent shrubs. This plant community is sparsely vegetated with approximate ground cover (basal and crown) 2 to 10 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	37	110	183
Grass/Grasslike	13	41	69
Forb	6	17	28
Total	**56**	**168**	**280**

Community 1.2
Plant Community 1.2

This plant community is characteristic of a post-disturbance plant community. Initially herbaceous vegetation increases, sprouting shrubs, such as ephedra, quickly recover and provide favorable sites for the establishment of other shrub seedlings. Post-disturbance plant community composition may vary depending on season of disturbance. This plant community is ‘at-risk’ of invasion by non-native species. Non-natives are able to take advantage of increased availability of critical resources following disturbance.

Pathway 1.1a
Community 1.1 to 1.2

Prolonged drought, insect attack and possibly low intensity, patchy wildfire.

Pathway 1.2a
Community 1.2 to 1.1

Absence from disturbance and natural regeneration over time.

State 2
Invaded State

The invaded state is characterized by the presence of non-native species in the understory. Non-native annuals such as red brome, Mediterranean grass, and redstem filaree have invaded the reference plant community and have become a dominant component of the herbaceous cover. A biotic threshold is crossed with the introduction of non-natives that cannot be easily removed from the system and have the potential to significantly alter disturbance regimes from their historic range of variability. These non-natives are highly flammable and promote wildfires where

fires historically have been infrequent. Shadscale persists after this invasion, however shrub seedlings and native forbs have limited competitive ability against non-native annuals.

Community 2.1
Invaded Plant Community 2.1

This plant community is characterized by the presence of non-natives. Species composition and ecological function are similar to the reference plant community. However, ecological resilience is reduced by the presence of non-native species. This plant community may respond differently following a disturbance, when compared to non-invaded plant communities.

Community 2.2
Invaded Plant Community 2.2

This plant community is characterized by the reduction of native perennials and the increase of non-native annuals. Native shrubs will persist through the invasion but will experience reduced vigor and seedling recruitment. This plant community is identified as “at-risk”. The decreased native perennial vegetation and dominance by non-native annuals reduces the soil stability and leaves the site vulnerable to erosion from wind and water. Careful management is needed to ensure further degradation and loss of ecosystem function.

Pathway 2.1a
Community 2.1 to 2.2

Prolonged drought, wildfire, disease/insect attack or other localized disturbance.

Pathway 2.2a
Community 2.2 to 2.1

Absence from disturbance and natural regeneration over time. Non-natives persist in the plant community.

State 3
Eroded State

The eroded state is characterized by reduced cover of perennial vegetation which leads to an increase in bare ground, leading to higher levels erosion and decreased infiltration rates. Feedbacks keeping this state stable include reduced perennial vegetative cover causing increased runoff, decreased infiltration and reduced run-on moisture preventing establishment of desirable perennial vegetation.

Community 3.1
Eroded Plant Community 3.1

This plant community is characterized by decreased perennial native vegetation and increased soil erosion. Patches of vegetation increase water storage capacity and increase organic carbon and nutrient inputs. The loss of patches of vegetation negatively affects soil hydrology, nutrient cycling and vegetation establishment. Severity of erosion is dependent on environmental factors such as topography, rainfall and soil type.

Community 3.2
Eroded Plant Community 3.2

This plant community is characterized by the total loss of perennial vegetation. Soil and soil nutrients are being relocated down slope. Ecological processes, including nutrient and carbon inputs, hydrological cycle, and soil stability, have been significantly altered, even truncated in some cases. Non-native annuals persist in the plant community.

Pathway 3.1a
Community 3.1 to 3.2

Prolonged surface disturbance, prolonged drought or both.

Pathway 3.2a
Community 3.2 to 3.1

Changes in management and/or periods of favorable climatic conditions allow for natural regeneration over time.

Transition T1
State 1 to 2

Introduction of non-natives due to a combination of factors including: 1) surface disturbances, 2) changes in the kinds of animals and their grazing patterns, 3) drought and/or 4) changes in fire history.

Transition T2
State 2 to 3

Large scale disturbance removes native perennial vegetation.

Restoration pathway R3
State 3 to 2

Possible restoration techniques, to stabilize the site and reestablish native perennials, include flattening and terracing hill slopes, closing roads, vertical, horizontal and rock mulching, as well as, planting container stock. Non-native species remain in the plant community.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			16–44	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	9–17	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	3–13	–
	big galleta	PLRI3	*Pleuraphis rigida*	3–13	–
2	**Secondary Perennial Grasses**			1–9	
	threeawn	ARIST	*Aristida*	1–3	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	1–3	–
	squirreltail	ELEL5	*Elymus elymoides*	1–3	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	1–3	–
Forb					
3	**Perennial**			3–13	
	globemallow	SPHAE	*Sphaeralcea*	1–6	–
4	**Annual**			1–28	
	threeawn	ARIST	*Aristida*	1–2	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	1–2	–
Shrub/Vine					
5	**Primary shrubs**			61–119	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	50–84	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	2–9	–
	Torrey's jointfir	EPTO	*Ephedra torreyana*	2–9	–
	creosote bush	LATR2	*Larrea tridentata*	3–9	–
	burrobush	AMDU2	*Ambrosia dumosa*	3–9	–
6	**Secondary shrubs**			9–28	
	burrobrush	HYSA	*Hymenoclea salsola*	1–6	–
	desert pepperweed	LEFR2	*Lepidium fremontii*	1–6	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	1–6	–
	yucca	YUCCA	*Yucca*	1–6	–

Animal community

Livestock Interpretations:
This site is poorly suited to livestock grazing, due to the low forage production. 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. Desert needlegrass produces considerable basal foliage and is good forage while young. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle but rarely grazed by sheep. 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. Shadscale provides good browse for domestic sheep and goats. Shadscale leaves and seeds are an important component of domestic sheep and cattle winter diets. Shadscale tends to be browse tolerant. Heavy grazing during the winter and/or spring reduces shadscale. Die-off can also occur during extended periods of high precipitation. Shadscale is tolerant of early spring light-intensity browsing. Nevada and Torrey ephedra are important winter range browse for domestic cattle, sheep and goats. They are usually grazed heavily and seems to be perfectly safe for grazing livestock since they induce neither toxicity in ewes or cows, nor congenital deformities in lambs. 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. Creosotebush is unpalatable to livestock. Consumption of

creosotebush may be fatal to sheep.

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:
Shadscale is a valuable browse species providing a source of palatable, nutritious forage for a wide variety of wildlife. The fruits and leaves are a food source for deer, desert bighorn sheep and pronghorn antelope. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Mountain quail eat Ephedra seeds. Nevada and Torrey ephedra are important browse species for big game. They are moderately palatable to many big game species, especially as winter browse. White bursage is an important browse species for wildlife. Creosotebush is unpalatable to most browsing 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. Desert bighorn sheep and feral horses and burros will graze desert needlegrass.

Hydrological functions

Runoff is high and permeability is moderately rapid. Rills are none to rare, with a few occuron on steeper slopes in areas recently subjected to summer convection storms. Water flow patterns are rare and are short and stable. Sparse shrub canopy and littler provide some protection from raindrop impact.

Recreational uses

This site is used for hiking, photography and upland gamebird hunting.

Other products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source. Seeds of shadscale were used by Native Americans for bread and mush. White bursage is a host for sandfood, a parasitic plant. Sandfood was a valuable food supply for Native Americans. Creosotebush has been highly valued for its medicinal properties by Native Americans. It has been used to treat at least 14 illnesses. Twigs and leaves may be boiled as tea, steamed, pounded into a powder, pressed into a poultice, or heated into an infusion.

Other information

Desert needlegrass may be used for groundcover in areas of light disturbance, but it is susceptible to excessive trampling. Big galleta's clumped growth form stabilizes blowing sand. White bursage may be used to revegetate disturbed sites in southwestern deserts. Once established, creosotebush may improve sites for annuals that grow under its canopy by trapping fine soil, organic matter, and symbiont propagules. It may also increase water infiltration and storage.

Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T7S R61E S36
General legal description	East side of Pahranagat Valley, Lincoln County, Nevada. This site also occurs in 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.

Puigdefabregas, J. 2005. The role of vegetation patterns in structuring runoff and sediment fluxes in drylands. Earth Surface Processes and Landforms. 30:133-147.

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

Simonin, Kevin A. 2001. Atriplex confertifolia. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/

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

Contributors

HA
Dustin Detweiler

Approval

Kendra Moseley, 2/18/2025

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)	P. Novak-Echenique
Contact for lead author	State Range Management Specialist
Date	08/19/2011
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are rare. A few can be expected on steeper slopes in areas subjected to summer convection storms.

---

2. **Presence of water flow patterns:** Water flow patterns are none to few in areas subjected to summer convection storms. Flow patterns short and stable.

---

3. **Number and height of erosional pedestals or terracettes:** None

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 30 to over 50%

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 during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during 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 2 to 4 on most soil textures found on this site. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. (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 fine to medium platy or prismatic. 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 to 1 percent.

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.

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

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: Reference Plant Community: Low-statured salt desert shrub (shadscale)

    Sub-dominant: >associated low-statured salt desert shrubs >deep-rooted, cool season, perennial bunchgrasses>shallow-rooted, cool & warm season, perennial grasses>deep-rooted, cool season, perennial forbs=fibrous, shallow-rooted, cool season, annual and perennial forbs.

    Other:

    Additional:

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.

14. **Average percent litter cover (%) and depth (in):** Between plant interspaces and under shrubs 5-10% with depth <0.25 inches

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season ± 150 lbs/ac, favorable years ±250 lbs/ac, unfavorable years ±50 lbs/ac; Spring moisture significantly affects total 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:** Potential invaders include red brome, Mediterranean grass, redstem filaree and annual mustards.

17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing seasons. During drought years little growth occurs with some functional groups not reproducing.