USDA Natural Resources
Conservation Service

Ecological site R030XB037NV
LIMY SAND 5-7 P.Z.

Last updated: 3/11/2025
Accessed: 05/12/2025

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.

Ecological site concept

This site occurs on fan skirts, inset fans, and sand sheets on all exposures. Slopes range from 0 to 4 percent. Elevations are 2000 to 5000 feet.The soils associated with this site are moderately deep to very deep sands formed from mixed parent material.

Please refer to group concept R030XB137CA to view the provisional STM.

Associated sites

R030XB004NV	**SANDY 5-7 P.Z.**
R030XB019NV	**Eroded Fan Remnant Pavette 4-6 P.Z.**
R030XB063NV	**SANDHILL 5-7 P.Z.**

Similar sites

R030XB122NV	**LIMY SAND 3-5 P.Z.** PLRI3 dominant grass
R030XB039NV	**LIMY FAN 5-7 P.Z.** more productive site; MUPO2 important species
R030XB063NV	**SANDHILL 5-7 P.Z.** ACHY-PLRI3 codominant; more productive site; occurs on sand dunes
R030XB004NV	**SANDY 5-7 P.Z.** more productive site
R030XB121NV	**SANDY PLAIN 3-5 P.Z.** more productive site; on broad alluvial plains

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Ambrosia dumosa* (2) *Larrea tridentata*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Pleuraphis rigida*

Physiographic features

This site occurs on fan skirts, inset fans, and sand sheets on all exposures. Slopes range from 0 to 4 percent. Elevations are 2000 to 5000 feet.

Table 2. Representative physiographic features

Landforms	(1) Sand sheet (2) Fan skirt (3) Inset fan
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Very rare
Ponding frequency	None
Elevation	2,000–5,000 ft
Slope	0–4%
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 25 percent of the annual precipitation. 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

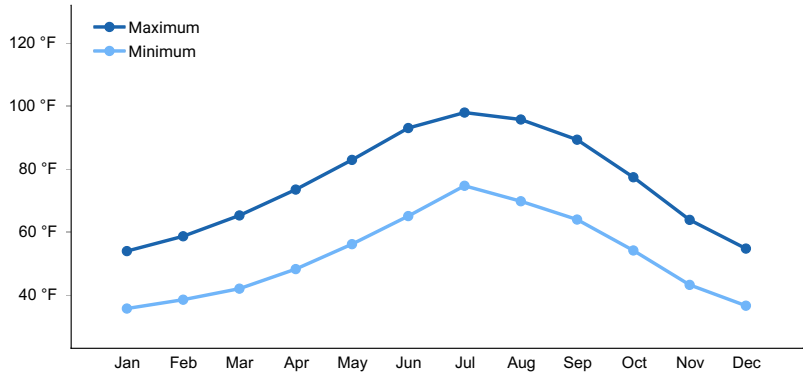


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are moderately deep to very deep sands formed from mixed parent material. The soils are well drained to excessively drained. Water intake rates are moderately rapid to very rapid and available water capacity is low to very low. Runoff is negligible to very slow. The soil series associated with this site include: Bluepoint, Corbilt, and Jean.

Table 4. Representative soil features

Surface texture	(1) Gravelly loamy fine sand (2) Extremely gravelly sand (3) Fine sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	39–84 in
Surface fragment cover <=3"	0–35%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	0.9–4.3 in
Calcium carbonate equivalent (0-40in)	1–20%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	7.4–9.6
Subsurface fragment volume <=3" (Depth not specified)	0–55%
Subsurface fragment volume >3" (Depth not specified)	0–17%

Ecological dynamics

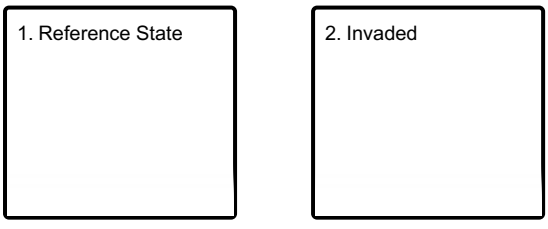
Please refer to group concept R030XB137CA to view the provisional STM.

As ecological condition deteriorates, perennial grasses and forbs decrease. Introduced annual forbs and grasses readily invade this site.

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. Creosotebush scrub fuels are comprised primarily of woody shrubs, but it is the fine fuels from annuals and perennial grasses that facilitate the ignition and spread of wildfires. Native annual plants usually break down rapidly during the summer and do not create a long-lived fuelbed. Fine fuels from non-native annual grasses currently represent the most important fuelbed component. Fire generally kills white bursage. 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. 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.

State and transition model

Ecosystem states



State 1 submodel, plant communities

1.1. Reference Plant Community

State 1
Reference State

Community 1.1
Reference Plant Community

The reference plant community is dominated by creosotebush, white bursage, Indian ricegrass and big galleta. Sand dropseed and mesa and spike dropseed are other important species associated with this site. Potential vegetative composition is about 35% grasses, 10% forbs and 55% shrubs. Approximate ground cover (basal and crown) is 5 to 10 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	110	193	330
Grass/Grasslike	70	122	210
Forb	20	35	60
Total	**200**	**350**	**600**

State 2
Invaded

Introduced annuals such as red brome, schismus and redstem stork's bill have invaded the reference plant community and have become a dominant component of the herbaceous cover. This invasion of non-natives is attributed to a combination of factors including: 1) surface disturbances, 2) changes in the kinds of animals and their grazing patterns, 3) drought, and 4) changes in fire history. These non-natives annuals are highly flammable and promote wildfires where fires historically have been infrequent. LATR and AMDU would persist after this invasion by non-native annuals, but the other shrubs and desirable grasses would either be unsuccessful in competing with the non-natives or removed from the system. The threshold that is crossed, is the introduction of non-native annuals that cannot be removed from the system and will alter disturbance regimes significantly from their natural or historic range of disturbances.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			53–123	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	35–70	–
	big galleta	PLRI3	*Pleuraphis rigida*	18–53	–
2	**Secondary Perennial Grasses**			1–18	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	2–7	–
Forb					
3	**Perennial Forbs**			7–28	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	2–11	–
4	**Annual Forbs**			1–53	
	pincushion flower	CHFR	*Chaenactis fremontii*	2–11	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	2–11	–
	evening primrose	OENOT	*Oenothera*	2–11	–
Shrub/Vine					
5	**Primary Shrubs**			105–175	
	burrobush	AMDU2	*Ambrosia dumosa*	70–105	–
	creosote bush	LATR2	*Larrea tridentata*	35–70	–
6	**Secondary Shrubs**			18–53	
	jointfir	EPHED	*Ephedra*	4–11	–
	burrobrush	HYSA	*Hymenoclea salsola*	4–11	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	4–11	–
	desert pepperweed	LEFR2	*Lepidium fremontii*	4–11	–
	desert-thorn	LYCIU	*Lycium*	4–11	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	4–11	–
	Mojave yucca	YUSC2	*Yucca schidigera*	4–11	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing, due to the low forage production. Grazing management should be keyed to perennial grasses or palatable shrubs production. 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 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. Many animals bed in or under creosotebush. Domestic sheep dig shallow beds under creosotebush because it provides the only shade in the desert scrub community. Creosotebush is unpalatable to livestock. Consumption of creosotebush may be fatal to sheep. 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. 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.
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:
White bursage is an important browse species for wildlife. Many small mammals browse creosotebush or consume its seeds. Desert reptiles and amphibians use creosotebush as a food source and perch site and hibernate or estivate in burrows under creosotebush, avoiding predators and excessive daytime temperatures. Indian ricegrass

is eaten by pronghorn in moderate amounts whenever available. 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. 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. In southern Nevada, big galleta is heavily utilized by bighorn sheep and in some blackbrush communities it is referred to as preferred habitat. Mule deer utilize trace amounts of big galleta.

Hydrological functions

Runoff is negligible to very low. Permeability is moderately rapid to rapid. Hydrologic soil groups are A, B, and C.

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. This site is used for camping and hiking and has potential for upland and big game hunting.

Other products

White bursage is a host for sandfood, a parasitic plant with a sweet, succulent, subterranean flowerstalk. Sandfood was a valuable food supply for desert peoples. Creosotebush has been highly valued for its medicinal properties by desert peoples. 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. Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the seed as a reserve food source.

Other information

White bursage may be used to revegetate disturbed sites in southwestern deserts. Creosotebush may be used to rehabilitate disturbed environments 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. Big galleta's clumped growth form stabilizes blowing sand.

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T28S R65E S20
UTM zone	N
UTM northing	3930313
UTM easting	704128
Latitude	35° 29′ 43″
Longitude	114° 44′ 58″
General legal description	Along Nevada Highway 68 to Cottonwood Cove leading east out of Searchlight, Clark County, Nevada. This site also includes southern Lincoln and southern Nye counties.

Other references

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

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

Contributors

HA/GKB

Approval

Kendra Moseley, 3/11/2025

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 Rangland Management Specialist
Date	03/09/2010
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. Rills only expected on steeper slopes in areas recently subjected to summer convection storms.

---

2. **Presence of water flow patterns:** Water flow patterns none to rare. Waterflow patterns only expected on steeper slopes in areas recently subjected to summer convection storms.

---

3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas affected by wind scouring or on steeper slopes in association with waterflow patterns.

---

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

---

5. **Number of gullies and erosion associated with gullies:** Gullies are none to rare.

---

6. **Extent of wind scoured, blowouts and/or depositional areas:** None to slight. If observed, wind scour spots are isolated and of small extent.

---

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 storms. Persistent litter (large woody material) will remain in place except during catastrophic 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 the sandy 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 single grain. Soil surface colors are light and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is typically 1 to 1.5 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., Indian ricegrass and big galleta] slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact.

---

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

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

    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 25% of total woody canopy; some of the mature bunchgrasses (<20%) have dead centers.

---

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

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season ±350 lbs/ac.

---

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:** Invaders on this site include Mediterranean grass, red brome, and filaree.

17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years.