USDA Natural Resources
Conservation Service

Ecological site R030XA059NV
GRAVELLY HILL 5-7 P.Z.

Last updated: 2/18/2025
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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.

Ecological site concept

This site occurs on the summits and sideslopes of hills and lower mountains and fan remnants on all aspects. Slopes range from 8 to 50 percent, but slope gradients of 15 to 50 percent are typical. Elevations are 3400 to about 5100 feet. The soils assocaited with this site are very shallow to shallow and well to somewhat excessively drained.

Please refer to group concept R030XB072NV to view the provisional STM.

Similar sites

R030XA061NV	**LOAMY 5-7 P.Z.** Not on hills; slopes typically <15%; greater shrub diversity
R030XA066NV	**CALCAREOUS LOAM 5-7 P.Z.** AMDU2-ATCO codominant
R030XA002NV	**LIMESTONE HILL 5-7 P.Z.** Soils from limestone PM; LATR2 minor spp., if present
R030XA044NV	**LOAMY HILL 5-7 P.Z.** LYAN & MESP2 major shrubs; AMDU2 not a major shrub
R030XA068NV	**CALCAREOUS HILL 5-7 P.Z.** MESP2 & LYAN major shrubs
R030XA056NV	**LOAMY HILL 3-5 P.Z.** LYAN & Ephedra minor spp

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex confertifolia* (2) *Larrea tridentata*
Herbaceous	(1) *Achnatherum speciosum*

Physiographic features

This site occurs on the summits and sideslopes of hills and lower mountains and fan remnants on all aspects. Slopes range from 8 to 50 percent, but slope gradients of 15 to 50 percent are typical. Elevations are 3400 to about 5100 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain (3) Fan remnant
Elevation	3,400–5,100 ft
Slope	8–50%
Aspect	Aspect is not a significant factor

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 58 to 68 degrees F. The average growing season is about 160 to 260 days.

Table 3. Representative climatic features

Frost-free period (average)	260 days
Freeze-free period (average)	
Precipitation total (average)	7 in

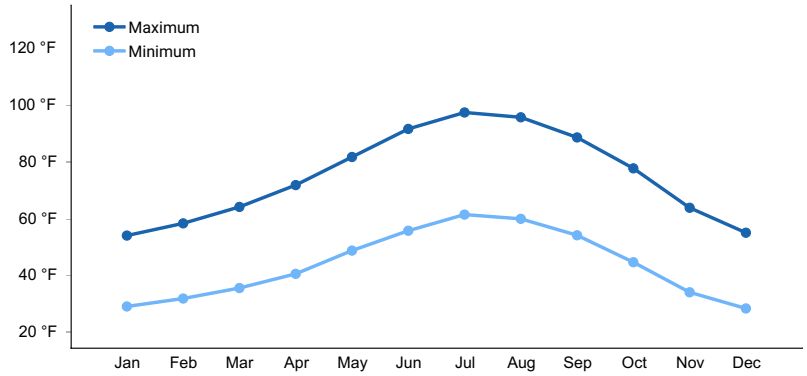

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils assocaited with this site are very shallow to shallow and well to somewhat excessively drained. These soils have formed in residuum from mixed parent material. High amounts of rock fragments occur at the soil surface which occupy plant growing space yet help to reduce evaporation and conserve soil moisture. Coarse fragments on the surface provide a stabilizing affect of surface erosion conditions. Runoff is very high, available water capacity is very low and water intake rates are slow to moderately rapid. The soil series associated with this site include: Birdspring, Greyeagle, Tecopa, and Zalda.

Table 4. Representative soil features

Surface texture	(1) Extremely gravelly sandy loam (2) Very gravelly loam (3) Very gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Slow to moderately rapid

Soil depth	2–20 in
Surface fragment cover <=3"	55–70%
Surface fragment cover >3"	5–13%
Available water capacity (0-40in)	0.2–1.3 in
Calcium carbonate equivalent (0-40in)	0–25%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	12–65%
Subsurface fragment volume >3" (Depth not specified)	0–45%

Ecological dynamics

Please refer to group concept R030XB072NV to view the provisional STM.

As ecological condition declines, creosotebush, white burrubrush, and wolfberry increase. Following mechanical disturbance or wildfire, introduced annual grasses and forbs readily invade or increase on this site.

Fire Ecology:
Fires in creosotebush scrub were an infrequent event in pre-settlement desert habitats, because fine fuels from winter annual plants were probably sparse, only occurring in large amounts during exceptionally wet winters. Increased presence of non-native annual grasses, such as cheatgrass, can alter fire regimes by increasing fire frequency under wet to near-normal summer moisture conditions. Fire generally kills white bursage. However, most white bursage plants burned because their canopies contained numerous small branches in proximity to herbaceous fuels. 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. 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. Shadscale is fire intolerant and it does not readily recover from fire, except for establishment through seed. 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. 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

1. Reference State

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 and shadscale. White bursage, Ephedra ssp., and desert needlegrass are other important plants associated with this site. Potential vegetative composition is about 20% grasses, 10% annual and perennial forbs, and 70% shrubs. Approximate ground cover (basal and crown) is 3 to 8 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	35	105	175
Grass/Grasslike	10	30	50
Forb	5	15	25
Total	**50**	**150**	**250**

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**			11–27	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	8–15	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	3–12	–
2	**Secondary Perennial Grasses**			1–8	
	low woollygrass	DAPU7	*Dasyochloa pulchella*	1–5	–
	squirreltail	ELEL5	*Elymus elymoides*	1–5	–
Forb					
3	**Perennial forbs**			1–12	
4	**Annual forbs**			1–15	
Shrub/Vine					
5	**Primary shrubs**			75–129	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	30–53	–
	creosote bush	LATR2	*Larrea tridentata*	15–30	–
	burrobush	AMDU2	*Ambrosia dumosa*	15–23	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	15–23	–
6	**Secondary shrubs**			3–15	
	fourwing saltbush	ATCA2	*Atriplex canescens*	2–5	–
	burrobrush	HYSA	*Hymenoclea salsola*	2–5	–
	desert pepperweed	LEFR2	*Lepidium fremontii*	2–5	–
	desert-thorn	LYCIU	*Lycium*	2–5	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing, due to the low forage production, steep slopes and stony surfaces. 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. 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. 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. Creosotebush is unpalatable to livestock. Consumption of creosotebush may be fatal to sheep. 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. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Nevada ephedra is usually grazed heavily and seems to be perfectly safe for grazing livestock since it induces neither toxicity in ewes or cows, nor congenital deformities in lambs.

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. Creosotebush is unpalatable to most browsing wildlife. White bursage is an important browse species for wildlife.

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. Desert bighorn sheep and feral horses and burros will graze desert needlegrass. 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

Runoff is very high. Permeability is slow to moderately rapid.

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. 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. White bursage is a host for sandfood, a parasitic plant. Sandfood was a valuable food supply for Native Americans. Some Native American tribes steeped the twigs of Nevada ephedra and drank the tea as a general beverage.

Other information

Desert needlegrass may be used for groundcover in areas of light disturbance, but it is susceptible to excessive trampling. 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. White bursage may be used to revegetate disturbed sites in southwestern deserts.

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

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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)	
Contact for lead author	
Date	05/11/2025
Approved by	Kendra Moseley

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

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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

    Dominant:

    Sub-dominant:

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
