USDA Natural Resources
Conservation Service

Ecological site R030XB081NV
BOULDERY SLOPE 5-7 P.Z.

Last updated: 2/26/2025
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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 stony and bouldery sideslopes of hills and lower mountains. Slopes range from 15 to 75 percent, but slope gradients of 30 to 50 percent are most typical Elevations are 4000 to 5500. The soil associated with this site are shallow and formed in residuum and colluvium.

Please refer to group concept R030XB067NV to view the provisional STM.

Associated sites

R030XB069NV	**BASALTIC HILL 5-7 P.Z.**
R030XB080NV	**STONY LOAM 5-7 P.Z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Encelia virginensis* (2) *Krascheninnikovia lanata*
Herbaceous	(1) *Muhlenbergia porteri* (2) *Achnatherum hymenoides*

Physiographic features

This site occurs on stony and bouldery sideslopes of hills and lower mountains. Slopes range from 15 to 75 percent, but slope gradients of 30 to 50 percent are most typical Elevations are 4000 to 5500.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Elevation	1,219–1,676 m
Slope	15–75%

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 51 to 57 degrees F. The average growing season is about 140 to 180 days.

Table 3. Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	
Precipitation total (average)	178 mm

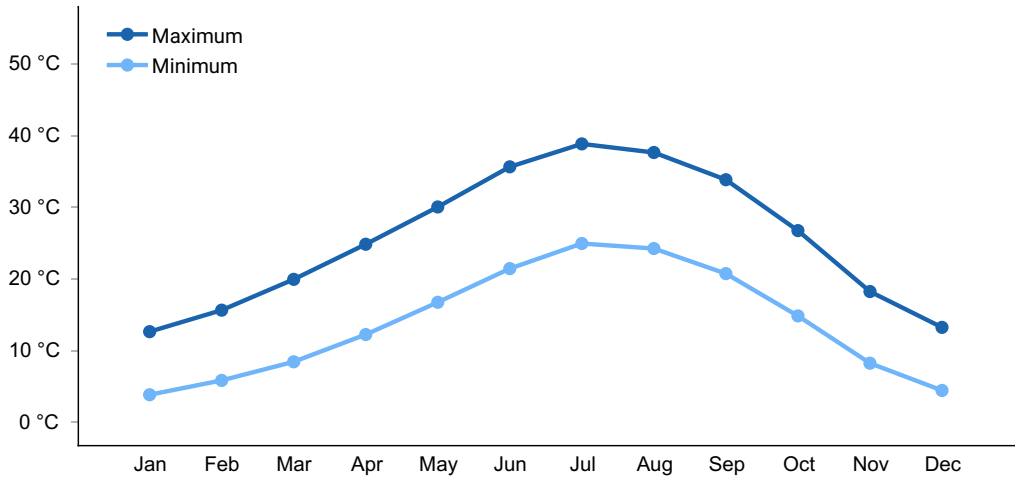

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soil associated with this site are shallow and formed in residuum and colluvium. These soils are well drained with moderately rapid permeability. The available water holding capacity is very low to low.

Table 4. Representative soil features

Drainage class	Well drained
Permeability class	Moderately rapid

Ecological dynamics

Please refer to group concept R030XB067NV to view the provisional STM.

As ecological condition deteriorates, creosotebush increases. Introduced annual forbs and grasses readily invade this site.

Fire Ecology:
Following fire, Virgin River encelia depends on off-site seed rather than on-site sprouts for regeneration. 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. 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. Most 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. 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. 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. Bush muhly regenerates following fire from soil-stored seed. Fire probably top-kills bush muhly. Burning causes at least short-term decline of bush muhly. Recovery time is thought to vary considerably and is probably dependent on postfire weather and competition. 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. 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. 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.

State and transition model

Ecosystem states

1. Reference Plant Community

State 1 submodel, plant communities

1.1. Reference Plant Community

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by Virgin River encelia, Nevada ephedra, winterfat, and bush muhly. Other important species are Indian ricegrass, big galleta, and desert needlegrass. Potential vegetative composition is about 50% grasses, 10% annual and perennial forbs and 40% shrubs. Approximate ground cover (basal and crown) is 10 to 20 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	168	252	336
Shrub/Vine	135	202	269
Forb	34	50	67
Total	**337**	**504**	**672**

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**			150–378	

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	bush muhly	MUPO2	*Muhlenbergia porteri*	76–101	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	25–76	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	25–50	–
	big galleta	PLRI3	*Pleuraphis rigida*	25–50	–
2	**Secondary Perennial Grasses**			10–40	
	threeawn	ARIST	*Aristida*	2–10	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–10	–
	slim tridens	TRMU	*Tridens muticus*	2–10	–
3	**Annual Grasses**			1–25	
Forb					
4	**Perennial forbs**			10–40	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	2–16	–
5	**Annual forbs**			1–25	
Shrub/Vine					
6	**Primary shrubs**			55–202	
	Virgin River brittlebush	ENVI	*Encelia virginensis*	25–76	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	10–50	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	10–50	–
	creosote bush	LATR2	*Larrea tridentata*	10–25	–
7	**Secondary shrubs**			34–101	
	burrobush	AMDU2	*Ambrosia dumosa*	6–16	–
	sweetbush	BEJU	*Bebbia juncea*	6–16	–
	pungent brickellbush	BRAR2	*Brickellia arguta*	6–16	–
	spiny hopsage	GRSP	*Grayia spinosa*	6–16	–
	desert pepperweed	LEFR2	*Lepidium fremontii*	6–16	–
	water jacket	LYAN	*Lycium andersonii*	6–16	–
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	6–16	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing, due to the low forage production, steep slopes and stony surfaces. Bush muhly is readily eaten by livestock throughout the year when available; however, it is usually not abundant enough to provide much forage. It is grazed heavily in winter when other species become scarce. Because of its branching habit, it is extremely susceptible to heavy grazing. Bush muhly is damaged when continuously grazed to a stubble height of less than 4 inches (10 cm). 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. 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. Encelia has no forage value for domestic livestock. 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. 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. 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:
Virgin River encelia is important to the desert tortoise as a source of succulent forage in periods of low moisture. Encelia is a browse species of desert mule deer and desert bighorn Sheep. 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. 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. Creosotebush is unpalatable to most browsing wildlife. The palatability of bush muhly for wildlife species is rated fair to poor. 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

These soils are well drained with moderately rapid permeability. The available water holding capacity is very low to low.

Other products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source. Some Native American tribes steeped the twigs of Nevada ephedra and drank the tea as a general beverage. 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

Big galleta's clumped growth form stabilizes blowing sand. 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.

Type locality

Location 1: Clark County, NV	
General legal description	West side of McCullough Range, east side of Hidden Valley, Clark County, Nevada.

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

GKB

Approval

Sarah Quistberg, 2/26/2025

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	05/20/2025
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:**