USDA Natural Resources
Conservation Service

Ecological site R030XB069NV
BASALTIC HILL 5-7 P.Z.

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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 summits and sideslopes of hills and low mountains on all exposures. Slopes range from 2 to over 30 percent, but slope gradients of 4 to 15 percent are most typical. Elevations are 3000 to 4500 feet. The soil associated with this site are derived from basalt and other mafic extrusive volcanic rock.

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

Associated sites

R030XB080NV	**STONY LOAM 5-7 P.Z.**
R030XB081NV	**BOULDERY SLOPE 5-7 P.Z.**
R030XB082NV	**CLAY PLAIN 5-7 P.Z.**

Similar sites

R030XB089NV	**STONY LOAM 7-9 P.Z.** More productive site; PLRI3-MUPO2 codominant grasses
R030XB053NV	**SHALLOW HILL 5-7 P. Z.** GRSP important shrub; PLRI3 dominant plant
R030XB091NV	**MOUNTAIN RIDGE** Occurs on mountain crests; 15 to 50% slopes typical; higher elevations
R030XB102NV	**GRAVELLY LOAM 5-7 P.Z.** GRSP and MESP2 common; few surface cobbles or stones
R030XB085NV	**BASALTIC NORTH SLOPE 7-9 P.Z.** Less productive site; PLRI3 minor grass
R030XB080NV	**STONY LOAM 5-7 P.Z.** More productive site; PLRI3 dominant plant
R030XB105NV	**BOULDERY LIMESTONE SLOPE 5-7 P.Z.** MOUT codominant shrub; ACHY dominant grass

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Krascheninnikovia lanata* (2) *Ambrosia dumosa*
Herbaceous	(1) *Pleuraphis rigida*

Physiographic features

This site occurs on summits and sideslopes of hills and low mountains on all exposures. Slopes range from 2 to over 30 percent, but slope gradients of 4 to 15 percent are most typical. Elevations are 3000 to 4500 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Elevation	914–1,372 m
Slope	2–30%

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 8 inches. Mean annual air temperature is 60 to 65 degrees F. The average growing season is about 180 to 220 days.

Table 3. Representative climatic features

Frost-free period (average)	220 days
Freeze-free period (average)	
Precipitation total (average)	203 mm

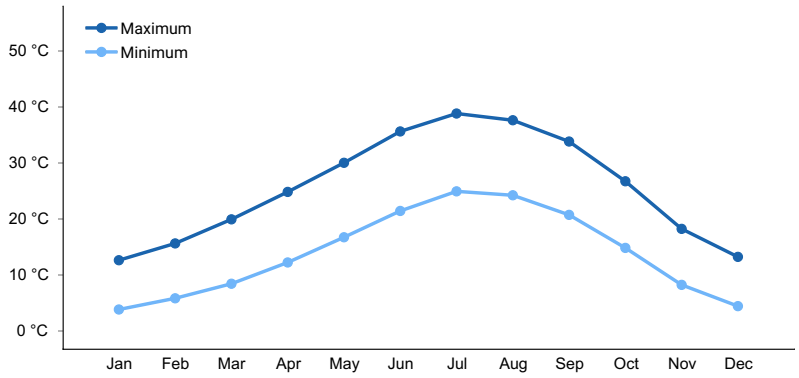

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soil associated with this site are derived from basalt and other mafic extrusive volcanic rock. More than 70 percent rock fragments cover the soil surface with stone and cobble-sized fragments predominating.

Ecological dynamics

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

Following wildfire, snakeweed and ephedra greatly increase. Species likely to invade this site are annual forbs and grasses.

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. 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. 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. Range ratany is top-killed by fire. Range ratany resprouts from the root crown after fire. 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. 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.

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 winterfat and white bursage. Big galleta and Nevada ephedra are other important species associated with this site. Potential vegetative composition is about 15% grasses, 10% annual and perennial forbs, and 75% shrubs. Approximate ground cover (basal and crown) is 10 to 20 percent.

Table 4. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	211	336	420
Grass/Grasslike	41	67	84
Forb	28	45	56
Total	**280**	**448**	**560**

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			55–112	
	big galleta	PLRI3	*Pleuraphis rigida*	45–67	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	9–22	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	1–22	–
2	**Secondary Perennial Grasses**			1–22	
	threeawn	ARIST	*Aristida*	2–9	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–9	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–9	–
	slim tridens	TRMU	*Tridens muticus*	2–9	–
3	**Annual Grasses**			1–13	
Forb					
4	**Primary Perennial forbs**			9–22	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	9–22	–
5	**Perennial forbs**			9–22	
	woolly desert marigold	BAPL3	*Baileya pleniradiata*	2–9	–
	desert princesplume	STPI	*Stanleya pinnata*	2–9	–
6	**Annual forbs**			1–22	
Shrub/Vine					
7	**Primary shrubs**			206–417	
	winterfat	KRLA2	*Krascheninnikovia lanata*	112–202	–
	burrobush	AMDU2	*Ambrosia dumosa*	67–135	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	9–36	–
	creosote bush	LATR2	*Larrea tridentata*	9–22	–
8	**Secondary shrubs**			22–45	
	fourwing saltbush	ATCA2	*Atriplex canescens*	4–13	–
	spiny hopsage	GRSP	*Grayia spinosa*	4–13	–
	water jacket	LYAN	*Lycium andersonii*	4–13	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	4–13	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	4–13	–
	Mojave woodyaster	XYTO2	*Xylorhiza tortifolia*	4–13	–
	Joshua tree	YUBR	*Yucca brevifolia*	4–13	–
	Mojave yucca	YUSC2	*Yucca schidigera*	4–13	–

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. 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). 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. 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. Creosotebush is unpalatable to livestock. Consumption of creosotebush may be fatal to sheep. Range ratany is an important forage species for all classes of livestock. Palatability of range ratany is rated fair to good for cattle and 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:
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. 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. Creosotebush is unpalatable to most browsing wildlife. Range ratany is an important forage species for deer. Mule deer browse range ratany year-long with seasonal peaks. Mule deer peak use is from February to April and from August to October. 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. The palatability of bush muhly for wildlife species is rated fair to poor.

Other products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source. 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. 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. The Papago Indians used an infusion of range ratany twigs externally for treating sore eyes and internally for dysentery. The roots provided them with a red dye for wool and other materials. The dye was also used as an ink.

Other information

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: Clark County, NV	
Township/Range/Section	T24S R61E S23
General legal description	About 13 miles northeast of Jean, east side of Hidden Valley, Clark County, Nevada. This site also occurs in southern Lincoln 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

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)	Patti Novak-Echenique
Contact for lead author	State Rangeland Management Specialist
Date	07/19/2013
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills none to rare, a few may be expected on steeper slopes and in areas recently subject to intense summer rainfall.

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2. **Presence of water flow patterns:** Water flow patterns rare, but may be evident in areas recently subject to intense summer rainfall and on steeper slopes.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas within water flow patterns.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground to 15%; surface rock fragments >70%; shrub canopy to 20%; basal area for perennial herbaceous plants <5%.

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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 (<10 ft) during intense summer convection storms or rapid snowmelt events. 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 3 to 6 on most 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 weak, thin platy. 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 1 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse shrub canopy, surface rock, 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):** Compacted layers are none. Platy or massive sub-surface horizons, or subsoil argillic horizons are not to be interpreted as compacted layers.

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: low-statured shrubs (winterfat & white bursage)

    Sub-dominant: deep-rooted, warm-season, perennial grasses (big galleta & bush muhly) = associated shrubs >> perennial forbs > deep-rooted, cool-season, bunchgrasses (Indian ricegrass) = annual forbs > shallow-rooted perennial grasses

    Other: succulents, biological crusts

    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 (<5%) and depth (±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 (February thru May) ± 400lbs/ac; Favorable years ±500 lbs/ac and unfavorable years ± 250 lbs/ac

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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:** Potential invaders on this site include red brome, red-stem filaree, and Mediterranean grass.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years. Little growth or reproduction occurs during extreme or extended drought conditions.
