USDA Natural Resources
Conservation Service

Ecological site R030XB015NV
SHALLOW GRAVELLY SLOPE 7-9 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 summits and sideslopes of upper fan piedmonts, fan remnants, inset fans, partial ballenas, hills and lower mountains. Slopes range from 2 to over 50 percent, but slope gradients of 15 to 30 percent are most typical. Elevations are 3000 to 6000 feet. The soils associated with this site are very shallow to moderately deep to a layer restrictive to root development.

Please refer to group concept R030XC236CA to view the provisional STM.

Associated sites

R030XB014NV	**SHALLOW GRAVELLY LOAM 7-9 P.Z.** The ecological site concepts of R030XB014NV and R030XB015NV are intertwined. Ecological Site projects R030XC236CA and R030XC238CA will attempt to untangle the two concepts.
R030XB033NV	**SANDY PLAIN 7-9 P.Z.**
R030XB090NV	**GRAVELLY FAN 7-9 P.Z.** This is likely the same site as R030XC238CA. The ecological site project R030XC238CA will determine if all components with the R030XB014NV and R030XB090NV are community phases of R030XC238CA.

Similar sites

R030XA094NV	**SHALLOW GRAVELLY LOAM 5-7 P.Z.** PLRI3 rarely occurs on site; BOER4 absent
R030XB090NV	**GRAVELLY FAN 7-9 P.Z.** This is likely the same site as R030XC238CA. The ecological site project R030XC238CA will determine if all components with the R030XB014NV and R030XB090NV are community phases of R030XC238CA. (More productive site; deep soils; greater diversity of shrub species - legacy info)
R030XB014NV	**SHALLOW GRAVELLY LOAM 7-9 P.Z.** The ecological site concepts of R030XB014NV and R030XB015NV are intertwined. Ecological Site projects R030XC236CA and R030XC238CA will attempt to untangle the two concepts. (More productive site - legacy info)
R030XA095NV	**SHALLOW GRAVELLY SLOPE 5-7 P.Z.** PLRI3 rarely occurs on site; BOER4 absent

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima*
Herbaceous	(1) *Pleuraphis rigida* (2) *Bouteloua eriopoda*

Physiographic features

This site occurs on summits and sideslopes of upper fan piedmonts, fan remnants, inset fans, partial ballenas, hills and lower mountains. Slopes range from 2 to over 50 percent, but slope gradients of 15 to 30 percent are most typical. Elevations are 3000 to 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Hill (3) Inset fan
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare
Ponding frequency	None
Elevation	914–1,829 m
Slope	2–50%
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 7 to 9(10) inches. Mean annual air temperature is 54 to 65 degrees F. The average growing season is about 140 to 210 days.

Table 3. Representative climatic features

Frost-free period (average)	210 days
Freeze-free period (average)	
Precipitation total (average)	229 mm

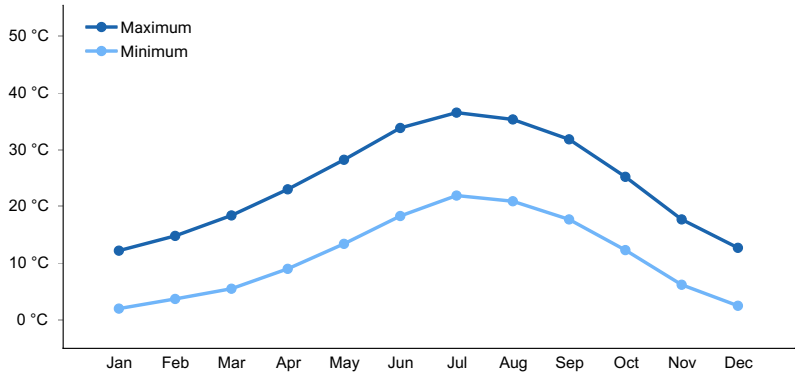

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very shallow to moderately deep to a layer restrictive to root development. Available water capacity is very low. Runoff is high to very high depending on slope. A surface cover of gravels provides a stabilizing effect of surface erosion condition. The soil series associated with this site include Crystal

Spring, Pulsipher, and Ustidur.

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Extremely gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	10–51 cm
Surface fragment cover <=3"	17–75%
Surface fragment cover >3"	0–6%
Available water capacity (0-101.6cm)	0.76–5.08 cm
Calcium carbonate equivalent (0-101.6cm)	0–30%
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)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	17–69%
Subsurface fragment volume >3" (Depth not specified)	0–13%

Ecological dynamics

Please refer to group concept R030XC236CA to view the provisional STM.

Blackbrush often occurs as nearly monospecific stands and is thought to be climax vegetation, occurring in late seral stages. Blackbrush is a long-lived, dominant on older, undisturbed geologic sites. Succession occurs at a very slow rate. Increasing in cover and density, this shrub becomes more dominant over time.
As ecological condition deteriorates, cool-season perennial grasses and black grama decrease as blackbrush becomes more dominant. Big galleta initally will increase but with further site degradation this grass also decreases. With severe disturbance such as wildfire, snakeweed, Mojave buckwheat, threeawn and burrobrush significantly increase. At higher elevations for the range of this site, or on steep northerly aspects, galleta may be the most prevalent grass species following wildfire.

Fire Ecology:
Historic fire return intervals, for blackbrush communities, appear to have been on the order of centuries, allowing late seral blackbrush stands to establish. Low amounts of fine fuels in interspaces probably limited fire spread to only extreme fire conditions, during which high winds, low relative humidity, and low fuel moisture led to high intensity stand-replacing crown fires. Blackbrush stands are subject to fire, and fire will start and spread easily due to the dense, close spacing nature and resinous foliage of blackbrush. Blackbrush is slow to reestablish. It is generally removed from the site.
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.
Black grama is reported to be fire sensitive. Black grama is generally top-killed by fire. It usually recovers from fire slowly, through vegetative spread. However, black grama grows quickly in response to summer moisture, and its postfire recovery can be good if the stand was healthy before fire and there is adequate precipitation in the first two growing seasons after fire.

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 blackbrush. Black grama, big galleta, desert needlegrass and Nevada ephedra are other important species associated with this site. Potential vegetative composition is about 35% grasses, 5% annual and perennial forbs and 60% shrubs and trees. Approximate ground cover (basal and crown) is 15 to 25 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	101	168	269
Grass/Grasslike	58	98	157
Forb	9	15	22
Total	**168**	**281**	**448**

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**			48–121	
	big galleta	PLRI3	*Pleuraphis rigida*	28–56	–
	black grama	BOER4	*Bouteloua eriopoda*	15–43	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	6–22	–
2	**Secondary Perennial Grasses**			6–22	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	1–6	–
	threeawn	ARIST	*Aristida*	1–6	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	1–6	–
	James' galleta	PLJA	*Pleuraphis jamesii*	1–6	–
3	**Annual**			1–15	
	sixweeks grama	BOBA2	*Bouteloua barbata*	1–6	–
Forb					
4	**Perennial**			6–22	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–6	–
5	**Annual**			1–15	
Shrub/Vine					
6	**Primary shrubs**			133–197	
	blackbrush	CORA	*Coleogyne ramosissima*	127–168	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	6–15	–
	Eastern Mojave buckwheat	ERFAP	*Eriogonum fasciculatum var. polifolium*	1–15	–
7	**Secondary shrubs**			15–56	
	fourwing saltbush	ATCA2	*Atriplex canescens*	3–9	–
	Virgin River brittlebush	ENVI	*Encelia virginensis*	3–9	–
	snakeweed	GUTIE	*Gutierrezia*	3–9	–
	creosote bush	LATR2	*Larrea tridentata*	3–9	–
	water jacket	LYAN	*Lycium andersonii*	3–9	–
	pricklypear	OPUNT	*Opuntia*	3–9	–
	Joshua tree	YUBR	*Yucca brevifolia*	3–9	–
	Mojave yucca	YUSC2	*Yucca schidigera*	3–9	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass and palatable shrub production. Black grama is one of the most nutritious desert winter grasses for livestock. Black grama is considered excellent forage for all livestock classes. 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. Blackbrush is not preferred as forage by domestic livestock, but does provide some forage during the spring, summer and fall. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats.

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:
Blackbrush is a valuable browse species for bighorn sheep. It may also comprise up to 25% of the mule deer winter diet. Blackbrush provides cover for upland game birds, nongame birds and small mammals. Big galleta and black grama are other important forage species for several wildlife species. Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Desert bighorn sheep graze desert needlegrass. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available.

Hydrological functions

Runoff is high to very high and permeability is impermeable to moderately rapid.

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

Other products

Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments.

Other information

Blackbrush contributes to desert fertility by 1) protecting the soil against wind erosion through retarding the movement of soil and increasing the accumulation of fine soil particles around its base; 2) protecting understory vegetation from the effects of high temperatures, thereby helping to retain surface nitrogen and adding organic matter to the soil; and 3) serving as a nitrogen reservoir through the storage of nitrogen in roots, leaves, and stems. Nevada ephedra is useful for erosion control, and seedlings have been successfully planted onto reclaimed strip mines. Atrazine may be effective in controlling Nevada ephedra, though some plants can survive through crown sprouting. Irrigation may increase control by atrazine.

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T28S R61E S16
General legal description	Approximately 15 miles west of Searchlight, along Nevada Highway 164, 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

RRK/GKB

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 Rangeland Management Specialist
Date	05/02/2013
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare. A few rills can be expected on steeper slopes in areas recently subjected to summer convection storms.

2. **Presence of water flow patterns:** Water flow patterns are none to rare but can be expected in areas recently subjected to summer convection storms, usually on steeper slopes. These are short (<1m) and not connected.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare. Occurrence is usually limited to areas of water flow patterns.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 10-15%; surface cover of rock fragments up to 75%; shrub canopy to 15%; foliar cover of perennial herbaceous plants ± 10%.

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 large 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 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 moderately thick to weak thin platy. Soil surface colors are pale brown to very dark brown when moist. Organic matter of the surface 2 to 4 inches is typically less than 1 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Shrub canopy and associated litter provide some protection from raindrop impact.

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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. Subsoil paralithic horizons or duripans are not to be interpreted as compacted.

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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: Mojave Desert shrubs

    Sub-dominant: Warm-season, perennial bunchgrasses > cool-season, perennial bunchgrasses > perennial forbs > annual grasses = annual forbs.

    Other:

    Additional:

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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 (<10%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** 25 to 30 percent, under canopy and interspaces <1/4 inch in depth

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season ± 250 lbs/ac. Favorable years ±400 lbs/ac and unfavorable years ±150 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, redstem filaree, annual mustards and Mediterranean grass.

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