USDA Natural Resources
Conservation Service

Ecological site R030XB014NV
SHALLOW GRAVELLY LOAM 7-9 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 sideslopes of mountains, fan remnants and upper fan piedmonts. Slopes range from 2 to 50 percent, but slope gradients of 2 to 15 percent are most typical. Elevations are 4700 to 6500. The soils associated with this site are very shallow to very deep. Subsurface textures are loams and sandy loams.

Please refer to group concept R030XC238CA to view the provisional STM.

Associated sites

R030XB015NV	**SHALLOW GRAVELLY SLOPE 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. (Steeper slopes; less productive site - legacy info).
R030XB033NV	**SANDY PLAIN 7-9 P.Z.**
R030XB090NV	**GRAVELLY FAN 7-9 P.Z.**

Similar sites

R030XB015NV	**SHALLOW GRAVELLY SLOPE 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. (Steeper slopes; less productive site - legacy info).
R030XB090NV	**GRAVELLY FAN 7-9 P.Z.** This is likely the same site. 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)
R030XA094NV	**SHALLOW GRAVELLY LOAM 5-7 P.Z.** PLRI3 rarely occurs on site
R030XB057NV	**SHALLOW GRANITIC LOAM 5-7 P.Z.** Less productive site; no BOER4
R030XA095NV	**SHALLOW GRAVELLY SLOPE 5-7 P.Z.** PLRI3 rarely occurs on site

Table 1. Dominant plant species

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

Physiographic features

This site occurs on sideslopes of mountains, fan remnants and upper fan piedmonts. Slopes range from 2 to 50 percent, but slope gradients of 2 to 15 percent are most typical. Elevations are 4700 to 6500.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Fan piedmont (3) Mountain slope
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Very rare
Ponding frequency	None
Elevation	4,700–6,500 ft
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)	9 in

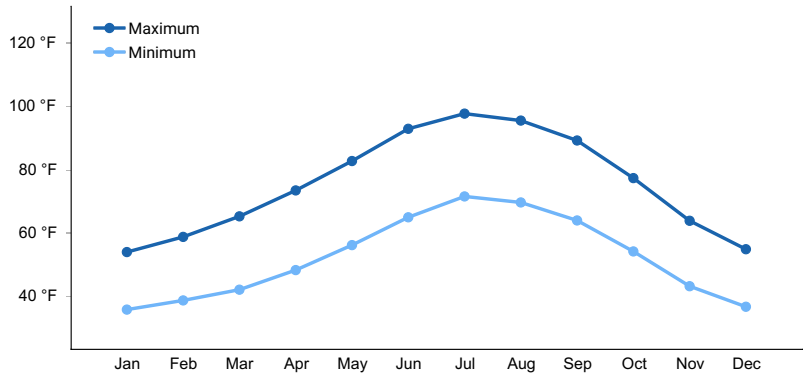

Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very shallow to very deep. Subsurface textures are loams and sandy loams. 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 are Hoppswell and

Nippeno.

Table 4. Representative soil features

Surface texture	(1) Extremely gravelly loam (2) Extremely gravelly sandy loam (3) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	4–84 in
Surface fragment cover <=3"	13–80%
Surface fragment cover >3"	0–8%
Available water capacity (0-40in)	0.6–5.4 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	13–96%
Subsurface fragment volume >3" (Depth not specified)	0–8%

Ecological dynamics

Please refer to group concept R030XC238CA 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 initially 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 the 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. 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. 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. Most perennial grasses have root crowns that can survive wildfire.

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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	163	320	446
Grass/Grasslike	75	150	210
Forb	10	25	35
Tree	2	5	9
Total	**250**	**500**	**700**

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**			96–255	
	black grama	BOER4	*Bouteloua eriopoda*	50–100	–
	big galleta	PLRI3	*Pleuraphis rigida*	25–50	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	10–40	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	10–40	–
	James' galleta	PLJA	*Pleuraphis jamesii*	1–25	–
2	**Secondary Perennial Grasses**			10–40	
	threeawn	ARIST	*Aristida*	3–10	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	3–10	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	3–10	–
3	**Annual**			1–25	
	sixweeks grama	BOBA2	*Bouteloua barbata*	3–10	–
Forb					
4	**Perennial**			10–40	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	3–10	–
5	**Annual**			1–25	
Shrub/Vine					
6	**Primary shrubs**			235–325	
	blackbrush	CORA	*Coleogyne ramosissima*	225–300	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	10–25	–
7	**Secondary shrubs**			10–40	
	Virgin River brittlebush	ENVI	*Encelia virginensis*	5–10	–
	Eastern Mojave buckwheat	ERFAP	*Eriogonum fasciculatum var. polifolium*	5–10	–
	snakeweed	GUTIE	*Gutierrezia*	5–10	–
	singlewhorl burrobrush	HYMO	*Hymenoclea monogyra*	5–10	–
	water jacket	LYAN	*Lycium andersonii*	5–10	–
	pricklypear	OPUNT	*Opuntia*	5–10	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	5–10	–
	banana yucca	YUBA	*Yucca baccata*	5–10	–
	Joshua tree	YUBR	*Yucca brevifolia*	5–10	–
	Mojave yucca	YUSC2	*Yucca schidigera*	5–10	–
Tree					
8	**Trees**			2–9	
	Utah juniper	JUOS	*Juniperus osteosperma*	1–5	–
	singleleaf pinyon	PIMO	*Pinus monophylla*	1–5	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass and palatable shrub production. Overall, 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. 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. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. When actively growing, galleta provides good to excellent forage for cattle and horses and fair forage for domestic sheep. Although not preferred, all classes of livestock may use galleta when it is dry. Domestic sheep show greater use in winter than summer months and typically feed upon central portions of galleta tufts, leaving coarser growth around the edges. Galleta may prove somewhat coarse to domestic 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:
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. Black grama and big galleta are other important forage species for several wildlife species. 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. 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. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species.

Hydrological functions

Runoff is high to very high and permeability is moderately slow to moderate.

Other products

Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the seed as a reserve food source.

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.

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T28S R61E S13
General legal description	Approximately 11 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, 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 Rangeland Management Specialist
Date	07/20/2012
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 15-20%; surface cover of rock fragments are variable but are usually more than 70%; shrub canopy to 25%.

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 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 moderate medium and thick platy to weak fine subangular blocky. Soil surface colors are grays and soils typically have an ochric epipedon. Organic matter of the surface horizon is typically less than 1 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:** Shrub canopy and associated litter provide some protection from 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. Subsoil argillic horizons are not to be interpreted as compacted.

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:

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.

14. **Average percent litter cover (%) and depth (in):** Up to 30% < ¼ inch in depth

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season ± 500 lbs/ac. Favorable years ± 700 lbs/ac and unfavorable years ±250 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: 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 years. Little growth occurs during extreme drought years or extended drought.
