Ecological site R030XC040NV
STEEP NORTH SLOPE 9-11 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 north-facing sideslopes of hills and mountains. Slopes range from 25 to over 50 percent, but slope gradients from 30 to 40 percent are most typical. Elevations range from 5500 to 7000 feet. The soils associated with this site are shallow to bedrock. They formed in residuum and colluvium from dolomite and limestone. This is a group concept and provisional STM that also covers the following sites: (R030XC045NV, R030XC046NV, R030XC025NV

Associated sites

R030XC030NV	**MOUNTAIN RIDGE**
R030XC036NV	**STEEP GRAVELLY SLOPE 9-11 P.Z.**
R030XC038NV	**SHALLOW GRAVELLY SLOPE 9-11 P.Z.**
R030XC041NV	**GRAVELLY FAN APRON 9-11 P.Z.**
R030XC045NV	**SHALLOW NORTH SLOPE 9-11 P.Z.**

Similar sites

R030XC037NV	**SHALLOW LOAM 9-11 P.Z.** ATCA2 co-dominant.
R030XC038NV	**SHALLOW GRAVELLY SLOPE 9-11 P.Z.** Lacks ARTRV, ARPU9 important grass.

R030XC034NV	**SHALLOW GRAVELLY LOAM 9-11 P.Z.** More productive site, occurs on fan remnants.
R030XC027NV	**SHALLOW GRAVELLY SANDSTONE 7-9 P.Z.** MESP2 co-dominant species, more productive site.
R030XC036NV	**STEEP GRAVELLY SLOPE 9-11 P.Z.** More productive site, PUST co-dominant.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima* (2) *Artemisia tridentata ssp. vaseyana*
Herbaceous	(1) *Achnatherum*

Physiographic features

This site occurs on north-facing sideslopes of hills and mountains. Slopes range from 25 to over 50 percent, but slope gradients from 30 to 40 percent are most typical. Elevations range from 5500 to 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Flooding frequency	None
Elevation	1,680 – 2,130 m
Slope	30 – 50 %
Aspect	N, NE, NW

Climatic features

The climate is semiarid with cold, moist winters and warm, intermittently moist summers. Precipitation is greatest in the winter, with a lesser secondary peak in the summer typical of the Mojave Desert transitional to the Great Basin. Average annual precipitation is 7 to 11 inches. Mean annual air temperature about 55 degrees F. The average growing season is about 150 to 180 days.

Table 3 Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	
Precipitation total (average)	280 mm

Influencing water features

There are no influencing water features associated with this ecological site.

Soil features

The soils associated with this site are shallow to bedrock. They formed in residuum and colluvium from dolomite and limestone. The soils are well drained and available water capacity is low. Runoff is very high and permeability is moderate. The control section averages 30 to 40 percent calcium carbonate equivalent. Reaction is strongly to moderately alkaline. The moisture regime is aridic bordering on ustic. Soil series correlated to this ecological site include Boxspring, a loamy-skeletal, carbonatic, mesic Lithic Ustic Torriorthents.

Table 4. Representative soil features

Parent material	(1) Colluvium – dolomite (2) Residuum – limestone
Surface texture	(1) Extremely gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	50 – 60 cm
Surface fragment cover <=3"	50 – 70 %
Surface fragment cover >3"	10 – 20 %
Available water capacity (0-101.6cm)	1.5 – 3.05 cm
Calcium carbonate equivalent (0-101.6cm)	30 – 60 %

Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	40 – 60 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

Blackbrush communities are most prevalent in the transitional zone between the Mojave Desert and Great Basin. Blackbrush is a paleoendemic species as originally postulated by Stebbins and Major (1965). Blackbrush is a transitional species that occupies a boundary that has shifted in recent geologic time. Analysis of packrat middens suggests a 50–100m downward movement of the blackbrush zone along elevational gradients in the Mojave Desert (Cole and Webb, 1985; Hunter and McAuliffe, 1994).

Blackbrush is a long-lived and generally considered a climax species. It is a non-sprouter; regeneration depends on wind pollinated seed and heavy winter precipitation, and is therefore slow to re-colonize burned areas (Anderson 2001). Blackbrush recruitment is episodic, like many shrubs in arid systems, when conditions are favorable large seed crops are produced and the rest of the time is characterized by minimal seed output (Pendleton and Meyer 2004). Blackbrush seeds are frequently cached away by rodents, until conditions are conducive for germination. Typically, germination occurs during the winter and early spring, given the proper moisture conditions and cool soil temperatures (Pendleton 2008). Seeds require cold stratification before germination and the survival of seedlings following germination is dependent on the availability of spring time moisture (Pendleton 2008). On undisturbed sites, blackbrush dominates the landscape and species diversity is generally low. Undisturbed blackbrush communities are fairly resistant to invasion by non-natives (Brooks and Matchett 2003). Mature blackbrush plants are well adapted to persist under less than optimal conditions, and individuals' may live as long as 400 years (Pendleton and Meyer 2004).

Fire Ecology:

Blackbrush stands are considered to be one of the most flammable native plant assemblages in the Mojave Desert. Fire will start and spread easily due to the close spacing nature and resinous foliage of blackbrush. During periods with high winds, low relative humidity and low fuel moisture blackbrush will experience stand replacing fires. The short-lived seed of blackbrush is readily destroyed by fire and it may take upwards of 60 years for blackbrush to achieve pre-fire conditions. There is frequently 100 percent mortality of mature blackbrush following fire (Brooks and Matchett 2003) and reestablishment occurs solely from seed. Mountain big sagebrush is highly susceptible to fire and establishes solely from seed. Nevada ephedra and Torrey's ephedra respond similarily to fire. They are generally top-killed by fire, but underground regenerative structures commonly survive. Ephedra generally sprouts after fire damages aboveground vegetation and may increase in plant cover. 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. James galleta is a rhizomatous perennial bunchgrass which can resprout after it is top-kill by fire.

Post-fire plant communities vary, depending on use history and species present prior to the fire. Post fire sprouting shrub species such as yucca, Stansbury cliffrose and ephedra increase in cover and density. Species that readily reestablish from seed such as shadscale and snakeweed also increase. Generally, non-natives increase and native species decrease post fire (Brooks and Matchett 2003). The effects of fire on blackbrush appear to be long term.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			41-84	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	20-39	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	10-20	–
	Mormon needlegrass	ACAR14	*Achnatherum aridum*	10-20	–
2	**Secondary Perennial Grasses**			8-31	
	blue grama	BOGR2	*Bouteloua gracilis*	1-8	–
	squirreltail	ELEL5	*Elymus elymoides*	1-8	–
	James' galleta	PLJA	*Pleuraphis jamesii*	1-8	–
	muttongrass	POFE	*Poa fendleriana*	1-8	–
	Sandberg bluegrass	POSE	*Poa secunda*	1-8	–
3	**Annual Grasses**			1-8	
	sixweeks fescue	VUOC	*Vulpia octoflora*	1-8	–
Forb					
4	**Perennial Forbs**			28-56	
	Indian paintbrush	CASTI2	*Castilleja*	1-8	–
	desert frasera	FRAL5	*Frasera albomarginata*	1-8	–
	Cooper's rubberweed	HYCO2	*Hymenoxys cooperi*	1-8	–
	hoary tansyaster	MACA2	*Machaeranthera canescens*	1-8	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1-8	–
5	**Annual Forbs**			1-20	
Shrub/Vine					
6	**Primary Shrubs**			138-216	
	blackbrush	CORA	*Coleogyne ramosissima*	118-157	–
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	20-59	–
7	**Secondary Shrubs**			18-72	
	black sagebrush	ARNO4	*Artemisia nova*	1-12	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	1-12	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	1-12	–
	mormon tea	EPVI	*Ephedra viridis*	1-12	–
	Apache plume	FAPA	*Fallugia paradoxa*	1-12	–
	spiny greasebush	GLSP	*Glossopetalon spinescens*	1-12	–
	threadleaf snakeweed	GUMI	*Gutierrezia microcephala*	1-12	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	1-12	–
	spiny menodora	MESP2	*Menodora spinescens*	1-12	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	1-12	–
	purple sage	SADO4	*Salvia dorrii*	1-12	–
	banana yucca	YUBA	*Yucca baccata*	1-12	–
	Joshua tree	YUBR	*Yucca brevifolia*	1-12	–
	grizzlybear pricklypear	OPPOE	*Opuntia polyacantha var. erinacea*	1-4	–
Tree					
8	**Evergreen**			1-4	
	Utah juniper	JUOS	*Juniperus osteosperma*	1-2	–
	singleleaf pinyon	PIMO	*Pinus monophylla*	1-2	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 1.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 10. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 11. Community 2.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 12. Community 2.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 13. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 14. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 15. Community 3.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 16. Community 3.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Animal community

Livestock interpretations: This site has limited value for livestock grazing, due to low forage production and distance from adequate water resources. Grazing management should be keyed to dominant perennial grasses. Indian ricegrass benefits from moderate grazing use in winter and early spring. Inappropriate season of grazing may sharply reduce vigor of decrease overall cover. Indian ricegrass is high palatable to all classes of livestock in both the green and cured condition. Blackbrush is economically important forage in the winter especially for domestic sheep. It is considered poor forage during the spring, summer and fall for domestic cattle, horses and sheep. Nevada ephedra is also highly important winter forage for domestic cattle, sheep and goats. It is generally heavily grazed without inducing toxicity in ewes or cows. Mountain big sagebrush is unpalatable to domestic livestock, but is used if little else is available. Stocking rates vary over time depending upon season of use, climate variation, 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: A variety of wildlife species find valuable foraging and habitat resources on this ecological site. Indian ricegrass is eaten by pronghorn when available. It is also the preferred seed of a variety of rodents and small mammals. Indian ricegrass makes up a significant portion of jackrabbit diets in the spring and summer. It also provides seed for many species of birds. Blackbrush provides an important winter browsing resource for several species of wildlife, including mule deer and bighorn sheep. Mountain big sagebrush is desirable winter forage for mule deer and elk. Nevada ephedra is browsed by mule deer, bighorn sheep and pronghorn in the spring to late summer when new growth is available.

Hydrological functions

The soils associated with this site are characterized very high runoff and moderately slow permeability.

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 offers rewarding opportunities for photography and nature study. This site is used for camping and hiking and has potential for upland and big game hunting.

Other products

Native Americans used big sagebrush leaves and branches for medicinal teas, and the leaves as a fumigant. Bark was woven into mats, bags and clothing. As the name suggests, the highly nutritious seed of Indian ricegrass was one of the staple foods of Native American. Banana yucca was used by Native Americans as a food source. Fruits were consumed raw before fully ripening. Cakes were also made by pit roasting the fruits, grinding them into a paste, and drying the resulting material. Fermented banana yucca has been used for beverages, its juices used as a preservative, its seeds dried and ground into a meal and the central leaves were incorporated into soups and meat dishes.

Other information

Indian ricegrass is well adapted to stabilization of disturbed sandy soils and is especially valuable for controlling wind erosion. It is well suited for reclamation projects in areas receiving 8 to 14 inches annual precipitation.

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T14S R61E S24
UTM zone	N
UTM northing	4063405
UTM easting	670254
Latitude	36° 42′3″
Longitude	115° 5′38″
General legal description	Approximately 1.2 miles from the head of Sawmill Canyon, eastside of Sheep Range, Desert National Wildlife Refuge. Mormon Well 7.5 minute topographic quadrangle.

Other references

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Contributors

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Approval

Sarah Quistberg, 2/25/2025

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)	E.Hourihan/P.Novak-Echenique
Contact for lead author	State Rangeland Management Specialist
Date	11/16/2011
Approved by	
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 (< 3 ft) can be expected on steeper slopes in areas recently subjected to summer convection storms or rapid**

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2. **Presence of water flow patterns:** **Water flow patterns (short <3 ft, not connected) are none to rare but can be expected on steeper slopes in areas recently subjected to summer convection storms or rapid snowmelt.**

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3. **Number and height of erosional pedestals or terracettes:** **None**

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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 2-10% depending on amount of surface rock fragments

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5. **Number of gullies and erosion associated with gullies:** None

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None

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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 during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large events.

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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.)

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically weak thin platy that parts to moderate very fine subangular blocky. Soil surface colors are pale brown and soils are typified by a ochric epipedon. Organic matter of the surface 2 to 4 inches is typically 1.0 to 1.5 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:** Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., Indian ricegrass] slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

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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. Subangular blocky or massive sub-surface horizons 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: Reference Plant Community: Evergreen shrubs (blackbrush & big sagebrush)>>

    Sub-dominant: Deep-rooted, cool season, perennial bunchgrasses> associated shrubs>shallow-rooted, cool season, perennial grasses>deep-rooted, cool season, perennial forbs>shallow-rooted, warm-season perennial grasses>fibrous, shallow-rooted, cool season, perennial and annual forbs.

    Other: Succulents, evergreen trees

    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.

14. **Average percent litter cover (%) and depth (in):** Between plant interspaces and under canopy 20-35% and litter depth is ± 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 (through mid-June) ± 350 lbs/ac; favorable years 500 lbs/ac, 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 include red brome and redstem filaree.

17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years