

Ecological site R027XY061NV

SHALLOW CALCAREOUS SLOPE 8-10 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.

MLRA notes

Major Land Resource Area (MLRA): 027X–Fallon-Lovelock Area

Physiography Found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus this area is characterized by isolated uplifted fault block mountain ranges trending north to south that are separated by broad, hydrologically closed basins. The entire area occurs in the rain-shadow of the Sierra Nevada mountains and is influenced by Pleistocene Lake Lahontan which reached its most recent high stand about 12,000 years ago. There is substantial evidence suggesting the western Great Basin has been the site of pluvial-interpluvial cycles for at least the past two million years. The mountains and valleys are dissected by the Humboldt, Truckee, Carson, and Walker Rivers and their tributaries, all of which terminate within MLRA 27. Extensive playas can be found throughout this area and are the result of drying of ancient Lake Lahontan. Elevation generally ranges from 3,300 to 5,900 feet (1,005 to 1,800 meters) in valleys, but on some mountain peaks it is more than 7,870 feet (2,400 meters). Geology Landforms and soils of this MLRA have been heavily influenced by fluctuating lake level over the last 40,000 years. There is a level line evident on the higher slopes marking the former extent of glacial Lake Lahontan. Almost half of this area has surface deposits of alluvial valley fill influenced by lacustrine sediment. The rest has andesite and basalt rocks of different ages. Mesozoic and Tertiary intrusives are concentrated along the western border of the area, and Lower Volcanic Rocks (17 to 43 million years old) are common on the eastern side of the area. Also, some scattered outcrops of Mesozoic sedimentary and volcanic rocks and tuffaceous sedimentary rocks are in the mountains within the interior of this MLRA. Climate The average annual precipitation is 5 to 10 inches (125 to 255 millimeters) in most of the area but is as much as 19 inches (485 millimeters) on high mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The amount of precipitation is very low from summer to midautumn. The precipitation in winter occurs mainly as snow. The average annual temperature is 43 to 54 degrees F (6 to 12 degrees C). The freeze-free period averages 155 days and ranges from 110 to 195 days, decreasing in length with elevation. Water The amount of precipitation is very low, and water for irrigation is obtained principally from diversions on the four large rivers in the area and from water stored in the Lahontan, Rye Patch, and Weber Reservoirs. Pyramid Lake and Walker Lakes are terminal lakes for the Truckee and Walker Rivers, respectively. Much of the annual flow of both rivers is diverted for irrigation, causing lake levels to fall and levels of dissolved salts to increase causing problems for the native Lahontan cutthroat trout. Soils The dominant soil orders are Aridisols and Entisols. The soils in the area are predominantly a mesic temperature regime, aridic moisture regime, and have a mixed mineralogy. They are generally well drained, loamy or sandy, commonly skeletal, and shallow to very deep. Accumulation of salts, tufa deposits, and eolian sediments with soluble salts over lacustrine deposits influence most of the soils in the basin landforms of this MLRA. Soils on bedrock-controlled landforms are typically comprised of volcanic or tuffaceous sedimentary colluvium over residuum. Biological Resources This area supports extensive areas of salt-desert shrub vegetation. Shadscale and Bailey's greasewood are widespread, occurring both individually and together. Grasses are generally sparse, although Indian ricegrass is prominent, especially on the sandy soils. Fourwing saltbush, winterfat, spiny hopsage, wolfberry, ephedra, dalea, and bud sagebrush are common shrubs. Basin wildrye, creeping wildrye, alkali sacaton, saltgrass, black greasewood, rubber rabbitbrush, and big saltbush are important plants on saline bottom lands and terraces. A few marsh areas support cattail, bulrushes, sedges, and rushes. Big sagebrush, along with scattered Utah juniper and singleleaf pinyon, is associated with Thurber needlegrass, desert needlegrass, Sandberg bluegrass, and squirreltail on the higher elevation piedmont slopes and mountains.

Ecological site concept

The Shallow Calcareous Slope 8-10 P.Z. site occurs on mountain and hill sideslopes on all aspects but is most commonly found on southerly aspects. Slope gradients of 30 to 75 percent are typical. Elevations are 5000 to 6500 feet. The soils are very shallow and shallow and well drained. The soils typically have high volumes of coarse fragments through the soil profile.

Associated sites

R027XY031NV	SHALLOW CALCAREOUS LOAM 8-10 P.Z. ACHY dominant grass; occurs on slopes <30%
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Similar sites

R027XY032NV	SHALLOW CALCAREOUS LOAM 10-12 P.Z. ACTH7 dominant grass; more productive site
R027XY079NV	GRAVELLY CLAYPAN 8-10 P.Z. ARARL3 dominant shrub; ACTH7 dominant grass
R027XY020NV	SHALLOW CLAYPAN 8-10 P.Z. ARARL3 dominant shrub

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia nova</i>
Herbaceous	(1) <i>Achnatherum speciosum</i>

Physiographic features

The Shallow Calcareous Slope 8-10 P.Z. site occurs on mountain and hill sideslopes on all aspects but is most commonly found on southerly aspects. Slope gradients of 30 to 75 percent are typical. Elevations are 5000 to 6500 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill
Runoff class	Very high
Elevation	1,520 – 1,980 m
Slope	30 – 80 %
Water table depth	180 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 8 to 10(12) inches. Mean annual air temperature is 45 to 55 degrees F. The average growing season is about 110 to 140 days.

Table 3 Representative climatic features

Frost-free period (average)	140 days
Freeze-free period (average)	
Precipitation total (average)	250 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils of this site are very shallow and shallow and well drained. These soils typically have high volumes of coarse fragments through the soil profile. Rock fragments in the profile occupy plant growing space and reduce the potential soil moisture holding capacity. The available water capacity is very low. Runoff is rapid and the potential for sheet and rill erosion is to high. The soil temperature regime is aridic bordering on xeric and the soil moisture regime is mesic. Soil serie correlated to this site includes Puett.

Table 4. Representative soil features

Parent material	(1) Residuum – welded tuff (2) Colluvium – tuff
Surface texture	(1) Very gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	10 – 40 cm
Surface fragment cover <=3"	40 – 50 %
Surface fragment cover >3"	10 – 30 %

Available water capacity (0-101.6cm)	1.27 – 3.81 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 8.2
Subsurface fragment volume <=3" (Depth not specified)	30 – 50 %
Subsurface fragment volume >3" (Depth not specified)	10 %

Ecological dynamics

As ecological condition declines, bottlebrush squirreltail increases in the understory as black sagebrush increases and becomes the dominant plant. Cheatgrass, Russian thistle, and halogeton are species most likely to invade this site. Following wildfire, shadscale and spiny hopsage (with rabbitbrush, horsebrush, and snakeweed) often replace black sagebrush.

Fire Ecology:

Black sagebrush communities generally lack enough fine fuels to carry a fire. In addition to low fine fuel loading, wide shrub spacing makes fire infrequent or difficult to prescribe in black sagebrush types.

Black sagebrush is highly susceptible to fire-caused mortality; plants are readily killed by all fire intensities. Following burning, reestablishment occurs through off-site sources.

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

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			99-141	
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	71-99	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	28-43	–
2	Secondary Perennial Grasses			6-22	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	1-8	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	1-8	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	1-8	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	1-8	–
Forb					
3	Perennial Forbs			6-22	
	milkvetch	ASTRA	<i>Astragalus</i>	1-8	–
	buckwheat	ERIOG	<i>Eriogonum</i>	1-8	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	1-8	–
	princesplume	STANL	<i>Stanleya</i>	1-8	–
Shrub/Vine					
4	Primary Shrubs			90-140	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	84-112	–
5	Secondary Shrubs			15-43	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	1-8	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	1-8	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	1-8	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	1-8	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	1-8	–
	littleleaf horsebrush	TEGL	<i>Tetradymia glabrata</i>	1-8	–

Animal community

Livestock Interpretations: This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass and palatable shrub production. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. In winter, at lower elevations, black sagebrush is heavily utilized by 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: Black sagebrush is a significant browse species within the Intermountain region. It is especially important on low elevation winter ranges in the southern Great Basin, where extended snow free periods allow animal's access to plants throughout most of the winter. In these areas it is heavily utilized by pronghorn and mule deer. 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.

Hydrological functions

Runoff is high.

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 to photographers and for nature study. This site is used for camping and hiking and has potential for upland and big game hunting.

Other information

Black sagebrush is an excellent species to establish on sites where management objectives include restoration or improvement of domestic sheep, pronghorn, or mule deer winter range.

Inventory data references

Type locality

Location 1: Mineral County, NV	
Township/Range/Section	T9N R34E S26
General legal description	North of Luning, about 7 miles northwest of NvHwy 23 (Skidue turnoff), Gabbs valley Range, Mineral County, Nevada. This site also occurs in Churchill, Lyon, Pershing and Storey Counties, 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

DK/GD

Approval

Kendra Moseley, 6/03/2024

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	09/24/2026
Approved by	
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:
