Ecological site R026XY077NV
SNOW POCKET

Last updated: 4/10/2024
Accessed: 05/10/2025

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): 026X–Carson Basin and Mountains

The area lies within western Nevada and eastern California, with about 69 percent being within Nevada, and 31 percent being within California. Almost all this area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. Isolated north-south trending mountain ranges are separated by aggraded desert plains. The mountains are uplifted fault blocks with steep side slopes. Most of the valleys are drained by three major rivers flowing east across this MLRA. A narrow strip along the western border of the area is in the Sierra Nevada Section of the Cascade-Sierra Mountains Province of the Pacific Mountain System. The Sierra Nevada Mountains are primarily a large fault block that has been uplifted with a dominant tilt to the west. This structure leaves an impressive wall of mountains directly west of this area. This helps create a rain shadow affect to MLRA 26. Parts of this eastern face, but mostly just the foothills, mark the western boundary of this area. Elevations range from about 3,806 feet (1,160 meters) on the west shore of Pyramid Lake to 11,653 feet (3,552 meters) on the summit of Mount Patterson in the Sweetwater Mountains.

Valley areas are dominantly composed of Quaternary alluvial deposits with Quaternary playa or alluvial flat deposits often occupying the lowest valley bottoms in the internally drained valleys, and river deposited alluvium being dominant in externally drained valleys. Hills and mountains are dominantly Tertiary andesitic flows, breccias, ash flow tuffs, rhyolite tuffs or granodioritic rocks. Quaternary basalt flows are present in lesser amounts, and Jurassic and Triassic limestone and shale, and Precambrian limestone and dolomite are also present in very limited amounts. Also of limited extent are glacial till deposits along the east flank of the Sierra Nevada Mountains, the result of alpine glaciation.

The average annual precipitation in this area is 5 to 36 inches (125 to 915 millimeters), increasing with elevation. Most of the rainfall occurs as high-intensity, convective storms in spring and autumn. Precipitation is mostly snow in winter. Summers are dry. The average annual temperature is 37 to 54 degrees F (3 to 12 degrees C). The freeze-free period averages 115 days and ranges from 40 to 195 days, decreasing in length with elevation.

The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an aridic or xeric soil moisture regime, and mixed or smectitic mineralogy. They generally are well drained, are clayey or loamy and commonly skeletal, and are very shallow to moderately deep.

This area supports shrub-grass vegetation characterized by big sagebrush. Low sagebrush and Lahontan sagebrush occur on some soils. Antelope bitterbrush, squirreltail, desert needlegrass, Thurber needlegrass, and Indian ricegrass are important associated plants. Green ephedra, Sandberg bluegrass, Anderson peachbrush, and several forb species also are common. Juniper-pinyon woodland is typical on mountain slopes. Jeffrey pine, lodgepole pine, white fir, and manzanita grow on the highest mountain slopes. Shadscale is the typical plant in the drier parts of the area. Sedges, rushes, and moisture-loving grasses grow on the wettest parts of the wet flood plains and terraces. Basin wildrye, alkali sacaton, saltgrass, buffaloberry, black greasewood, and rubber rabbitbrush grow on the drier sites that have a high concentration of salts.

Some of the major wildlife species in this area are mule deer, coyote, beaver, muskrat, jackrabbit, cottontail, raptors, pheasant, chukar, blue grouse, mountain quail, and mourning dove. The species of fish in the area include trout and catfish. The Lahontan cutthroat trout in the Truckee River is a threatened and endangered species.

LRU notes

The Bodie Hills LRU straddles the California-Nevada state boundary, just north of Mono Lake. The area is underlain by late Miocene age volcanic fields with upper Miocene and Pliocene sedimentary deposits over top. The youngest faults in the area are north and north-east striking. Extensive zones of hydrothermally altered rocks and large mineral deposits, including gold and silver rich veins, formed during hydrothermally active periods of the Miocene (John et al. 2015). A primary distinguishing factor between the Bodie Hills and other hills in MLRA 26 is the dominance of volcanic parent material.

Ecological site concept

The Snow Pocket site occurs in concave positions off the lee-ward side of mountain summits. The associated soils are moderately deep to very deep to bedrock and somewhat excessively well drained. The dominant plants are forbs and grasses, sulphur-flower buckwheat (Eriogonum umbellatum var. majus) and western needlegrass (Achnatherum occidentale).

Associated sites

R026XY004NV	**SALINE BOTTOM**
R026XY010NV	**LOAMY 10-12 P.Z.**
R026XY024NV	**DROUGHTY LOAM 8-10 P.Z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Eriogonum subalpinum*
Herbaceous	(1) *Achnatherum occidentale*

Physiographic features

The Snow Pocket site occurs in concave positions off the lee-ward side of mountain summits. Slopes range from 15 to 50 percent. Elevations are 7800 to 9200 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain
Elevation	7,800–9,200 ft
Slope	15–50%
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is subhumid with cool, dry summers and cold, wet winters. Average annual precipitation ranges from 16 to 30 inches. Mean annual air temperature is 36 to 42 degrees F. The average growing season is about 30 to 70 days.

Nevada’s climate is predominantly arid, with large daily ranges of temperature, infrequent severe storms, heavy snowfall in the higher mountains, and great location variations with elevation. Three basic geographical factors largely influence Nevada’s climate: continentality, latitude, and elevation. Continentality is the most important factor. The strong continental effect is expressed in the form of both dryness and large temperature variations. Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the

climate of the State. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation occurs and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the West but throughout the state, with the result that the lowlands of Nevada are largely desert or steppes. The temperature regime is also affected by the blocking of the inland-moving maritime air. Nevada sheltered from maritime winds, has a continental climate with well-developed seasons and the terrain responds quickly to changes in solar heating.

Nevada lies within the mid-latitude belt of prevailing westerly winds which occur most of the year. These winds bring frequent changes in weather during the late fall, winter and spring months, when most of the precipitation occurs. To the south of the mid-latitude westerlies, lies a zone of high pressure in subtropical latitudes, with a center over the Pacific Ocean. In the summer, this high-pressure belt shifts northward over the latitudes of Nevada, blocking storms from the ocean. The resulting weather is mostly clear and dry during the summer and early fall, with scattered thundershowers. The eastern portion of the state receives significant summer thunderstorms generated from monsoonal moisture pushed up from the Gulf of California, known as the North American monsoon. The monsoon system peaks in August and by October the monsoon high over the Western U.S. begins to weaken and the precipitation retreats southward towards the tropics (NOAA 2004).

Table 3. Representative climatic features

Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	16-30 in
Frost-free period (average)	50 days
Freeze-free period (average)	
Precipitation total (average)	23 in

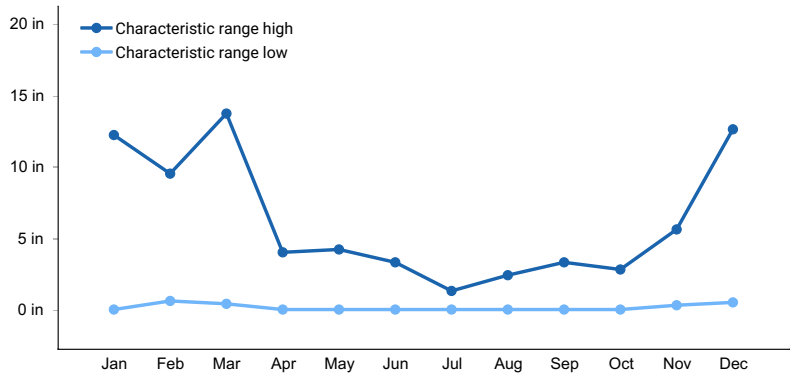

Figure 1. Monthly precipitation range

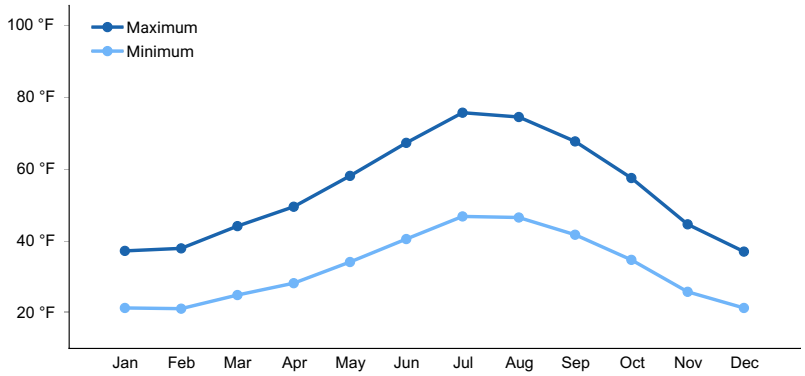

Figure 2. Monthly average minimum and maximum temperature

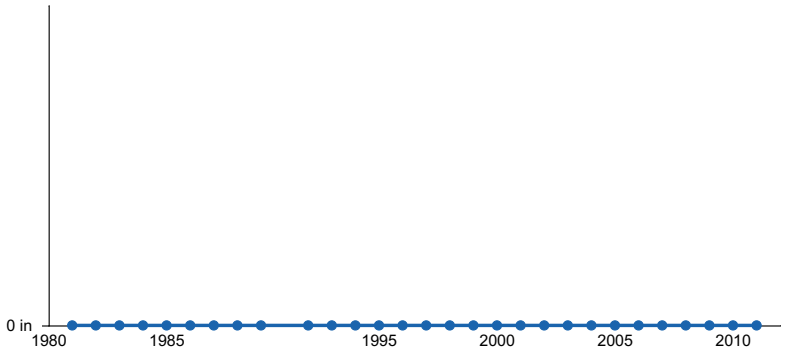

Figure 3. Annual precipitation pattern

Influencing water features

There are no influencing water features associated with this site.

Soil features

The associated soils are moderately deep to very deep to bedrock and well drained. Some soils are modified by high volumes of rock fragments through their profile. The soils are normally moderately to strongly acid. This site provides a cool, moist environment for plant growth because of the elevations and northerly exposures where they occur. Heavy snow accumulation on this site often persists into summer and significantly reduces the potential plant growth period. Snow melt adds to the soil moisture supply that is available to plants during their limited growing season. Runoff from this site is medium. Potential for surface erosion is moderate to high depending on slope.

Table 4. Representative soil features

Parent material	(1) Colluvium–andesite (2) Colluvium–tuff breccia (3) Residuum–andesite (4) Residuum–tuff breccia
Surface texture	(1) Very gravelly loamy coarse sand
Family particle size	(1) Ashy-skeletal
Drainage class	Somewhat excessively drained
Permeability class	Rapid
Depth to restrictive layer	20–39 in
Surface fragment cover <=3"	32%
Surface fragment cover >3"	9%
Available water capacity (Depth not specified)	1.2–2 in
Calcium carbonate equivalent (Depth not specified)	0%
Clay content (Depth not specified)	7%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	4.5–6
Subsurface fragment volume <=3" (Depth not specified)	40%

Subsurface fragment volume >3" (Depth not specified)	2%

Ecological dynamics

As ecological condition declines, lupine increases and will eventually dominate the site. Western needlegrass composition declines as bottlebrush squirreltail increases.

Fire Ecology:
Perennial needlegrasses tend to be among the least fire resistant bunchgrass due to the densely tufted stems.

State and transition model

Ecosystem states

1. Reference State

State 1 submodel, plant communities

1.1. Western needlegrass-Forbs

State 1
Reference State

The Reference State is characterized by native plants that are adapted to a short growing season. The site typically has snow remaining until late in the spring or early summer.

Community 1.1
Western needlegrass-Forbs

The reference plant community is dominated by western needlegrass, tailcup lupine and bighead goldenbush. Potential vegetative composition is about 50 percent grasses and 50 percent forbs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	250	300	450
Forb	225	270	405
Shrub/Vine	25	30	45
Total	**500**	**600**	**900**

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/Grasslikes**			132–228	
	western needlegrass	ACOCO	*Achnatherum occidentale ssp. occidentale*	120–180	–
	sedge	CAREX	*Carex*	12–48	–
2	**Secondary Perennial Grasses**			6–48	
	squirreltail	ELEL5	*Elymus elymoides*	3–18	–
Forb					
3	**Perennial Forbs**			138–228	
	tailcup lupine	LUCA	*Lupinus caudatus*	180–240	–
	Forb, perennial	2FP	*Forb, perennial*	0–48	–
	beebalm	MONAR	*Monarda*	12–30	–
Shrub/Vine					
4	**Primary Shrubs**			120–180	
	singlehead goldenbush	ERSU13	*Ericameria suffruticosa*	120–180	–
5	**Secondary Shrubs**			6–48	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	6–18	–
	buckwheat	ERIOG	*Eriogonum*	6–18	–

Animal community

Livestock Interpretations:
This site is suited to livestock grazing. Grazing Management should be keyed to Western needlegrass. Needlegrass species are an important forage species for livestock. Needlegrass species tend to be more palatable early in the growing season prior to fruit development. They become less palatable as they mature, becoming coarse and wiry.

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:
Needlegrass provides valuable forage for many species of wildlife. They are most palatable early in the season before the foliage becomes coarse and wiry.

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.

Type locality

Location 1: Douglas County, NV

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

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Approval

Kendra Moseley, 4/10/2024

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	05/10/2025
Approved by	Kendra Moseley

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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**
