Ecological site R025XY028NV
SNOWPOCKET

Last updated: 4/25/2024
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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): 025X–Owyhee High Plateau

MLRA Notes 25—Owyhee High Plateau
This area is in Nevada (56 percent), Idaho (30 percent), Oregon (12 percent), and Utah (2 percent). It makes up about 27,443 square miles. MLRA 25 is characteristically cooler and wetter than the neighboring MLRAs of the Great Basin. The western boundary is marked by a gradual transition to the lower and warmer basins of MLRA 24. The boundary to the south-southeast, with MLRA 28B, is marked by gradual changes in geology marked by an increased dominance of singleleaf pinyon and Utah juniper and a reduced presence of Idaho fescue. The boundary to the north, with MLRA 11, is a rapid transition from the lava plateau topography to the lower elevation Snake River Plain.
Physiography:
All of this area lies within the Intermontane Plateaus. The southern half is in the Great Basin section of the Basin and Range province. This part of the MLRA is characterized by isolated, uplifted fault-block mountain ranges separated by narrow, aggraded desert plains. This geologically older terrain has been dissected by numerous streams draining to the Humboldt River.
The northern half of the area lies within the Columbia Plateaus province. This part of the MLRA forms the southern boundary of the extensive Columbia Plateau basalt flows. Most of the northern half is in the Payette section, but the northeast corner is in the Snake River Plain section. Deep, narrow canyons draining into the Snake River have been incised into this broad basalt plain. Elevation ranges from 3,000 to 7,550 feet on rolling plateaus and in gently sloping basins. It is more than 9,840 feet on some steep mountains. The Humboldt River crosses the southern half of this area
Geology:
The dominant rock types in this MLRA are volcanic. They include andesite, basalt, tuff, and rhyolite. In the north and west parts of the area, Cretaceous granitic rocks are exposed among Miocene volcanic rocks in mountains. A Mesozoic igneous and metamorphic rock complex dominates the south and east parts of the area. Upper and Lower Paleozoic calcareous sediments, including oceanic deposits, are exposed with limited extent in the mountains. Alluvial fan and basin fill sediments occur in the valleys.
Climate:
The average annual precipitation in most of this area is typically 11 to 22 inches. It increases to as much as 49 inches at the higher elevations. Rainfall occurs in spring and sporadically in summer. Precipitation occurs mainly as snow in winter. The precipitation is distributed fairly evenly throughout fall, winter, and spring. The amount of precipitation is lowest from midsummer to early autumn. The average annual temperature is 33 to 51 degrees F. The freeze-free period averages 130 days and ranges from 65 to 190 days, decreasing in length with elevation. It is typically less than 70 days in the mountains.
Water:
The supply of water from precipitation and streamflow is small and unreliable, except along the Owyhee, Bruneau, and Humboldt Rivers. Streamflow depends largely on accumulated snow in the mountains. Surface water from mountain runoff is generally of excellent quality and suitable for all uses. The basin fill sediments in the narrow alluvial valleys between the mountain ranges provide some ground water for irrigation. The alluvial deposits along the large streams have the most ground water. Based on measurements of water quality in similar deposits in

adjacent areas, the basin fill deposits probably contain moderately hard water. The water is suitable for almost all uses. The carbonate rocks in this area are considered aquifers, but they are little used. Springs are common along the edges of the limestone outcrops.
Soils:
The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic or frigid temperature regime and an aridic, aridic bordering on xeric, or xeric moisture regime. Soils with aquic moisture regimes are limited to drainage or spring areas, where moisture originates or runs on and through. These soils are of a very limited extent throughout the MLRA. They generally are well drained, clayey or loamy, and shallow or moderately deep. Most of the soils formed in mixed parent material. Volcanic ash and loess mantle the landscape. Surface soil textures are loam and silt loam with ashy texture modifiers in some areas. Argillic horizons occur on the more stable landforms. They are exposed nearer the soil surface on convex landforms, where ash and loess deposits are more likely to erode. Soils that formed in carbonatic parent material in areas that receive less than 12 inches of precipitation are characterized by calcic horizons throughout the profile, while soils in areas that receive more than 12 inches of precipitation do not have calcic horizons in the upper part of the profile. Soils that formed on stable landforms at the lower elevations are dominated by ochric horizons. Soils that formed at the middle and upper elevations are characterized by mollic epipedons. Soils in drainage areas at all elevations that receive moisture running on or through them are characterized by thicker mollic epipedons.
Biological Resources:
This MLRA supports shrub-grass vegetation. Lower elevations are characterized by Wyoming big sagebrush associated with bluebunch wheatgrass, western wheatgrass, and Thurber’s needlegrass. Other important plants include bluegrass, squirreltail, penstemon, phlox, milkvetch, lupine, Indian paintbrush, aster, and rabbitbrush. Black sagebrush occurs but is less extensive. Singleleaf pinyon and Utah juniper occur in limited areas. With increasing elevation and precipitation, vast areas characterized by mountain big sagebrush or low sagebrush/early sagebrush in association with Idaho fescue, bluebunch wheatgrass, needlegrasses, and bluegrass become common. Snowberry, curl-leaf mountain mahogany, ceanothus, and juniper also occur. Mountains at the highest elevations support whitebark pine, Douglas-fir, limber pine, Engelmann spruce, subalpine fir, aspen, and curl-leaf mountain mahogany.
Major wildlife species include mule deer, bighorn sheep, pronghorn, mountain lion, coyote, bobcat, badger, river otter, mink, weasel, golden eagle, red-tailed hawk, ferruginous hawk, Swainson’s hawk, northern harrier, prairie falcon, kestrel, great horned owl, short-eared owl, long-eared owl, burrowing owl, pheasant, sage grouse, chukar, gray partridge, and California quail. Reptiles and amphibians include western racer, gopher snake, western rattlesnake, side-blotched lizard, western toad, and spotted frog. Fish species include bull, red band, and rainbow trout.

Ecological site concept

This site occurs in concave positions off the lee-ward side of mountain summits. Slopes range from 4 to 75 percent, but slope gradients of 15 to 50 percent are most typical. Elevations range from 7,000 to 9,500 feet.

The soils associated with this site are moderately deep to very deep to bedrock and well drained. Some soils have high volumes of rock fragments through their profile. The soils are normally moderately to strongly acid. The available water capacity is moderate to high.

The representative plant community is dominated by tailcup lupine and Letterman’s needlegrass.

Associated sites

R025XY004NV	**LOAMY SLOPE 16+ P.Z.**
R025XY010NV	**STEEP NORTH SLOPE**
R025XY024NV	**MOUNTAIN RIDGE**

Similar sites

R025XY014OR	**LOAMY 13-16 PZ**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Lupinus caudatus* (2) *Achnatherum lettermanii*

Physiographic features

The Snowpocket site occurs in concave positions off the lee-ward side of mountain summits. Slopes range from 4 to 75 percent, but slope gradients of 15 to 50 percent are most typical. Elevations are 7000 to 9500 feet.

Table 2. Representative physiographic features

Slope shape across	(1) Concave
Slope shape up-down	(1) Concave
Landforms	(1) Mountain
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	7,000–9,500 ft
Slope	4–75%
Water table depth	48 in
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cold, moist winters and warm, dry summers. The average annual precipitation ranges from 14 or more inches. Mean annual air temperature is typically <45 degrees F.

Mean annual precipitation across the range in which this ES occurs is 18.58".

Monthly mean precipitation: January 1.65”; February 1.68”; March 1.98”; April 2.43”; May 2.41”; June 1.62”; July 0.61”; August 0.63”; September 0.84”; October 1.41”; November 1.51”; December 1.79”.

*The above data is averaged from the Jarbridge 4N and Lamoille PH WRCC climate stations.

Table 3. Representative climatic features

Frost-free period (average)	84 days
Freeze-free period (average)	114 days
Precipitation total (average)	19 in

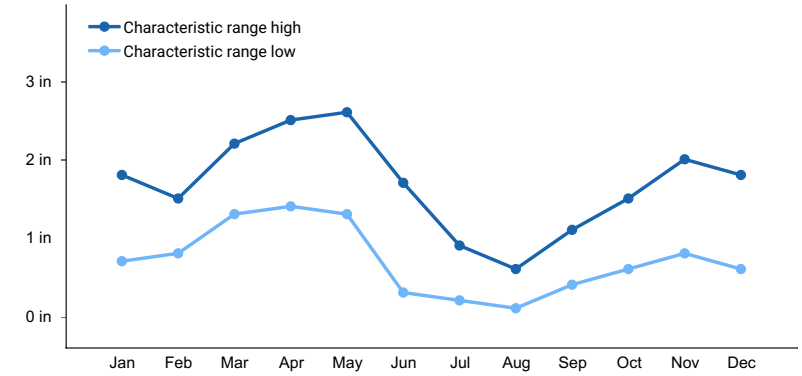


Figure 1. Monthly precipitation range

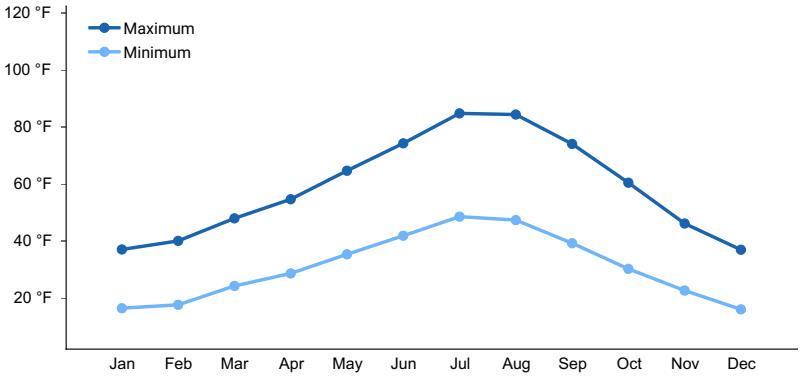


Figure 2. Monthly average minimum and maximum temperature

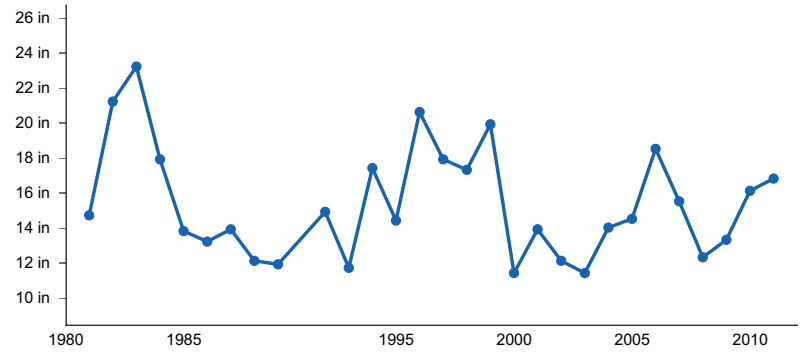


Figure 3. Annual precipitation pattern

Climate stations used

- (1) LAMOILLE YOST [USC00264394], Spring Creek, NV
- (2) JARBIDGE 7 N [USC00264039], Jackpot, NV

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are moderately deep to very deep to bedrock and well drained. Some soils have high volumes of rock fragments through their profile. The soils are normally moderately to strongly acid. The available water capacity is moderate to high. 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.

The soil series associated with this site is Snotown.

A representative soil series is Snotown, classified as a loamy-skeletal, mixed, superactive Xeric Dystrocryept. This soil is moderately deep and moderately well drained. It was formed in residuum and colluvium derived from shale and other sedimentary rocks. Base saturation is 5 to 15 percent and reaction is very strongly acid and extremely acid. Diagnostic horizon include an ochric epipedon that occurs from the soil surface to 7 inches. A cambic horizon occurs from 3 inches to 30 inches. Clay content in the particle-size control section is 12 to 18 percent. Rock fragments range from 40 to 65 percent gravel and up to 5 percent cobbles.

Table 4. Representative soil features

Parent material	(1) Residuum (2) Colluvium
Surface texture	(1) Very gravelly coarse sandy loam
Family particle size	(1) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderately rapid
Depth to restrictive layer	20–40 in
Soil depth	20–40 in
Surface fragment cover <=3"	35–41%
Surface fragment cover >3"	35–40%
Available water capacity (0-40in)	1.79–1.8 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	2–5
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0–2%

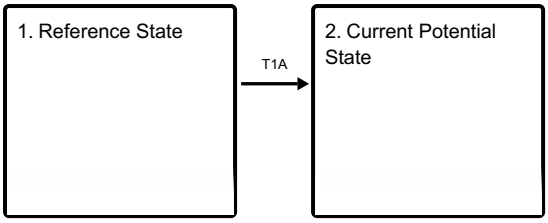
Ecological dynamics

As ecological condition declines, lupine increases and will eventually dominate the site. Letterman’s needlegrass composition declines as bottlebrush squirreltail increases. On lower condition sites, rabbitbrush or goldenbush often invades the plant community.

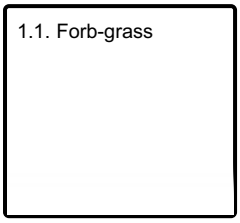
Fire effects:
Little specific information is available on adaptations of Letterman's needlegrass to fire. It is morphologically similar to Columbia needlegrass, which is only slightly to moderately damaged by fire. Season of burn affects the plant's ability to survive a fire. Post fire regeneration is through seeding and tillering. Tailcup lupine is favored or relatively unaffected by fire in sagebrush or pinyon-juniper habitats. It also germinated from buried seed after fire. The top-killed plants may make a ready recovery and rapid increase in vigor, but an increase in plant numbers must await seed production, usually in the second growing season after burning.

State and transition model

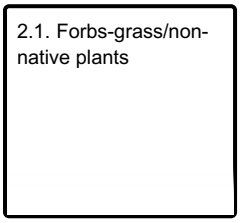
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Reference State

The Reference State is a representative of the natural range of variability under pristine conditions. The reference state has one general community phase: a forb-grass dominant phase. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Plant community phase changes are unknown but are assumed to be relatively stable in reference condition.

Community 1.1
Forb-grass

The representative plant community is dominated by tailcup lupine and Letterman’s needlegrass. Potential vegetative composition is about 50 percent grasses and 50 percent forbs. Approximate ground cover (basal area of perennial herbaceous plants) is 20 to 35 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	550	700	850
Forb	550	700	850
Total	**1100**	**1400**	**1700**

State 2
Current Potential State

This state is similar to the Reference State 1.0. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds.

Community 2.1

Forbs-grass/non-native plants

Similar to Community Phase 1.1, with the inclusion of non-native plants.

Transition T1A
State 1 to 2

Trigger: This transition is caused by the introduction of non-native annual plants. Slow variables: Over time the annual non-native species will increase within the community. Threshold: Any amount of introduced non-native species causes an immediate decrease in the resilience of the site. Annual non-native species cannot be easily removed from the system and have the potential to significantly alter disturbance regimes from their historic range of variation.

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**			560–840	
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	560–840	–
2	**Secondary Perennial Grasses**			28–140	
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	7–42	–
	western needlegrass	ACOC3	*Achnatherum occidentale*	7–42	–
	squirreltail	ELEL5	*Elymus elymoides*	7–42	–
	blue wildrye	ELGL	*Elymus glaucus*	7–42	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	7–42	–
	Idaho fescue	FEID	*Festuca idahoensis*	7–42	–
	basin wildrye	LECI4	*Leymus cinereus*	7–42	–
Forb					
3	**Perennial**			280–672	
	tailcup lupine	LUCA	*Lupinus caudatus*	280–560	–

Animal community

Livestock Interpretations:
This site is suited to livestock grazing. Considerations for grazing management should include timing, intensity and duration of grazing. Grazing managment should be keyed to Letterman's needlegrass. 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.

Alkaloids present in lupine species may be harmful to livestock. Letterman’s needlegrass begins growth early in the year and remains green throughout the relatively long growing season, making it valuable forage for livestock.

Recreational uses

Aesthetic value is derived from the colorful flowering of the lupine backgrounded by the verdure of needlegrass during the summer. Recreational use is limited.

Wood products

None

Other information

Letterman’s needlegrass has been used successfully in revegetating mine spoils. This species also has good potential for erosion control.

Inventory data references

NRCS-RANGE-417 - 3 records

Soils and Physiographic features were gathered from NASIS.

Type locality

Location 1: Elko County, NV	
Township/Range/Section	T41N R62E S31
General legal description	West side of Snake Mountain Range north of Wells, Elko County, Nevada.
Location 2: Elko County, NV	
Township/Range/Section	T37N R51E S18
General legal description	About 4 air miles southwest of St. Johns Ranch, west of Toro Canyon, Tuscarora Mountains, Elko County, Nevada.

Other references

Fire Effects Information System (online http://www.fs.fed.us/database/feis)

Houghton, J.G., C.M. Sakamoto, and R.O. Gifford. 1975. Nevada’s Weather and Climate, Special Publication 2. Nevada Bureau of Mines and Geology, Mackay School of Mines, University of Nevada, Reno, NV.

National Oceanic and Atmospheric Administration. 2004. The North American Monsoon. Reports to the Nation. National Weather Service, Climate Prediction Center. Available online: http://www.weather.gov/

USDA-NRCS Plants Database (online http://plants.usda.gov/)

Contributors

RK/GKB

Approval

Kendra Moseley, 4/25/2024

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:**
