USDA Natural Resources Conservation Service

Ecological site R025XY077NV
Dry Snowfield

Last updated: 4/25/2024
Accessed: 11/21/2024

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 on broad concave, high elevation, mountain sideslopes. Slopes range from 30 to 40 percent. Elevations are greater than 8500 feet.
The soils associated with this site are moderately deep and moderately well drained. The soils are formed in residuum and colluvium derived from shale and other sedimentary rocks. These soils have high volumes of rock fragments through their profile. The soils are normally moderately to extremely acid. The available water capacity is very low.

The reference plant community is dominated by perennial forbs.

Associated sites

F025XY065NV	**Backslope Aspen**
F025XY073NV	**Limber Pine Colluvium**
F025XY078NV	**High Mountain Loam**
R025XY002NV	**ASPEN THICKET**
R025XY024NV	**MOUNTAIN RIDGE**
R025XY052NV	**CEANOTHUS THICKET**

Similar sites

R025XY028NV	**SNOWPOCKET** ACLE9 dominant grass; LUPIN dominant forb; lower precipitation zones

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Ericameria discoidea* (2) *Dasiphora fruticosa*
Herbaceous	(1) *Polygonum phytolaccifolium* (2) *Festuca idahoensis*

Physiographic features

This site occurs on broad concave mountain backslopes. Slopes typically range from 30 to 40 percent, but may reach 60 percent in some places. Elevations are 8500 to 10,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	2,591–3,048 m
Slope	30–40%
Water table depth	183 cm
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. The average growing season is about 50 to 70 days.

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)	483 mm

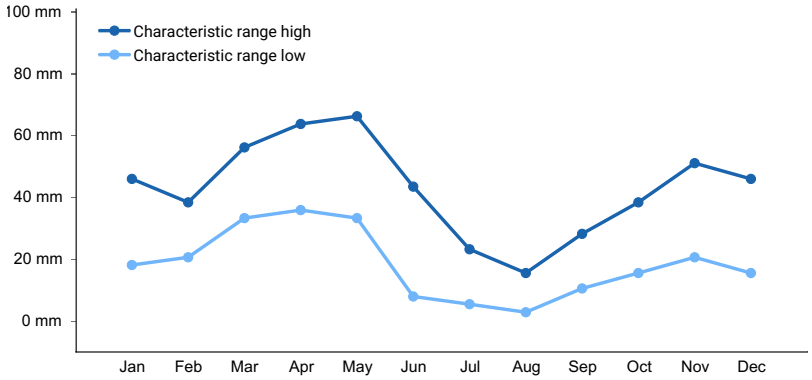


Figure 1. Monthly precipitation range

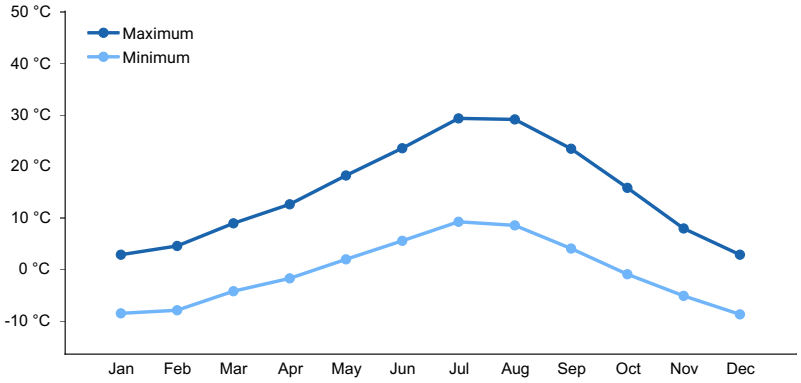


Figure 2. Monthly average minimum and maximum temperature

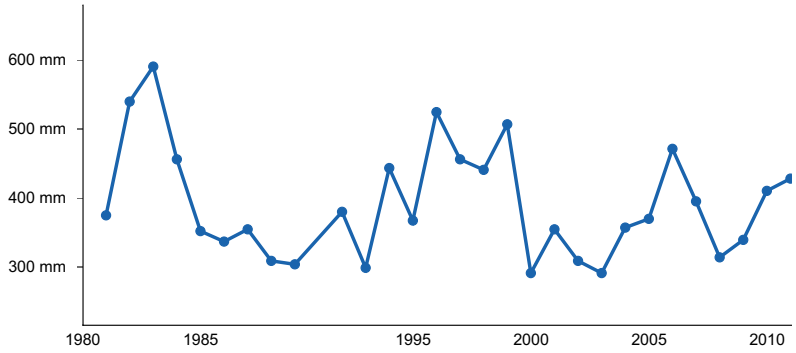


Figure 3. Annual precipitation pattern

Climate stations used

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

Influencing water features

Influencing water features are not associated with this site.

Soil features

The soils are moderately deep and moderately well drained. The soils are formed in residuum and colluvium derived from shale and other sedimentary rocks. These soils have high volumes of rock fragments through their profile. The soils are normally moderately to extremely acid. The available water capacity is very low. This site provides a cool, moist environment for plant growth because of the elevations and northerly exposures where they occur. Soil temperatures and evapotranspiration potentials are limited during the growing season due to reduced insulation. Heavy snow accumulation on this site often persists into summer and significantly reduces the potential plant growth period. Snow melt adds to the soils moisture supply site is medium to rapid and potential for surface erosion

is moderate to high depending on slope.

The soil series correlated to this site include: Lowemar.

Table 4. Representative soil features

Parent material	(1) Colluvium (2) Residuum
Surface texture	(1) Very gravelly coarse sandy loam
Family particle size	(1) Sandy-skeletal (2) Loamy-skeletal
Drainage class	Moderately well drained
Permeability class	Moderately rapid
Depth to restrictive layer	51–102 cm
Soil depth	51–102 cm
Surface fragment cover <=3"	41–70%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	4.32–4.83 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	2–5
Subsurface fragment volume <=3" (Depth not specified)	40–41%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

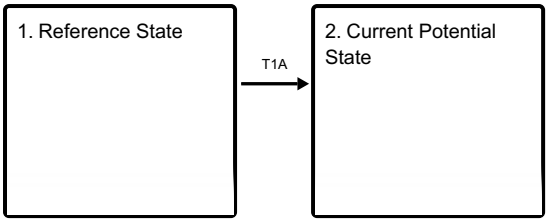
Abiotic factors:
Soil temperatures and evapotranspiration potentials are limited during the growing season due to reduced insulation. Heavy snow accumulation on this site often persists into summer and significantly reduces the potential plant growth period. Snow melt adds to the soil moisture supply.

Ecological dynamics:
As ecological condition deteriorates rabbitbrush and shrubby cinquefoil increases and can eventually dominate the site.

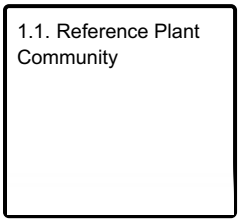
Fire Ecology:
The effects of fire on slender wheatgrass are dependent on its growth form. Tall, decadent plants with many leaves sustain the most fire damage, while those with short, sparse growth form, is the least likely to sustain damage to the root system during a fire. Little specific information 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.

State and transition model

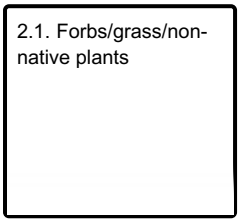
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Reference State

The reference state is characteristic of vegetation dominance at the time of Euro-American settlement in the West.

Community 1.1
Reference Plant Community

The reference plant community is dominated by alpine knotweed. Potential vegetative composition is about 60 percent forbs, 25 percent grasses and about 10 percent shrubs by weight . Approximate ground cover (basal and crown) is 40 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Forb	364	544	656
Grass/Grasslike	140	213	252
Shrub/Vine	56	84	101
Total	**560**	**841**	**1009**

State 2
Current Potential State

This state is similar to the Reference State. 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 (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			140–252	
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	45–81	1–5
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	22–39	2–5
	Idaho fescue	FEID	*Festuca idahoensis*	17–30	1–5
2	**Secondary Perennial Grasses**			56–213	
	mountain brome	BRMA4	*Bromus marginatus*	1–10	–
	Hood's sedge	CAHO5	*Carex hoodii*	1–10	–
	sedge	CAREX	*Carex*	1–10	–
	squirreltail	ELEL5	*Elymus elymoides*	1–10	–
	blue wildrye	ELGL	*Elymus glaucus*	1–10	–
	bluegrass	POA	*Poa*	1–10	–
	spike fescue	LEKI2	*Leucopoa kingii*	1–4	–
	oniongrass	MEBU	*Melica bulbosa*	1–4	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	1–4	–
	western needlegrass	ACOC3	*Achnatherum occidentale*	1–4	–
Forb					
3	**Primary Perennial forbs**			280–504	
	owl's-claws	HYHO	*Hymenoxys hoopesii*	56–101	4–8
	silvery lupine	LUAR3	*Lupinus argenteus*	56–101	3–8
	slender cinquefoil	POGR9	*Potentilla gracilis*	28–50	1–5
	buckwheat	ERIOG	*Eriogonum*	17–30	1–5
	poke knotweed	POPH	*Polygonum phytolaccifolium*	11–22	5–10
	Ross' avens	GERO2	*Geum rossii*	11–20	1–5
4	**Secondary Perennial Forbs**			56–112	
	nettleleaf giant hyssop	AGUR	*Agastache urticifolia*	1–2	–
	mock goldenweed	STENO7	*Stenotus*	1–2	–
	Fendler's meadow-rue	THFE	*Thalictrum fendleri*	1–2	–
Shrub/Vine					
5	**Shrubs**			56–101	
	shrubby cinquefoil	DAFR6	*Dasiphora fruticosa*	11–39	3–6
	whitestem goldenbush	ERDI14	*Ericameria discoidea*	11–39	2–5
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	0–11	0–2
	dwarf bilberry	VACE	*Vaccinium cespitosum*	0–11	0–2
	Utah serviceberry	AMUT	*Amelanchier utahensis*	0–11	0–2
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–11	0–2

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass production. Slender wheatgrass is grazed by all classes of livestock. Letterman’s needlegrass begins growth early in the year and remains green throughout the relatively long growing season, thus, making it valuable forage for livestock.

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:
Slender wheatgrass is grazed by sage grouse, deer, elk, moose, bighorn sheep, mountain goat, pronghorn, various rodents, and all classes of livestock. The seeds are eaten by various seed predators. Slender wheatgrass provides hiding and thermal cover for songbirds, upland game birds, waterfowl, and small mammals. Letterman's needlegrass provides valuable forage for many species of wildlife. It is consumed by mule deer and is most palatable early in the season before the foliage becomes coarse and wiry.

Hydrological functions

Runoff is high. Permeability is moderately rapid. Hydrologic soil group is B.

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 hiking and has potential for upland and big game hunting.

Other information

Slender wheatgrass is widely used for revegetating disturbed lands. It has been used for rehabilitating mine spoils, livestock ranges, and wildlife habitat and watershed areas. Slender wheatgrass is used for rehabilitating alpine meadows and other high elevation habitats. Letterman’s needlegrass has been used successfully in revegetating mine spoils. This species also has good potential for erosion control.

Inventory data references

Soils and Physiographic features were gathered from NASIS.

Type locality

Location 1: Elko County, NV	
Township/Range/Section	T45N R57E S13
UTM zone	N
UTM northing	4627924
UTM easting	625727
Latitude	41° 47′ 35″
Longitude	115° 29′ 12″
General legal description	About ¼ mile northwest of Coon Creek Summit, Humboldt National Forest, 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

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	11/21/2024
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):

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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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):**

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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:

    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:**
