USDA Natural Resources Conservation Service

Ecological site R025XY006NV
DRY MEADOW

Last updated: 4/24/2024
Accessed: 05/13/2025

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): 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

The site occurs on axial-stream floodplains, stream terraces and inset fans. Slopes range from 0 to 15 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 5500 to 7500 feet.

The soils associated with this site are fertile and very deep. They are poorly drained with a water table within 15 inches of the surface. These soils are typically fine-textured and have a mollic epipedon. These soils are subject to flooding for brief periods in the early spring.

The representative plant community is characterized by a dense stand of perennial grasses, and grass-like plants. The plant community is dominated by Nevada bluegrass, alpine timothy and meadow sedges. Potential vegetative composition is about 80 percent grasses and grass-like plants, 15 percent forbs and 5 percent shrubs. Approximate ground cover (basal and crown) is 60 to 80 percent.

Associated sites

R025XY003NV	**LOAMY BOTTOM 8-14 P.Z.** Loamy Bottom 8-14
R025XY005NV	**WET MEADOW** Wet Meadow
R025XY012NV	**LOAMY SLOPE 12-16 P.Z.** Loamy Slope 12-16

R025XY017NV	**CLAYPAN 12-16 P.Z.** Claypan 12-16
R025XY019NV	**LOAMY 8-10 P.Z.**

Similar sites

R025XY003NV	**LOAMY BOTTOM 8-14 P.Z.** LECl4 dominant grass
R025XY005NV	**WET MEADOW** DECE dominant grass

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Poa nevadensis* (2) *Phleum alpinum*

Physiographic features

The site occurs on axial-stream floodplains, stream terraces and inset fans. Slopes range from 0 to 15 percent, but slope gradients of 2 to 8 percent are most typical. Elevations are 5500 to 7500 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace (3) Inset fan
Runoff class	Low to very low
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	1,676–2,286 m
Slope	0–15%
Ponding depth	152 cm
Water table depth	51–152 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 12 to 13 inches. Mean annual air temperature is about 40 to 45 degrees F.

Mean annual precipitation across the range in which this ES occurs is 13 inches.

Monthly mean precipitation in inches: January 1.22; February 0.92; March 1.17; April 1.20; May 1.54; June 1.11; July 0.44; August 0.45; September 0.73; October 0.86; November 1.26; December 1.29.

*The above data is averaged from the Deeth and Tuscarora WRCC climate stations.

Table 3. Representative climatic features

Frost-free period (characteristic range)	25-51 days
Freeze-free period (characteristic range)	79-94 days
Precipitation total (characteristic range)	305-330 mm
Frost-free period (actual range)	18-58 days
Freeze-free period (actual range)	75-98 days
Precipitation total (actual range)	305-330 mm
Frost-free period (average)	38 days
Freeze-free period (average)	87 days
Precipitation total (average)	330 mm

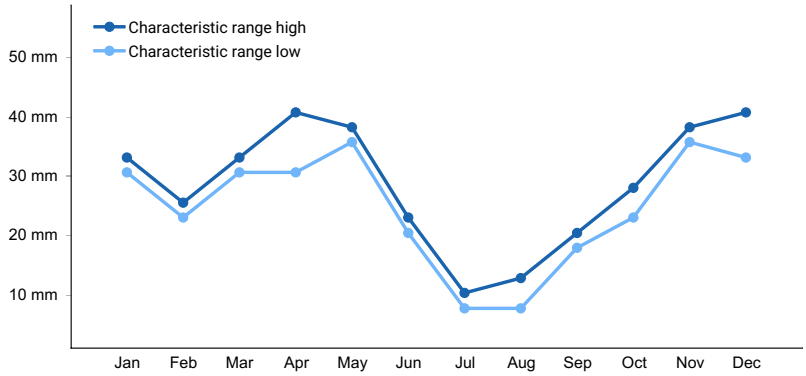


Figure 1. Monthly precipitation range

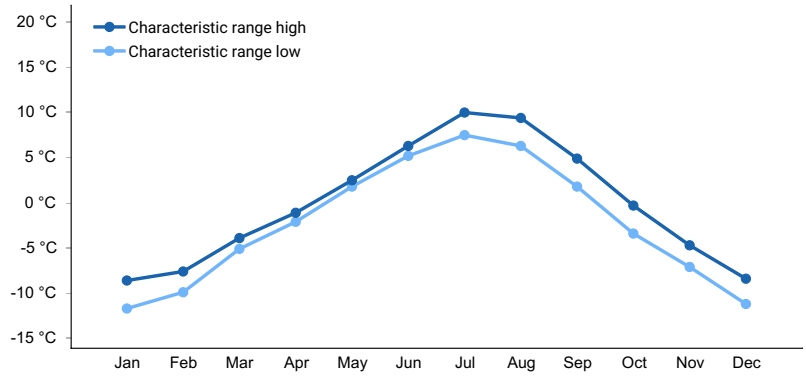


Figure 2. Monthly minimum temperature range

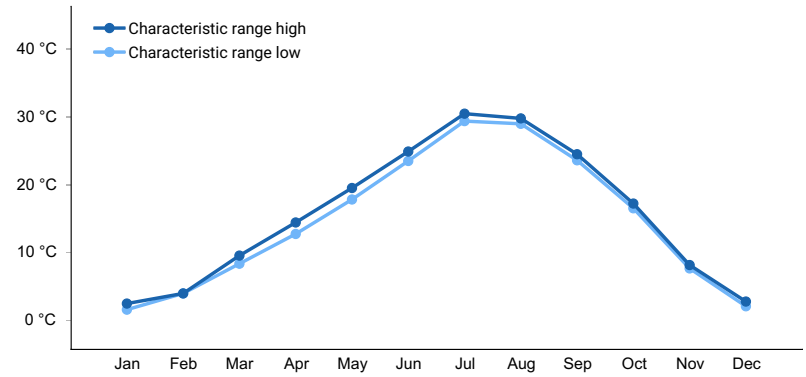


Figure 3. Monthly maximum temperature range

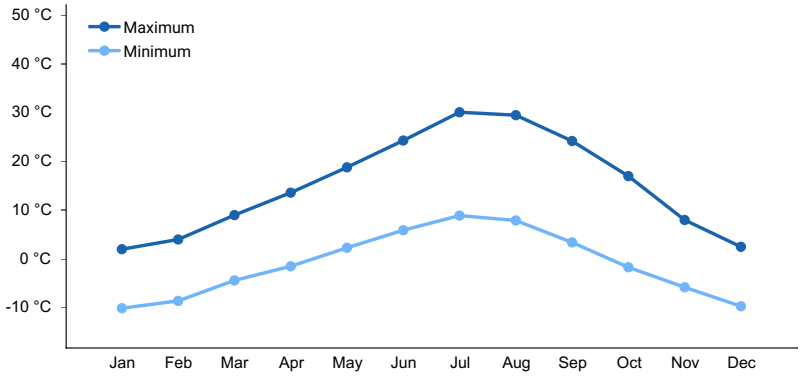


Figure 4. Monthly average minimum and maximum temperature

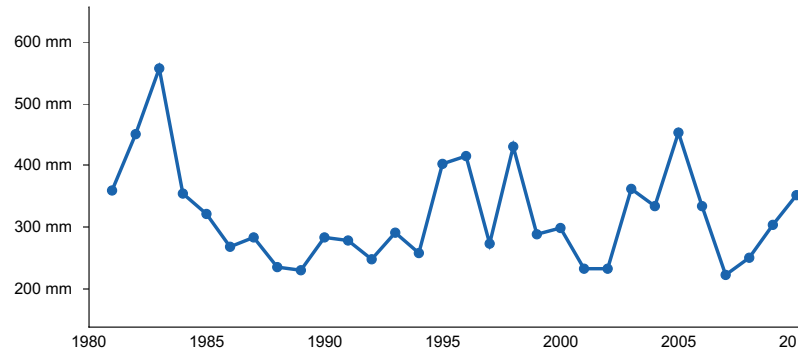


Figure 5. Annual precipitation pattern

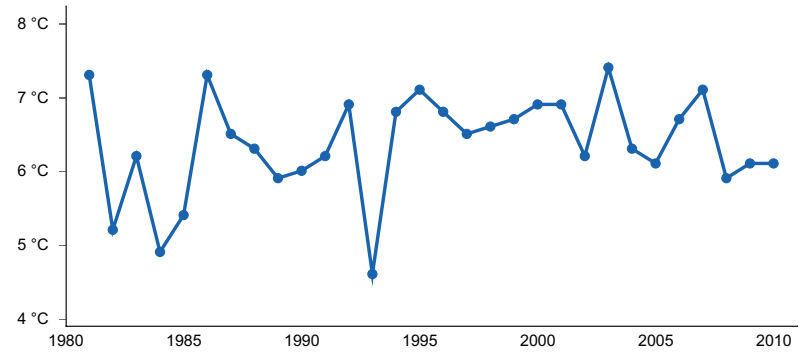


Figure 6. Annual average temperature pattern

Climate stations used

- (1) DEETH [USC00262189], Deeth, NV
- (2) TUSCARORA [USC00268346], Tuscarora, NV

Influencing water features

This site is influenced by perennial streams and is frequently flooded from run-off from snow-melt and high rainfall events.

Soil features

The soils associated with this site are fertile and very deep. They are poorly drained with a water table within 15 inches of the surface. These soils are typically fine-textured and have a mollic epipedon. These soils are subject to flooding for brief periods in the early spring.

Soil series correlated to this site include: Alburz, Crooked Creek, Welch and Halleck.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Silt loam (3) Silty clay loam (4) Clay loam (5) Gravelly loam
Family particle size	(1) Fine-loamy (2) Fine-silty (3) Fine
Drainage class	Poorly drained
Permeability class	Slow to moderate
Depth to restrictive layer	183 cm
Soil depth	183 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	8.89–20.07 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	4–51%
Subsurface fragment volume >3" (Depth not specified)	0–23%

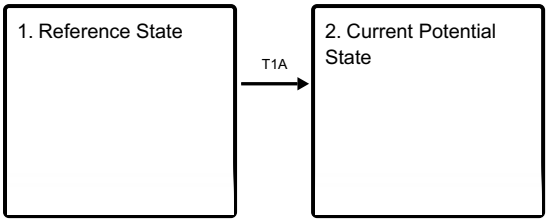
Ecological dynamics

Where management results in abusive livestock use, Kentucky bluegrass, rushes and forbs such as wildiris, cinquefoil, foxtail barley, yarrow, sagewort or wyethia increase on the site, along with brush species in the overstory. Thistles and big sagebrush are species likely to invade this site.

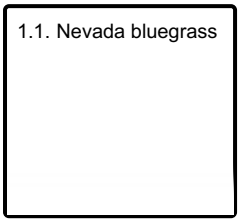
Fire Ecology:
Fire in Dry meadow communities often involves stand replacing fires. The fire return interval occurs every 0 to 35 years. Nevada bluegrass communities is generally unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Moderately severe fires will top-kill timothy, and severe fires may cause damage to or kill the root crown, killing the plant. It reproduces by both seed and shoots from the base. Sedge is top-killed by fire, with rhizomes protected by insulating soil. The rhizomes of sedge species may be killed by high-severity fires that remove most of the soil organic layer. Reestablishment after fire occurs by seed establishment and/or rhizomatous spread. Mat muhly is top killed be fire. Fire does not harm mat muhly to any great extent because the rhizome buds are insulated by the soil. There is a greater than 65 percent chance that at least 50 percent of the plants in a population will survive a fire. Basin wildrye is top-killed by fire. Older basin wildrye plants with large proportions of dead material within the perennial crown can be expected to show higher mortality due to fire than younger plants having little debris. Basin wildrye is generally tolerant of fire but may be damaged by early season fire combined with dry soil conditions. Meadow barley has high fire tolerance. Meadow barley grows in moist habitats that experience infrequent fire.

State and transition model

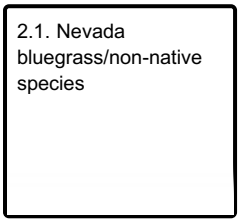
Ecosystem states



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 phases, a herbaceous dominated 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 primarily driven by fire, periodic drought and/or insect or disease attack.

Community 1.1
Nevada bluegrass

The representative plant community is characterized by a dense stand of perennial grasses, and grass-like plants. The plant community is dominated by Nevada bluegrass, alpine timothy and meadow sedges. Potential vegetative composition is about 80 percent grasses and grass-like plants, 15 percent forbs and 5 percent shrubs. Approximate ground cover (basal and crown) is 60 to 80 percent. The phase is maintained by infrequent fire and most of the plants return after a fire, with less cover.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	717	1166	1793
Forb	135	219	336
Shrub/Vine	45	73	112
Total	**897**	**1458**	**2241**

State 2
Current Potential State

This state is similar to the Reference State with one similar community phase. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds. Non-natives may increase in abundance but will not become dominant within this State. These non-natives can be highly flammable and can promote fire where historically fire had been infrequent. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These feedbacks include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Positive feedbacks decrease ecosystem resilience and stability of the state. These include the non-natives' high seed output, persistent seed bank, rapid growth rate, ability to cross pollinate, and adaptations for seed dispersal.

Community 2.1
Nevada bluegrass/non-native species

This community phase is similar to the Reference State Community Phase 1.1, with the presence of non-native species in trace amounts.

Transition T1A
State 1 to 2

Trigger: This transition is caused by the introduction of non-native annual and perennial plants. Slow variables: Over time the non-native species will increase within the community. Organic matter inputs are reduced. Threshold: Any amount of introduced non-native species causes an immediate decrease in the resilience of the site. 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. Soil moisture is reduced.

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**			991–1880	
	alpine timothy	PHAL2	*Phleum alpinum*	291–583	–
	sedge	CAREX	*Carex*	29–117	–
	basin wildrye	LECI4	*Leymus cinereus*	29–117	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	29–117	–
	meadow barley	HOBR2	*Hordeum brachyantherum*	29–73	–
2	**Secondary Perennial Grasses**			29–117	
	thickspike wheatgrass	ELLA3	*Elymus lanceolatus*	8–29	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	8–29	–
	rush	JUNCU	*Juncus*	8–29	–
	beardless wildrye	LETR5	*Leymus triticoides*	8–29	–
	Kentucky bluegrass	POPR	*Poa pratensis*	8–29	–
	Sandberg bluegrass	POSE	*Poa secunda*	8–29	–
Forb					
3	**Perennial**			146–291	
	basin wildrye	LECI4	*Leymus cinereus*	29–117	–
	yarrow	ACHIL	*Achillea*	8–44	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	8–44	–
	aster	ASTER	*Aster*	8–44	–
	Rocky Mountain iris	IRMI	*Iris missouriensis*	8–44	–
	cinquefoil	POTEN	*Potentilla*	8–44	–
	clover	TRIFO	*Trifolium*	8–44	–
	mule-ears	WYETH	*Wyethia*	8–44	–
Shrub/Vine					
4	**Secondary Shrubs**			29–117	
	sedge	CAREX	*Carex*	29–117	–
	rush	JUNCU	*Juncus*	8–29	–
	longrunner	ROSA	*Rorippa sarmentosa*	8–29	–
	willow	SALIX	*Salix*	8–29	–

Animal community

Livestock Interpretations:
This site provides valuable spring and summer forage to all classes of livestock. Grazing management should be keyed to Nevada bluegrass alpine timothy and all other perennial grass production. Bluegrass is a widespread forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species. Nevada bluegrass is a palatable species, but its production is closely tied to weather conditions. It produces little forage in drought years, making it a less dependable food source than other perennial bunchgrasses. Timothy is a palatable and nutritious forage for domestic livestock. Timothy maintains itself well with proper management, but it is not resistant to heavy grazing. Sedge provides good to fair forage for domestic grazing. Young mat muhly is readily eaten by livestock. Plants become less palatable as they mature. Mat muhly plants usually grow in scattered patches, so they are seldom sufficiently abundant to be of major importance to livestock. In the northern part of its range, mat muhly is rated as good to very good forage for cattle and horses and fairly good for domestic sheep. The early growth and abundant production of basin wildrye make it a valuable source of forage for livestock. It is important forage for cattle and is readily grazed by cattle and horses in early spring and fall.

Though coarse-textured during the winter, basin wildrye may be utilized more frequently by livestock and wildlife when snow has covered low shrubs and other grasses. Meadow barley tends to increase and replace the more palatable plants in moist meadows and in other sites favorable to growth, especially if such areas are somewhat overgrazed.

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.

Wildife Interpretations:
Timothy provides important cover for a variety of game birds, small mammals, and waterfowl. Nevada bluegrass is also an important forage species for several wildlife species. Sedges have a high to moderate resource value for elk and a medium value for mule deer. Elk consume beaked sedge later in the growing season. The palatability of mat muhly for wildlife species has been rated as fair to poor. Basin wildrye provides winter forage for mule deer, though use is often low compared to other native grasses. Basin wildrye provides summer forage for black-tailed jackrabbits. Because basin wildrye remains green throughout early summer, it remains available for small mammal forage for longer time than other grasses. Meadow barley is an important forage species for many wildlife species.

Hydrological functions

Flooding commonly occurs in areas along intermittent stream channels. In basin areas, overland flow occurs as run-in from higher landscapes. Runoff is very low to medium and the potential for sheet and rill erosion is slight. These soils are susceptible to gullying which intercepts normal overflow patterns and results in site degradation.

Recreational uses

This site had good recreational potential. When dry it is used for picnicking and camping. Aesthetic value is derived from the lush verdure of native grasses and the colorful flowering of the forbs in the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. It has potential for deer and upland game hunting.

Other products

Basin wildrye was used as bedding for various Native American ceremonies, providing a cool place for dancers to stand.

Other information

Timothy is successfully and profitably used for reseeding rangelands; where the soil is moist and the growing season long enough for seed production. Basin wildrye is useful in mine reclamation, fire rehabilitation and stabilizing disturbed areas. Its usefulness in range seeding, however, may be limited by initially weak stand establishment.

Inventory data references

Soils and Physiographic features were gathered from NASIS.

Type locality

Location 1: Elko County, NV	
Township/Range/Section	T40N R63E S23
General legal description	Approximately 18 miles north of Wells, west of Highway 93, Elko County, Nevada. This site also occurs in Eureka, Lander and Humboldt counties, Nevada.

Other references

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

USDA-NRCS Plants Database (Online; http://www.plants.usda.gov).

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/

Contributors

RK/GKB

Approval

Kendra Moseley, 4/24/2024

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	05/13/2025
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:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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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):**

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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:**
