

Ecological site R026XY003NV WET MEADOW 10-14 P.Z.

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 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 "XY" LRU contains all the sites that cross other LRU boundaries. The sites are typically found along waterways.

Ecological site concept

This site occurs on flood plains and stream terraces along perennial streams and around localized seeps and springs. Slopes range from 0 to 15 percent, but slope gradients of 2 to 4 percent are most typical. Elevations are 4500 to 9500 feet. The soils associated with this site are very deep and very poorly to somewhat poorly drained. The dominant plants are Nevada bluegrass (*Poa nevadensis*, also known as *Poa secunda*) and sedges (*Carex* spp.).

Associated sites

R026XY012NV	DRY FLOODPLAIN 8-10 P.Z.
R026XY013NV	SODIC FLOODPLAIN
R026XY021NV	SODIC FLAT
R026XY030NV	LOAMY BOTTOM 8-12 P.Z.
R026XY055NV	DRY MEADOW

Similar sites

R026XY054NV	WET MEADOW 14+ P.Z. DECE dominant grass; higher elevations.
R026XY001NV	MOIST FLOODPLAIN LETR5 or LEC14 dominant grasses; occurs on axial-stream, floodplains.
R026XY055NV	DRY MEADOW Water table below 30 inches during summer period.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Poa nevadensis</i> (2) <i>Carex</i>

Physiographic features

This site occurs on flood plains and stream terraces along perennial streams and around localized seeps and springs. Slopes range from 0 to 15 percent, but slope gradients of 2 to 4 percent are most typical. Elevations are 4500 to 9500 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace
Runoff class	Very low to very high
Flooding duration	Brief (2 to 7 days) to very brief (4 to 48 hours)
Flooding frequency	Rare to occasional

Ponding frequency	None
Elevation	4,500–9,500 ft
Slope	2–4%
Water table depth	0–60 in
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 8 to 14 inches. Mean annual air temperature is 47 to 49 degrees F. The average growing season is about 90 to 110 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)	8-14 in
Frost-free period (average)	100 days
Freeze-free period (average)	
Precipitation total (average)	11 in

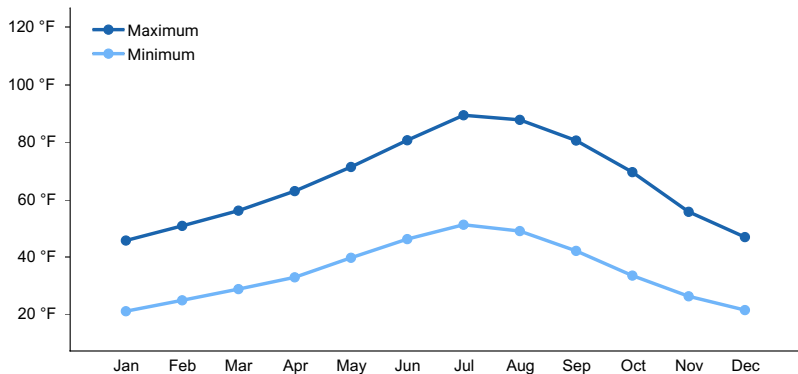


Figure 1. Monthly average minimum and maximum temperature

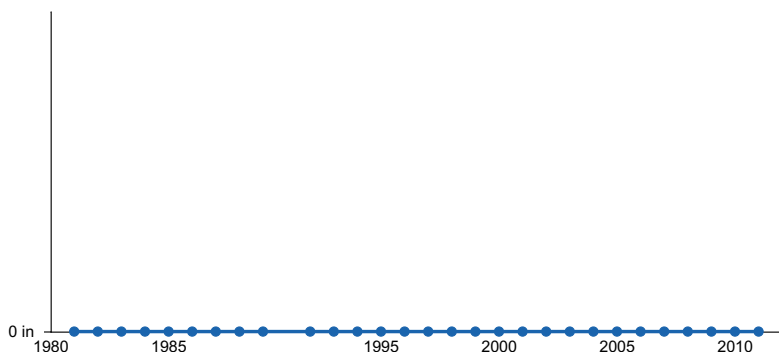


Figure 2. Annual precipitation pattern

Influencing water features

This site is influenced by perennial streams and localized seeps and springs.

Soil features

The soils associated with this site are very deep and very poorly to somewhat poorly drained. Permeability is very low to moderate. The available water capacity is low to moderate. The soils have a water table close to moderately close to the surface (0 to 60 inches) through most of the growing season. Inherent soil fertility is high. In some locations, toxic levels of molybdenum and/or fluorine occur in the soil and are taken up by plants. Plants adapted to saturated soil conditions during the growing season thrive on this site. The soils are highly susceptible to gullyng. The soil series associated with this site include: Blackwell, Jamdogle, Job, Jubilee, Kimmerling, Ophir, Settlemeyer, and Voltaire.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Clay loam (2) Loam (3) Sandy loam (4) Gravelly sandy loam (5) Peat (6) Clay
Family particle size	(1) Loamy
Drainage class	Very poorly drained to somewhat poorly drained
Permeability class	Very slow to moderate
Soil depth	72–84 in
Surface fragment cover <=3"	0–15%

Surface fragment cover >3"	0%
Available water capacity (0-40in)	2.2–8.1 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	5.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–23%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

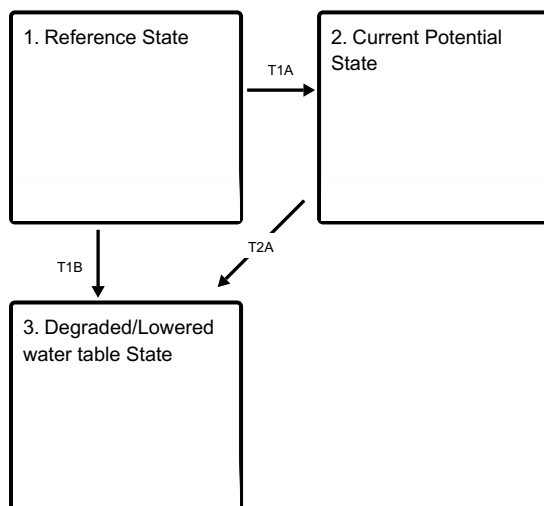
As ecological condition declines, wild iris will increase, while Nevada bluegrass and other desirable grasses and forbs decrease. Species most likely to invade this site are annual grasses and forbs, and thistles. When soil erosion results in gully formation, mountain big sagebrush and rubber rabbitbrush will invade this site.

Fire Ecology:

Fire in wet meadow communities often only top-kills plants. Prescribed fires are most effective in late summer, early fall, or during dry years when the water is below the soil surface. Nevada bluegrass is generally unharmed by fire due to low litter production. The small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Sedges have deep buried rhizomes which usually survive all but the most severe fires. Fire consumes the aboveground tissue of beaked sedge, top-killing the plant. The rhizomes, however, survive most fires, even those that consume organic soils.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities

2.1. Nevada bluegrass/sedges/non-native plants

State 3 submodel, plant communities

3.1. Non-native species/native species

State 1 Reference State

The Reference State represents the plant communities that are adapted to a high water table under a natural disturbance regime. The water table is quite variable across this site and the depth of the available water will largely determine the plants present on the site. Drier locations will have plants adapted to drier soil conditions (Nevada bluegrass), while wetter locations will have plants adapted to wetter soil conditions (sedge/rushes).

Community 1.1 Nevada bluegrass/sedges

The reference plant community is dominated by Nevada bluegrass and sedges. Potential vegetative composition is about 85% grasses and grass-like plants, and about 15% forbs and shrubs. Approximate ground cover (basal and crown) is 80 to 90 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1700	2550	3400
Forb	200	300	400
Shrub/Vine	100	150	200
Total	2000	3000	4000

State 2 Current Potential State

The Current Potential State is similar to the Reference State except the plant communities have non-native species present. The presence of non-native species, especially those that are invasive, lowers the resistance and resiliency of the state. Invasive/non-native plants that can come in with a high water table are meadow foxtail (*Alopecurus arundinaceus*), quackgrass (*Elymus repens*), reed canarygrass (*Phalaris arundinacea*), and Kentucky bluegrass (*Poa pratensis*). These species are also more tolerant of grazing and can increase and may become dominant on the site.

Community 2.1 Nevada bluegrass/sedges/non-native plants

Community Phase 2.1 is similar to Community Phase 1.1 with the exception of the presence of non-native species.

State 3

Degraded/Lowered water table State

The Degraded/Lower water table State develops after a permanent lowering of the water table. This can occur from excessive grazing that can cause meadow downcutting or through artificial meadow drainage to decrease soil saturation. State 1 and State 2 can transition to this state. This state can be similar to the Semiwet Fresh Meadow site in early seral status. The site has crossed the threshold. This state cannot be returned to State 1 without raising the water table.

Community 3.1

Non-native species/native species

Community Phase 3.1 contains plants that are more tolerant to drier soil conditions.

Transition T1A

State 1 to 2

This transition occurs after the introduction of non-native species.

Transition T1B

State 1 to 3

This transition can occur with artificial drainage of the site, which reduces the availability of water and reduces soil moisture.

Transition T2A

State 2 to 3

This transition develops through permanently lowering the late growing season water table. This can occur with continued improper grazing management. It may also occur with proper grazing on the site, but channel erosion may continue if poor off-site conditions because more frequent and/or severe flooding.

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			1740–3360	
	sedge	CAREX	<i>Carex</i>	300–600	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	60–240	–
	meadow barley	HOBR2	<i>Hordeum brachyantherum</i>	60–240	–
	rush	JUNCU	<i>Juncus</i>	60–240	–
	beardless wildrye	LETR5	<i>Leymus triticoides</i>	60–240	–
2	Secondary Perennial Grasses			150–450	
	bentgrass	AGROS2	<i>Agrostis</i>	15–90	–
	sloughgrass	BECKM	<i>Beckmannia</i>	15–90	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	15–90	–
Forb					
3	Perennial			300–600	
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	60–240	–
	beardless wildrye	LETR5	<i>Leymus triticoides</i>	60–240	–
	bentgrass	AGROS2	<i>Agrostis</i>	15–90	–
	sloughgrass	BECKM	<i>Beckmannia</i>	15–90	–
	yarrow	ACHIL	<i>Achillea</i>	15–60	–
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	15–60	–
	cinquefoil	POTEN	<i>Potentilla</i>	15–60	–
	ragwort	SENEC	<i>Senecio</i>	15–60	–
Shrub/Vine					
4	Secondary Shrubs			0–150	
	yarrow	ACHIL	<i>Achillea</i>	15–90	–
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	15–90	–
	cinquefoil	POTEN	<i>Potentilla</i>	15–90	–
	ragwort	SENEC	<i>Senecio</i>	15–90	–
	sloughgrass	BECKM	<i>Beckmannia</i>	15–90	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	15–60	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	15–60	–
	gooseberry currant	RIMO2	<i>Ribes montigenum</i>	15–60	–
	longrunner	ROSA	<i>Rorippa sarmentosa</i>	15–60	–
	willow	SALIX	<i>Salix</i>	15–60	–

Animal community

Livestock Interpretations:

This site is suited for livestock grazing. Grazing management should be keyed to Nevada bluegrass and sedge. 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. 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. Creeping wildrye can be used for forage and is very palatable to all livestock. Once established it is very rhizomatous and maintains stands for many years. Thickspike wheatgrass is palatable to all classes of livestock and wildlife. It is a preferred feed for

cattle, sheep, horses, and elk in spring and is considered a desirable feed for deer and antelope in spring. It is considered a desirable feed for cattle, sheep, and horses in summer, fall, and winter. Thickspike wheatgrass's extensive rhizome system allows established stands to withstand heavy grazing and trampling.

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:

Wet meadow habitats are productive communities that are important to a diversity of animals. Nevada bluegrass and rushes are 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. Creeping wildrye is used for forage for many wildlife species and is often used for cover. In the spring, it is a preferred feed for elk and is considered desirable feed for deer and antelope. It is desirable feed for elk during summer, fall, and winter. Thickspike wheatgrass is also a component of black-tailed jackrabbit diets. Thickspike wheatgrass provides some cover for small mammals and birds.

Hydrological functions

Runoff is very low to very high and permeability is very slow to moderate.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study.

Other information

Creeping wildrye is primarily used for reclamation of wet, saline soils. Thickspike is a good revegetation species because it forms tight sod under dry rangeland conditions, has good seedling strength, and performs well in low fertility or eroded sites. It does not compete well with aggressive introduced grasses during the establishment period, but are very compatible with slower developing natives, bluebunch wheatgrass (*Pseudoroegneria spicata*), western wheatgrass (*Pascopyrum smithii*), and needlegrass (*Achnatherum* spp.) species. It's drought tolerance combined with rhizomes, fibrous root systems, and good seedling vigor make these species ideal for reclamation in areas receiving 8 to 20 inches annual precipitation. Thickspike wheatgrass can be used for hay production and will make nutritious feed, but is more suited to pasture use.

Inventory data references

NASIS data from soil survey areas CA686, CA729, NV625, NV628, NV629, NV771, NV772, NV773, and NV774.

Type locality

Location 1: Douglas County, NV	
Township/Range/Section	T14N R19E S4
General legal description	About 5 miles southeast of Carson City, Clear Creek drainage, Douglas County, Nevada.

Other references

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

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

Contributors

DK/FR/GKB

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	04/25/2024
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):**

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

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

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

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

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

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

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**
