USDA Natural Resources Conservation Service

Ecological site R026XY055NV
DRY MEADOW

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

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): 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

The Dry Meadow site is found on stream terraces on slopes less than 8 percent. The site is rarely to occasionally flooded and the water table is between 20 to 60 inches below the surface. The dominant plant is Nevada bluegrass (Poa nevadensis, also known as Poa secunda).

Associated sites

R026XY003NV	**WET MEADOW 10-14 P.Z.**
R026XY012NV	**DRY FLOODPLAIN 8-10 P.Z.**
R026XY030NV	**LOAMY BOTTOM 8-12 P.Z.**
R026XY053NV	**LOAMY 16+ P.Z.**
R026XY054NV	**WET MEADOW 14+ P.Z.**

Similar sites

R026XY003NV	**WET MEADOW 10-14 P.Z.** More productive site; water table within 20” of surface throughout growing season.
R026XY054NV	**WET MEADOW 14+ P.Z.** DECE dominant grass; more productive site; water table within 20” of surface throughout growing season.
R026XY001NV	**MOIST FLOODPLAIN** LETR5 or LECI4 dominant grasses; occurs an axial-stream floodplains.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Poa nevadensis*

Physiographic features

This site occurs on stream terraces. Slopes range from 0 to 8 percent. Elevation ranges from 4650 to over 8850 feet.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace
Runoff class	Very low to high
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	4,650–8,850 ft
Slope	0–8%
Water table depth	20–60 in

Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is about 12 to over 16 inches. Mean annual air temperature is 43 to 47 degrees F. The average growing season is about 80 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)	12-16 in
Frost-free period (average)	95 days
Freeze-free period (average)	
Precipitation total (average)	14 in

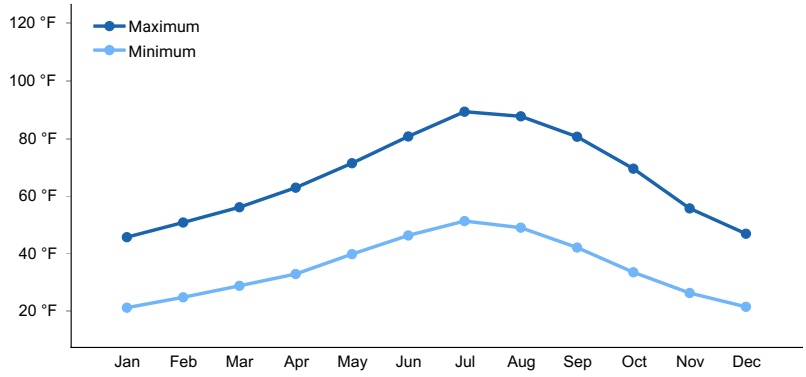


Figure 1. Monthly average minimum and maximum temperature

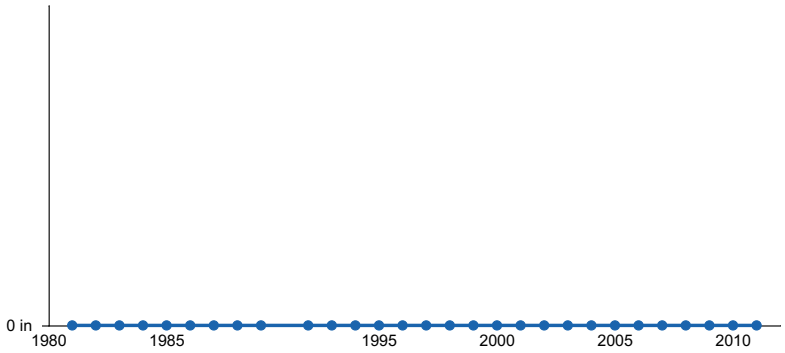


Figure 2. Annual precipitation pattern

Influencing water features

This site on occasion may experience water features; including high annual precipitation and slopes up to 30 percent.

Soil features

The soils associated with this site are very deep and are typically somewhat poorly to moderately well drained. They have a seasonally high water table in the spring. The soils have moderately slow to moderately rapid permeability. The available water capacity is very low to moderate. Surface soils are over 20 inches thick and very dark in color. The soil depth is very deep. The soil series associated with this site include Goodbye, Ormsby, Noodler, Longdrive, Grabbler, Settledrain, Nohope, Conway, and Welch.

Table 4. Representative soil features

Parent material	(1) Alluvium–granite
Surface texture	(1) Loam (2) Ashy loam (3) Gravelly loamy coarse sand
Family particle size	(1) Loamy
Drainage class	Poorly drained to moderately well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	72–84 in
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	1.6–7.4 in
Calcium carbonate equivalent (0-40in)	0–1%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	7–29%
Subsurface fragment volume >3" (Depth not specified)	0–4%

Ecological dynamics

As ecological condition declines foxtail barley, rabbitsfoot grass, and wild iris increase as 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.

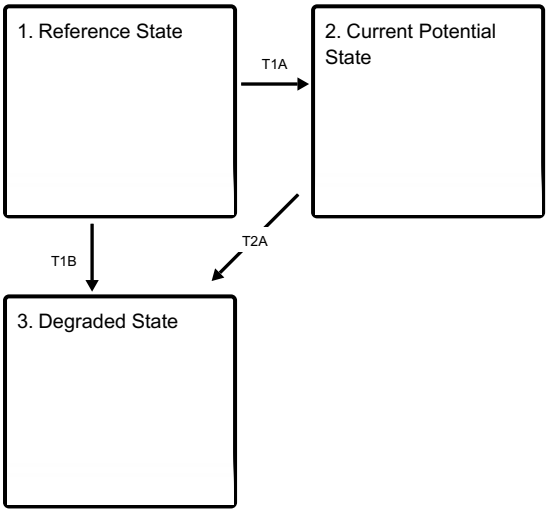
Fire effects:
Fire in dry meadow communities often involves stand replacing fires. The fire return interval occurs every 0 to 35 years. Bluegrass communities are unaffected by frequent fire. Fire return intervals can be as frequent as 1 to 3 years depending upon density. Nevada bluegrass communities 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.

Due to the deep soils, fertility, inherent high productivity of the site and relatively flat slopes, it is fairly resistant to disturbances that can potentially degrade the site. Site degradation is usually the result of lowering of the water table. This can occur with down cutting of adjacent stream channels or significant run-off following prolonged drought. This can result from on-site improper grazing or off-site conditions in the upper watershed. Once adjacent streams down-cut, concentrated flows lower the water table.

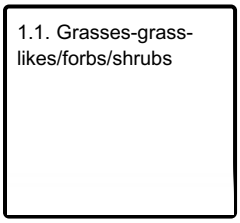
Season-long grazing can be very detrimental to this site. Excessive utilization is also detrimental. The grasses in the plant community will decline in the stand and sedges, rushes and forbs will increase. Continued improper grazing management will result in a stand of forbs and Kentucky bluegrass with sedges and rushes. This results in a reduced ability of the community to withstand seasonal flooding. Down cutting of adjacent streams can result. This down cutting will lower the water table and thus reduce the potential of the site.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities

2.1. Grasses-grass-likes/forbs/non-native plants

State 3 submodel, plant communities

3.1. Non-native grasses/Drought tolerant native grasses

State 1
Reference State

The Reference state is dominated by Nevada bluegrass. In the last few thousand years, this site has evolved in an arid climate characterized by warm, dry summers and cold, wet winters. Flooding and high water table have also influenced the development of this site. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include pronghorn antelope, mule deer, Rocky Mountain elk, sage grouse, lagomorphs and small rodents. Fire has historically occurred on the site and- normally burns in conjunction with an adjacent upland site.

Community 1.1
Grasses-grass-likes/forbs/shrubs

The reference plant community is dominated by Nevada bluegrass. Potential vegetative composition is about 75 percent grasses and grass-like plants, 18 percent forbs, and 2 percent shrubs. Approximate ground cover (basal and crown) is approximately 50 to 70 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	975	1275	1650
Forb	260	340	440
Shrub/Vine	65	85	110
Total	**1300**	**1700**	**2200**

State 2
Current Potential State

Community 2.1
Grasses-grass-likes/forbs/non-native plants

Community Phase 2.1 is dominated by Nevada bluegrass. Potential vegetative composition is about 75 percent grasses and grass-like plants, 18 percent forbs, and 2 percent shrubs. The plant community includes non-native species. Approximate ground cover (basal and crown) is approximately 50 to 70 percent.

State 3
Degraded State

This plant community is dominated by Kentucky bluegrass and white sagebrush but the overall production potential of the site is much lower than State 1. There is an increase in forbs and grasses that require less soil moisture.

Kentucky bluegrass, foxtail barley, bottlebrush squirreltail and Sandberg bluegrass may have invaded or increased in the community. This state developed due to continued improper grazing management and a permanent lowering of the water table. The site has crossed the threshold. This state cannot be returned to State 1 without raising the water table. This might be done using structures or bio-engineering over time, but the plant community may take many years to approach the plant community in State 1.

Community 3.1
Non-native grasses/Drought tolerant native grasses

This plant community is dominated by non-native grass, like Kentucky bluegrass, but the overall production potential of the site is much lower than State 1. There is an increase in forbs and grasses that require less soil moisture. Kentucky bluegrass, foxtail barley, bottlebrush squirreltail and Sandberg bluegrass may have invaded or increased in the community.

Transition T1A
State 1 to 2

Establishment of non-native plants.

Transition T1B
State 1 to 3

Develops through permanently lowering the late growing season water table to more than 60 inches. 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 cause frequent and/or severe flooding.

Transition T2A
State 2 to 3

Develops through permanently lowering the late growing season water table to more than 60 inches. 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 cause 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**			986–1904	
	sedge	CAREX	*Carex*	170–340	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	34–136	–
	meadow barley	HOBR2	*Hordeum brachyantherum*	34–136	–
	rush	JUNCU	*Juncus*	34–136	–
	beardless wildrye	LETR5	*Leymus triticoides*	34–136	–
2	**Secondary Perennial Grasses**			85–255	
	bentgrass	AGROS2	*Agrostis*	9–51	–
	sloughgrass	BECKM	*Beckmannia*	9–51	–
	tufted hairgrass	DECE	*Deschampsia cespitosa*	9–51	–
	foxtail barley	HOJU	*Hordeum jubatum*	9–51	–
Forb					
3	**Perennial**			170–340	
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	34–136	–
	beardless wildrye	LETR5	*Leymus triticoides*	34–136	–
	yarrow	ACHIL	*Achillea*	9–51	–
	Rocky Mountain iris	IRMI	*Iris missouriensis*	9–51	–
	cinquefoil	POTEN	*Potentilla*	9–51	–
	ragwort	SENEC	*Senecio*	9–51	–
Shrub/Vine					
4	**Secondary Shrubs**			1–85	
	big sagebrush	ARTR2	*Artemisia tridentata*	17–34	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	17–34	–
	gooseberry currant	RIMO2	*Ribes montigenum*	17–34	–
	Woods' rose	ROWO	*Rosa woodsii*	17–34	–
	willow	SALIX	*Salix*	17–34	–

Animal community

Livestock Interpretations:
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.

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:
Nevada bluegrass is an important forage species for several wildlife species.

Hydrological functions

Runoff varies from very low to very high.

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. This site is used for camping and hiking and has potential for upland and big game hunting.

Inventory data references

NASIS data for soil survey areas CA686, CA729, NV772, NV773, NV774, and NV779.

Type locality

Location 1: Mineral County, NV	
Township/Range/Section	T8N R28E S14
General legal description	Cottonwood Creek drainage, Hawthorne Army Depot, Wassuk Range, Mineral County, Nevada. This site also occurs in Carson City, Douglas, Lyon, Storey, and Washoe Counties, Nevada.

Other references

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

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

Contributors

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	05/05/2024
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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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:**
