

## **Ecological site R026XF054CA Ashy Semi-Wet Meadow**

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

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### **General information**

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

### **MLRA notes**

Major Land Resource Area (MLRA): 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 Bodie Hills LRU straddles the California-Nevada state boundary, just north of Mono Lake. The area is underlain by late Miocene age volcanic fields with upper Miocene and Pliocene sedimentary deposits over top. The youngest faults in the area are north and north-east striking. Extensive zones of hydrothermally altered rocks and large mineral deposits, including gold and silver rich veins, formed during hydrothermally active periods of the Miocene (John et al. 2015). A primary distinguishing factor between the Bodie Hills and other hills in MLRA 26 is the dominance of volcanic parent material. Elevations range from 2170 to 2650 meters and slopes typically range from 5 to 35 percent. FFD range from 75-105.

## Ecological site concept

The Ashy Semi-Wet Meadow site occurs on axial-stream flood plains and seeps. The soils are typically very deep and poorly drained that formed in alluvium derived from mixed rock sources and volcanic ash. Endosaturation is present with an apparent seasonal high water table between the soil surface and 12 inches from November through June. These soils are susceptible to occasional flooding for brief periods between December and September. The dominant vegetation is sedge (*Carex*), bluegrass (*Poa*), and tufted hairgrass (*Deschampsia cespitosa*).

## Associated sites

|             |                              |
|-------------|------------------------------|
| R026XF010CA | <b>Wet Meadow</b>            |
| R026XF018CA | <b>Streambank</b>            |
| R026XY049NV | <b>MOUNTAIN BASIN</b>        |
| R026XY055NV | <b>DRY MEADOW</b>            |
| R026XY057NV | <b>LOAMY BOTTOM 14+ P.Z.</b> |

## Similar sites

|             |  |
|-------------|--|
| R026XY010NV | <b>LOAMY 10-12 P.Z.</b><br>Wet Meadow [CAREX-DECE dominant species; more productive site]          |
| R026XY055NV | <b>DRY MEADOW</b><br>Dry Meadow [POSE dominant species]  |
| R026XY003NV | <b>WET MEADOW 10-14 P.Z.</b><br>Wet Meadow 10-14" PZ [POSE dominant species, more productive site] |
| R026XY054NV | <b>WET MEADOW 14+ P.Z.</b><br>Wet Meadow 14+ PZ [DECE dominant grass; higher elevations]           |

**Table 1. Dominant plant species**

|            |   |
|------------|---|
| Tree       | Not specified   |
| Shrub      | Not specified   |
| Herbaceous | (1) <i>Carex</i><br>(2) <i>Deschampsia caespitosa</i> |

## Physiographic features

The Ashy Semi-Wet Meadow site occurs on axial-stream flood plains and seeps. Slopes range from 0 to 4 percent, but slope gradients of 0 to 2 are most typical. Elevations are 6000 to 8800 feet.

**Table 2. Representative physiographic features**

|                    |                             |
|--------------------|-----------------------------|
| Landforms          | (1) Flood plain<br>(2) Seep |
| Flooding duration  | Brief (2 to 7 days)         |
| Flooding frequency | None to occasional          |
| Elevation          | 6,000–8,800 ft              |
| Slope              | 0–2%                        |
| Water table depth  | 0–12 in                     |

## Climatic features

The climate is semiarid with cold, moist winters and cool, dry summers. Average annual precipitation is 14 to 16 inches. Mean annual air temperature is 43 to 45 degrees F. The average growing season is about 30 to 60 days.

**Table 3. Representative climatic features**

|  |          |
|--|----------|
| Frost-free period (characteristic range)   |          |
| Freeze-free period (characteristic range)  |          |
| Precipitation total (characteristic range) | 14-16 in |
| Frost-free period (average)                | 60 days  |
| Freeze-free period (average)               |          |
| Precipitation total (average)              | 16 in    |

## Influencing water features

There are perennial streams, springs and seeps associated with the Ashy Semi-Wet Meadow site.

## Soil features

The soils are typically very deep and poorly drained that formed in alluvium derived from mixed rock sources and volcanic ash. The soil profile typically has significant amounts of volcanic glass in the soil profile. A mollic epipedon occurs from the soil surface to more than 40 inches. Endosaturation is present with an apparent seasonal high water table between the soil surface and 12 inches from November through June. These soils are susceptible to occasional flooding for brief periods between December and September.

Soils series correlated to this ecological site include Longdrive, Nohope, and dominantly not assigned a soil series but classified as Aquandic Cryaquolls.

**Table 4. Representative soil features**

|                             |   |
|-----------------------------|---|
| Parent material             | (1) Alluvium–volcanic rock<br>(2) Alluvium–metavolcanics<br>(3) Volcanic ash<br>(4) Eolian deposits–volcanic rock |
| Surface texture             | (1) Mucky, ashy loam<br>(2) Ashy loam<br>(3) Loam   |
| Family particle size        | (1) Fine-loamy  |
| Drainage class              | Poorly drained  |
| Permeability class          | Moderate  |
| Surface fragment cover <=3" | 7–11%   |
| Surface fragment cover >3"  | 0%  |

|   |              |
|---|--------------|
| Available water capacity<br>(Depth not specified)       | 5.5–7.4 in   |
| Calcium carbonate equivalent<br>(Depth not specified)   | 0–1%         |
| Clay content<br>(Depth not specified)                   | 10–23%       |
| Electrical conductivity<br>(Depth not specified)        | 0–2 mmhos/cm |
| Sodium adsorption ratio<br>(Depth not specified)        | 0            |
| Soil reaction (1:1 water)<br>(Depth not specified)      | 5.5–7.4      |
| Subsurface fragment volume ≤3"<br>(Depth not specified) | 10–33%       |
| Subsurface fragment volume >3"<br>(Depth not specified) | 0–2%         |

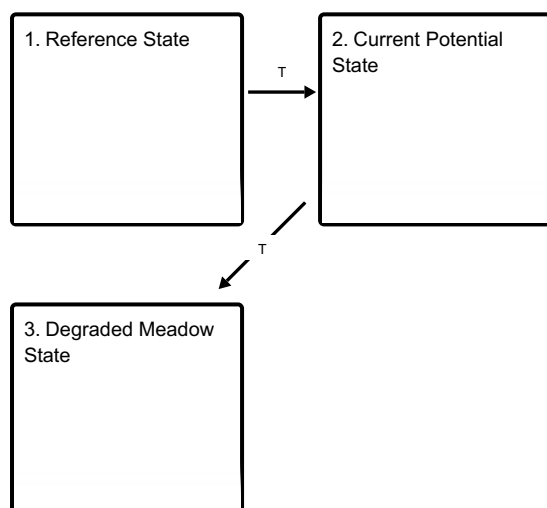
## Ecological dynamics

### Fire Ecology:

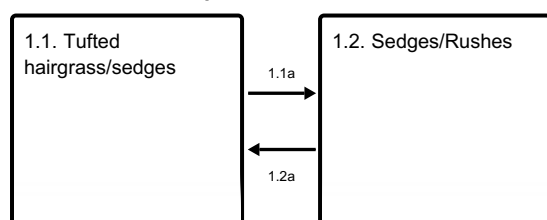
Fire in wet meadow communities often only top-kills plants. Prescribed fires are most effective in late summer, early fall, or during dry years when the water is below the soil surface. The sedges have deep buried rhizomes which usually survive all but the most severe fires. Sedges have deep buried rhizomes 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

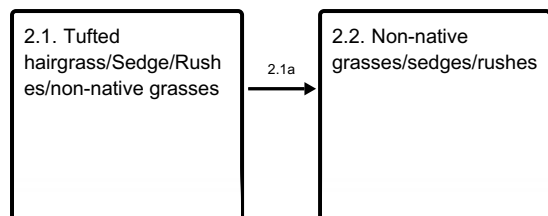
### Ecosystem states



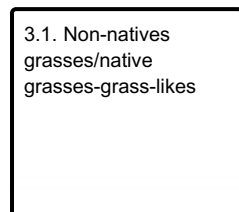
### State 1 submodel, plant communities



## State 2 submodel, plant communities



## State 3 submodel, plant communities



## State 1 Reference State

The plant community has tufted hairgrass and Nebraska sedge as co-dominant in the herbaceous layer. There are a wide variety of grasses and grass-like species and forbs that may occur in minor amounts. Some of these species may be dominant in small areas due to soil and water variations. Willows and shrubby cinquefoil can occur in small amounts. This state has two plant community phases, one with a grass/sedge dominance and the other with sedge/rush dominance. The community phase transition can occur either from grazing or fire. Bunchgrasses, like tufted hairgrass, are susceptible to grazing and fire and can be temporarily reduced, which may increase rhizomatous sedges and rushes in the community.

### Community 1.1 Tufted hairgrass/sedges

The reference plant community is dominated by a dense stand of perennial grasses, grass-like plants and forbs. The representative plant community is dominated by sedges, bluegrasses, tufted hairgrass and rushes. Potential vegetative composition is about 85 percent grasses and grass-like plants and 15 percent forbs and shrubs.

Table 5. Annual production by plant type

| Plant Type      | Low<br>(Lb/Acre) | Representative Value<br>(Lb/Acre) | High<br>(Lb/Acre) |
|-----------------|------------------|-----------------------------------|-------------------|
| Grass/Grasslike | 1105             | 1700                              | 2975              |
| Forb            | 130              | 200                               | 350               |
| Shrub/Vine      | 65               | 100                               | 175               |
| <b>Total</b>    | <b>1300</b>      | <b>2000</b>                       | <b>3500</b>       |

### Community 1.2 Sedges/Rushes

This plant community is dominated by Nebraska sedge and other sedges and Baltic rush. Forbs have increased in the community. This phase has developed due to improper grazing management. The water table has not been lowered from that of Community Phase 1.1.

### Pathway 1.1a Community 1.1 to 1.2

This pathway occurs due to intense grazing pressure or fire.

### Pathway 1.2a

## **Community 1.2 to 1.1**

This pathway occurs after recovery from fire or intense grazing pressure.

## **State 2**

### **Current Potential State**

This state is dominated by Kentucky bluegrass and/or quackgrass, Nebraska sedge and other sedges and Baltic rush 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, quackgrass, redtop bentgrass (*Agrostis stolonifera*) and meadow foxtail (*Alopecurus pratensis*) may have invaded the community. This state developed due to continued improper grazing management or using the site as a hayed pasture potentially with planted introduced species.

## **Community 2.1**

### **Tufted hairgrass/Sedge/Rushes/non-native grasses**

Community Phase 2.1 is similar to Community Phase 1.1 with the exception of non-native plants establishment in the plant community.

## **Community 2.2**

### **Non-native grasses/sedges/rushes**

This community phase develops after continued grazing pressure or haying or fire. Any of these disturbances or a combination of them has the potential to increase non-native grasses on the site.

## **Pathway 2.1a**

### **Community 2.1 to 2.2**

Intense grazing pressure or fire.

## **State 3**

### **Degraded Meadow State**

This state develops after prolonged water table lowering either through artificial drainage or downcutting of adjacent streams or drainageways. Kentucky bluegrass, quackgrass, redtop bentgrass and meadow foxtail have become dominant in the community. There is a permanent lowering of the water table. Significant loss of available soil moisture has occurred due to the loss of a water table. Some soil loss from the surface has occurred. This state can be similar to drier meadow sites or the Loamy Bottom site. 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 or State 2.

## **Community 3.1**

### **Non-natives grasses/native grasses-grass-likes**

This community phase is dominated by non-native grasses such as Kentucky bluegrass.

## **Transition T**

### **State 1 to 2**

## **Transition T**

### **State 2 to 3**

## **Additional community tables**

Table 6. Community 1.1 plant community composition

| Group                  | Common Name                                   | Symbol | Scientific Name                                     | Annual Production (Lb/Acre) | Foliar Cover (%) |
|------------------------|---|--------|---|-----------------------------|------------------|
| <b>Grass/Grasslike</b> |   |        |   |                             |                  |
| 1                      | <b>Primary Perennial Grasses/Grasslikes</b>   |        |   | 1000–2000                   |                  |
|                        | slenderbeak sedge                             | CAAT3  | <i>Carex athrostachya</i>                           | 200–333                     | –                |
|                        | Nebraska sedge                                | CANE2  | <i>Carex nebrascensis</i>                           | 200–333                     | –                |
|                        | clustered field sedge                         | CAPR5  | <i>Carex praegracilis</i>                           | 200–300                     | –                |
|                        | tufted hairgrass                              | DECE   | <i>Deschampsia cespitosa</i>                        | 100–300                     | –                |
|                        | Cusick's bluegrass                            | POCU3  | <i>Poa cusickii</i>                                 | 50–150                      | –                |
|                        | Sierra rush                                   | JUNE   | <i>Juncus nevadensis</i>                            | 50–100                      | –                |
| 2                      | <b>Secondary Perennial Grasses/Grasslikes</b> |        |   | 100–200                     |                  |
|                        | different-nerve sedge                         | CAHE8  | <i>Carex heteroneura</i>                            | 10–60                       | –                |
|                        | smallwing sedge                               | CAMI7  | <i>Carex microptera</i>                             | 10–60                       | –                |
|                        | slender wheatgrass                            | ELTRT  | <i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i> | 10–60                       | –                |
|                        | meadow barley                                 | HOBR2  | <i>Hordeum brachyantherum</i>                       | 10–60                       | –                |
|                        | mat muhly                                     | MURI   | <i>Muhlenbergia richardsonis</i>                    | 10–60                       | –                |
|                        | alpine timothy                                | PHAL2  | <i>Phleum alpinum</i>                               | 10–60                       | –                |
| <b>Forb</b>            |   |        |   |                             |                  |
| 3                      | <b>Perennial Forbs</b>                        |        |   | 200–300                     |                  |
|                        | common yarrow                                 | ACMI2  | <i>Achillea millefolium</i>                         | 10–60                       | –                |
|                        | slender cinquefoil                            | POGR9  | <i>Potentilla gracilis</i>                          | 10–60                       | –                |
|                        | western mountain aster                        | SYSP   | <i>Symphyotrichum spathulatum</i>                   | 10–60                       | –                |
|                        | clover  | TRIFO  | <i>Trifolium</i>                                    | 10–60                       | –                |
| <b>Shrub/Vine</b>      |   |        |   |                             |                  |
| 4                      | <b>Secondary Shrubs</b>                       |        |   | 0–100                       |                  |
|                        | silver sagebrush                              | ARCA13 | <i>Artemisia cana</i>                               | 10–40                       | –                |
|                        | Woods' rose                                   | ROWO   | <i>Rosa woodsii</i>                                 | 10–40                       | –                |
|                        | willow  | SALIX  | <i>Salix</i>  | 10–40                       | –                |

## Animal community

### Livestock Interpretations:

This site is suited to livestock grazing. Grazing management should be keyed to Nebraska sedge production. The palatability of sedges varies with the amount and distribution of palatable grasses and other plants associated with it, with the season of year, and with the amount of moisture in the soil. As a rule, it is fair forage for sheep and fairly good to good for cattle. Unless the soil is too boggy, cattle readily graze the moist areas where sedges grow. It is also produces a large volume of meadow hay for winter livestock feeding.

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:

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.

Hydrological functions

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

Type locality

|                             |   |
|-----------------------------|---|
| Location 1: Mono County, CA |   |
| Latitude                    | 38° 15' 31"                                   |
| Longitude                   | 119° 57' 34"                                  |
| General legal description   | Bodie Hills, 3.7miles northeast of Bodie, CA; |

Other references

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

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

Contributors

A. Mushrush

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:

2. Presence of water flow patterns:



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:**

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