# Ecological site R026XF002CA
# Dune 8-12" P.Z.

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 Mono-Adobe-Long Valleys LRU is comprised of the basins surrounding Mono Lake, Adobe Valley, and Long Valley to the southeast. Pleistocene and Holocene age alluvium and lacustrine deposits predominate. Ash layers occur from eruptions of the numerous volcanic domes that are mostly in adjacent LRUs. Soil temperature regimes are mesic and soil moisture regimes are aridic. Elevations range from 1310 to 2680 meters and slopes are typically less than 10 percent, however there are some ecological sites within the Mono-Adobe-Long Valleys LRU that are greater than 10 percent. Frost free days (FFD) range from 97-125.

## Ecological site concept

The Dune 8-12" P.Z. site occurs on stabilized sand dunes and sandy ridges of undulating to rolling lake terraces on slopes less than 15 percent. The soils are very deep and excessively drained. They formed in wind blown deposits of volcanic ash on semi-stable dunes. Surface textures are sand and fine sand over similar underlying material. The dominant plants are black greasewood (Sarcobatus vermiculatus) and Indian ricegrass (Achnatherum hymenoides).

## Associated sites

| | |
|---|---|
| R026XF016CA | **Wet Sodic Meadow**<br>Occurs on wetter soils. |
| R026XF605CA | **Sandy Juniper Flat (BLM)**<br>Soil is moderately deep. |
| R026XF001CA | **Interdune 8-10" P.Z.**<br>Site located in between dunes (interdune). |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Sarcobatus vermiculatus* |
| Herbaceous | (1) *Achnatherum hymenoides* |

## Physiographic features

This site occurs on stabilized sand dunes and sand sheets overlying undulating to rolling lake terraces. Slopes range from 2 to 15 percent.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Dune |
| Runoff class | Negligible to very low |
| Elevation | 6,400–7,600 ft |
| Slope | 2–15% |
| Aspect | Aspect is not a significant factor |

## Climatic features

The climate on this site is characterized by cold winters (20 to 40 degrees F) and warm, mostly dry summers (45 to 85 degrees F). The average annual precipitation ranges from 8 to 12 inches, with most falling as snow from November to March.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (characteristic range) | |
| Freeze-free period (characteristic range) | |
| Precipitation total (characteristic range) | 8-12 in |
| Frost-free period (average) | 108 days |
| Freeze-free period (average) | 135 days |
| Precipitation total (average) | 10 in |

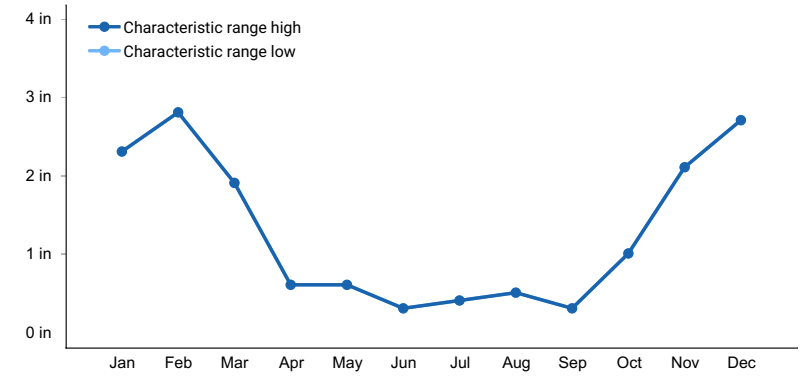



**Figure 1. Monthly precipitation range**

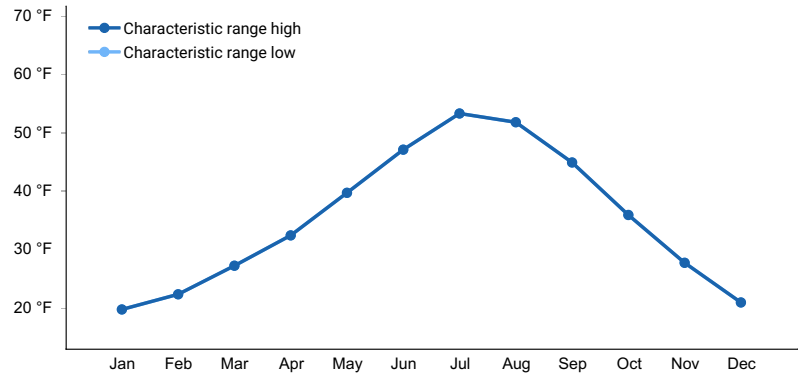



**Figure 2. Monthly minimum temperature range**

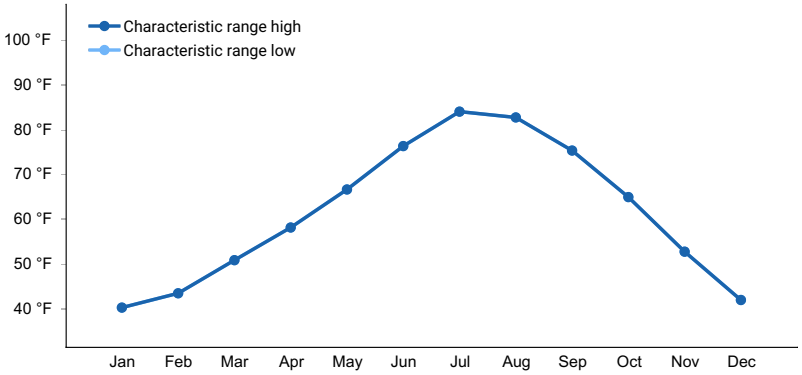



**Figure 3. Monthly maximum temperature range**

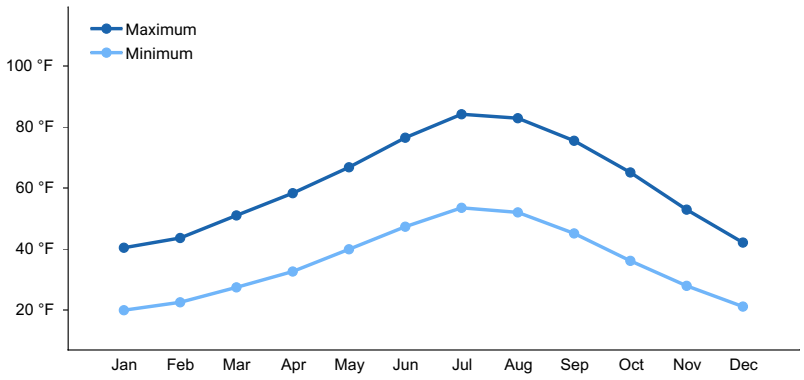



**Figure 4. Monthly average minimum and maximum temperature**

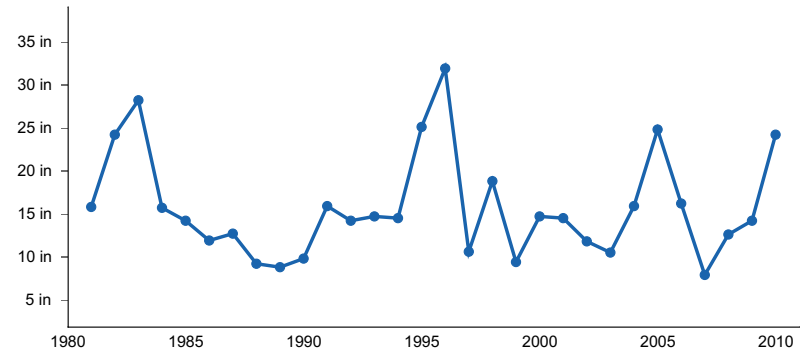



**Figure 5. Annual precipitation pattern**

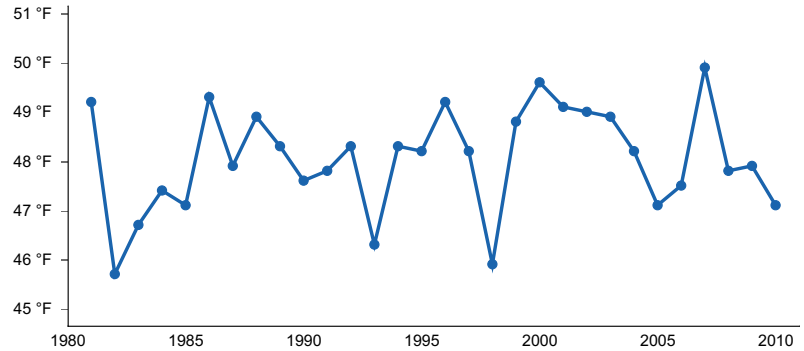



**Figure 6. Annual average temperature pattern**

## Climate stations used

- (1) LEE VINING [USC00044881], Lee Vining, CA

## Influencing water features

The Dune 8-12 P.Z. site is not influenced by water features.

## Soil features

The characteristic soils are very deep and excessively drained. They formed in wind blown deposits of volcanic ash on semi-stable dunes. Surface textures are sand and fine sand over similar underlying material. The substratum is nonsaline to strongly saline-alkali. Available water capacity is low to moderate and the hazard of water erosion is slight. Wind erosion hazard is severe to very severe. Effective rooting depth is greater than 60 inches. The Dune 8-12" P.Z. is correlated to the following soils: Deepwell (CA 732, CA763, CA802) and Brantel (CA732, CA802, NV774).

**Table 4. Representative soil features**

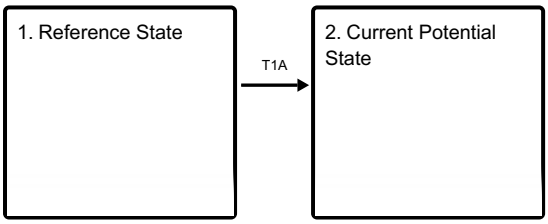
| | |
|---|---|
| Parent material | (1) Eolian deposits<br>(2) Volcanic ash |
| Surface texture | (1) Fine sand<br>(2) Sand |
| Drainage class | Excessively drained |
| Permeability class | Rapid |
| Surface fragment cover <=3" | 0–12% |
| Surface fragment cover >3" | 0% |
| Available water capacity<br>(Depth not specified) | 2–4.4 in |
| Calcium carbonate equivalent<br>(Depth not specified) | 0–5% |
| Electrical conductivity<br>(Depth not specified) | 0–8 mmhos/cm |
| Sodium adsorption ratio<br>(Depth not specified) | 0 |
| Soil reaction (1:1 water)<br>(Depth not specified) | 6.6–8.4 |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 0–12% |
| Subsurface fragment volume >3"<br>(Depth not specified) | 0% |

## Ecological dynamics

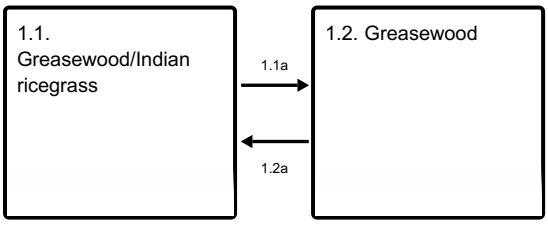
The ecological site may experience high wind erosion, especially with a decrease in vegetative cover. This can be caused by inappropriate grazing practices, drought, off-road vehicle use and/or fire. As ecological condition declines the dunes become mobile, recruitment and establishment of perennial grasses is reduced. This can cause an increase in sprouting shrubs such as rabbitbrush and horsebrush which are more adapted to disturbed sites. Annual non-native species such as Russian thistle and cheatgrass invade these sites where competition from perennial species is decreased. The ecological site has low resilience to disturbance and resistance to invasion. Increased resilience increases with elevation, aspect, increased precipitation and increased nutrient availability.

## State and transition model

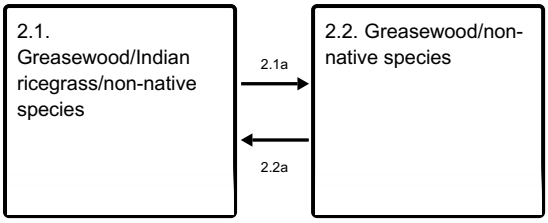
**Ecosystem states**




**State 1 submodel, plant communities**



**State 2 submodel, plant communities**




## State 1
## Reference State

The Reference State contains two conceptual community phases. Community Phase 1.1 (CP 1.1) is dominated by greasewood and Indian ricegrass on stabilized dunes. Community Phase 1.2 (CP 1.2) has transitioned to unstable dune with more open interspaces between plants. The community phase transition is a disturbance to remove grasses or shrubs in CP 1.1, which could be from extreme drought or over use by livestock. The community phase transition back to CP 1.1 would be increased precipitation allowing plants to recolonize open dune areas.

### Community 1.1
### Greasewood/Indian ricegrass

The plant community is dominated by black greasewood and Indian ricegrass. Potential vegetation composition is about 70 percent shrubs, 25 percent grasses, and 5 percent forbs.

**Dominant plant species**

- greasewood (*Sarcobatus vermiculatus*), shrub
- littleleaf horsebrush (*Tetradymia glabrata*), shrub
- fourpart horsebrush (*Tetradymia tetrameres*), shrub
- Indian ricegrass (*Achnatherum hymenoides*), grass

### Community 1.2
### Greasewood

Greasewood dominated community phase. The grasses are reduced from either drought or overuse.

### Pathway 1.1a
### Community 1.1 to 1.2

Drought or overuse by livestock reduces grasses and increases interspaces between shrubs.

### Pathway 1.2a
### Community 1.2 to 1.1

Increase in precipitation allows more plants to recolonize the interspaces between shrubs.

## State 2
## Current Potential State

Similar to the Reference State with the inclusion of non-native plants and animals.

### Community 2.1
### Greasewood/Indian ricegrass/non-native species

Similar to Community Phase 1.1 with the inclusion of non-native species.

### Community 2.2
### Greasewood/non-native species

Similar to Community Phase 1.2 with the inclusion of non-native species.

### Pathway 2.1a
### Community 2.1 to 2.2

Drought or overuse of grasses by livestock.

### Pathway 2.2a
### Community 2.2 to 2.1

Normal or above normal precipitation that allows recolonization of plants in interspaces.

### Transition T1A
### State 1 to 2

Introduction of non-native species.

## Additional community tables

## Inventory data references

NASIS data for soil surveys CA732, CA763, CA802, and NV774.

## Type locality

| Location 1: Mono County, CA | |
|---|---|
| Township/Range/Section | T3N R28E S16 |

## Contributors

V.Burlingame/J.Hanson/P.Novak

## 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:**

   _____

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):**

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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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