USDA Natural Resources Conservation Service

# Ecological site R027XY017NV
# SOUTH SLOPE 4-8 P.Z.

Last updated: 6/03/2024
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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): 027X–Fallon-Lovelock Area

Physiography
Found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus this area is characterized by isolated uplifted fault block mountain ranges trending north to south that are separated by broad, hydrologically closed basins. The entire area occurs in the rain-shadow of the Sierra Nevada mountains and is influenced by Pleistocene Lake Lahontan which reached its most recent high stand about 12,000 years ago. There is substantial evidence suggesting the western Great Basin has been the site of pluvial-interpluvial cycles for at least the past two million years.
The mountains and valleys are dissected by the Humboldt, Truckee, Carson, and Walker Rivers and their tributaries, all of which terminate within MLRA 27. Extensive playas can be found throughout this area and are the result of drying of ancient Lake Lahontan. Elevation generally ranges from 3,300 to 5,900 feet (1,005 to 1,800 meters) in valleys, but on some mountain peaks it is more than 7,870 feet (2,400 meters).

Geology
Landforms and soils of this MLRA have been heavily influenced by fluctuating lake level over the last 40,000 years. There is a level line evident on the higher slopes marking the former extent of glacial Lake Lahontan. Almost half of this area has surface deposits of alluvial valley fill influenced by lacustrine sediment. The rest has andesite and basalt rocks of different ages. Mesozoic and Tertiary intrusives are concentrated along the western border of the area, and Lower Volcanic Rocks (17 to 43 million years old) are common on the eastern side of the area. Also, some scattered outcrops of Mesozoic sedimentary and volcanic rocks and tuffaceous sedimentary rocks are in the mountains within the interior of this MLRA.

Climate
The average annual precipitation is 5 to 10 inches (125 to 255 millimeters) in most of the area but is as much as 19 inches (485 millimeters) on high mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The amount of precipitation is very low from summer to midautumn. The precipitation in winter occurs mainly as snow. The average annual temperature is 43 to 54 degrees F (6 to 12 degrees C). The freeze-free period averages 155 days and ranges from 110 to 195 days, decreasing in length with elevation.

Water
The amount of precipitation is very low, and water for irrigation is obtained principally from diversions on the four large rivers in the area and from water stored in the Lahontan, Rye Patch, and Weber Reservoirs. Pyramid Lake and Walker Lakes are terminal lakes for the Truckee and Walker Rivers, respectively. Much of the annual flow of both rivers is diverted for irrigation, causing lake levels to fall and levels of dissolved salts to increase causing problems for the native Lahontan cutthroat trout.

Soils
The dominant soil orders are Aridisols and Entisols. The soils in the area are predominantly a mesic temperature

regime, aridic moisture regime, and have a mixed mineralogy. They are generally well drained, loamy or sandy, commonly skeletal, and shallow to very deep. Accumulation of salts, tufa deposits, and eolian sediments with soluble salts over lacustrine deposits influence most of the soils in the basin landforms of this MLRA. Soils on bedrock-controlled landforms are typically comprised of volcanic or tuffaceous sedimentary colluvium over residuum.

Biological Resources
This area supports extensive areas of salt-desert shrub vegetation. Shadscale and Bailey's greasewood are widespread, occurring both individually and together. Grasses are generally sparse, although Indian ricegrass is prominent, especially on the sandy soils. Fourwing saltbush, winterfat, spiny hopsage, wolfberry, ephedra, dalea, and bud sagebrush are common shrubs. Basin wildrye, creeping wildrye, alkali sacaton, saltgrass, black greasewood, rubber rabbitbrush, and big saltbush are important plants on saline bottom lands and terraces. A few marsh areas support cattail, bulrushes, sedges, and rushes. Big sagebrush, along with scattered Utah juniper and singleleaf pinyon, is associated with Thurber needlegrass, desert needlegrass, Sandberg bluegrass, and squirreltail on the higher elevation piedmont slopes and mountains.

## Ecological site concept

The South Slope 4-8 P.Z. site occurs on sideslopes of hills and lower elevation mountains on all but northerly aspects. Slope gradients of 30 to 75 percent are most typical. Elevations are 4500 to 5500 feet. The soils are very shallow or have shallow depth to bedrock or a layer restrictive to root development. Surfaces are usually extremely cobbly or extremely stony and are medium to moderately coarse texture.

## Associated sites

| | |
|---|---|
| R027XY037NV | **LOAMY SLOPE 5-8 P.Z.**<br>ATCO-ARSP5 codominant shrubs; more productive site. |

## Similar sites

| | |
|---|---|
| R027XY019NV | **STONY SLOPE 4-8 P.Z.**<br>SAVEB codominant shrub. |
| R027XY015NV | **STONY LOAM 4-8 P.Z.**<br>SAVEB codominant shrub; ACHY dominant grass. |
| R027XY018NV | **GRAVELLY LOAM 4-8 P.Z.**<br>SAVEB codominant shrub; ACHY dominant grass. |
| R027XY027NV | **BARREN GRAVELLY SLOPE 4-8 P.Z.**<br>ACHY dominant grass; less productive site. |
| R027XY013NV | **LOAMY 4-8 P.Z.**<br>More productive site; ACHY dominant site. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Atriplex confertifolia* |
| Herbaceous | (1) *Achnatherum speciosum* |

## Physiographic features

The South Slope 4-8 P.Z. site occurs on sideslopes of hills and lower elevation mountains on all but northerly aspects. Slope gradients of 30 to 75 percent are most typical. Elevations are 4500 to 5500 feet.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Hill<br>(2) Mountain |

| | |
|---|---|
| Runoff class | Medium to very high |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 4,500–5,500 ft |
| Slope | 30–75% |
| Water table depth | 72 in |
| Aspect | W, E, S |

## Climatic features

The climate on this site is arid, characterized by cool, moist winters, and hot, dry summers. Average annual precipitation is 4 to 8 inches. Mean annual air temperature is 45 to 55 degrees F. The average growing season is about 100 to 140 days.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 140 days |
| Freeze-free period (average) | |
| Precipitation total (average) | 8 in |

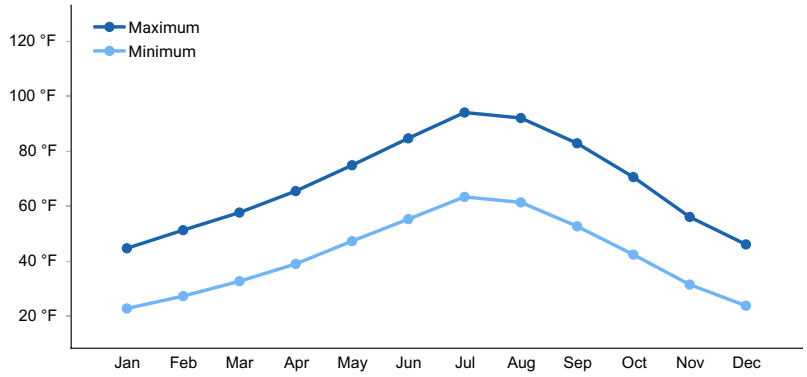



**Figure 1. Monthly average minimum and maximum temperature**

## Influencing water features

There are no influencing water features associated with this site.

## Soil features

The soils are very shallow or have shallow depth to bedrock or a layer restrictive to root development. Surfaces are usually extremely cobbly or extremely stony and are medium to moderately coarse texture. Available water capacity is very low and runoff is high to very high. The soil series associated with this site includes; Findout, Fireball, Mirkwood, Slocave, Theon, and Uripnes.

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Colluvium<br>(2) Residuum<br>(3) Colluvium–volcanic rock<br>(4) Colluvium–granite<br>(5) Residuum–basalt<br>(6) Residuum–limestone<br>(7) Colluvium–limestone |

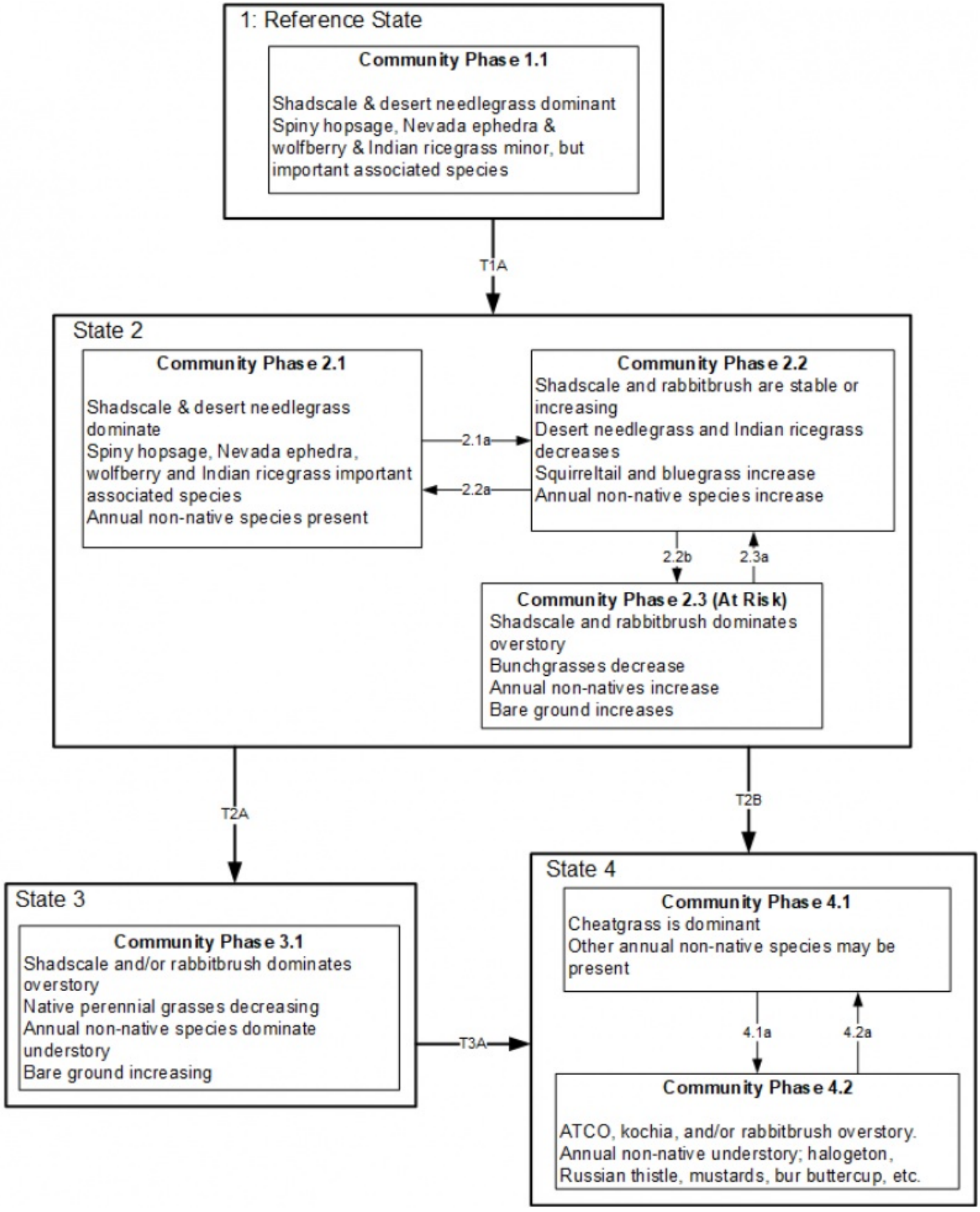
| | |
|---|---|
| Surface texture | (1) Very gravelly loam<br>(2) Extremely stony sandy loam<br>(3) Very gravelly coarse sandy loam |
| Family particle size | (1) Loamy |
| Drainage class | Well drained |
| Permeability class | Moderately slow to moderately rapid |
| Soil depth | 5–45 in |
| Surface fragment cover <=3" | 9–39% |
| Surface fragment cover >3" | 2–31% |
| Available water capacity (0-40in) | 0.2–2.6 in |
| Calcium carbonate equivalent (0-40in) | 1–40% |
| Electrical conductivity (0-40in) | 0–2 mmhos/cm |
| Sodium adsorption ratio (0-40in) | 1–30 |
| Soil reaction (1:1 water) (0-40in) | 6.6–9 |
| Subsurface fragment volume <=3" (Depth not specified) | 18–49% |
| Subsurface fragment volume >3" (Depth not specified) | 2–10% |

## Ecological dynamics

As ecological conditions deteriorates, shadscale, littleleaf horsebrush, and Bailey's greasewood increase as desert needlegrass and Indian ricegrass decline. Species likely to invade this site are cheatgrass and annual forbs.

Fire Ecology:
The mean fire return interval for shadscale-greasewood communities range from 35 to 100 years. Shadscale communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. Increased presence of non-native annual grasses, such as cheatgrass, can alter fire regimes in shadscale communities by increasing fire frequency under wet to near-normal summer moisture conditions. When fire does occur, the effect on the ecosystem may be extreme.
Fires in spiny hopsage sites generally occur in late summer when plants are dormant, and sprouting generally does not occur until the following spring. Spiny hopsage is considered to be somewhat fire tolerant and often survives fires that kill sagebrush. Mature spiny hopsage generally sprout after being burned. Spiny hopsage is reported to be least susceptible to fire during summer dormancy. Nevada ephedra generally sprouts after fire damages aboveground vegetation. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. However, severe fires may kill shallowly buried regenerative structures. Fire typically destroys aboveground parts of wolfberry, but the degree of damage to the plant depends on fire severity. Fire top-kills desert needlegrass. Most needlegrasses (Achnatherum spp.), especially young plants, are very susceptible to fire damage. Surviving tufts of desert needlegrass probably will sprout. Desert needlegrass has persistent dead leaf bases, which make it susceptible to burning. Fire removes the accumulation; a rapid, cool fire will not burn deep into the root crown. Most perennial grasses have root crowns that can survive wildfire. Indian ricegrass can be killed by fire, depending on severity and season of burn. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas.

## State and transition model




Reference State 1.0:
State dynamics are maintained by interactions between climatic patterns and disturbance regimes. Negative feedbacks enhance ecosystem resilience and contribute to the overall stability. These include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Under natural condition this site is very stable, with little variation in plant community composition. Plant community changes would be reflected in production response to long term drought or herbivory.

Community Phase 1.1:
This community is dominated by shadscale, bud sagebrush, and Indian ricegrass. Bottlebrush squirreltail, spiny hopsage, Bailye's greasewood and winterfat are important, but minor components within this community. Community phase changes are primarily a function of chronic drought. Drought favors shrubs over perennial bunchgrasses. However, long-term drought will result in an overall

decline in plant community production, regardless of functional group. Extreme growing season wet periods may also reduce the shadscale component. Fire is very infrequent to non-existent.

T1A: Transition from Reference State 1.0 to Current Potential State 2.0:
Trigger: This transition is caused by the introduction of non-native annual plants, such as halogeton, mustards and cheatgrass.
Slow variables: Over time the annual non-native species will increase within the community.
Threshold: Any amount of introduced non-native species causes an immediate decrease in the resilience of the site. Annual non-native species cannot be easily removed from the system and have the potential to significantly alter disturbance regimes from their historic range of variation.

Current Potential State 2.0: This state is similar to the Reference State 1.0. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of non-native annuals. Non-natives may increase in abundance but will not become dominant within this State. These non-natives can be highly flammable and can promote fire where historically fire had been infrequent. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These feedbacks include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Positive feedbacks decrease ecosystem resilience and stability of the state. These include the non-natives' high seed output, persistent seed bank, rapid growth rate, ability to cross pollinate, and adaptations for seed dispersal.

Community Phase 2.1:
This community is compositionally similar to the reference plant community with a trace of annual non-natives, primarily cheatgrass, halogeton and/or tansy mustard. Non-native species may also include seeded perennials and parasitic plants like dodder. Ecological resilience is reduced by the presence of non-native species. Community phase changes are primarily a function of chronic drought or extreme wet periods. Fire is infrequent and patchy due to low fuel loads.
Community Phase Pathway 2.1a: Inappropriate growing season grazing favors unpalatable shrubs over bunchgrasses, winterfat and bud sagebrush. Long term drought will also decrease the perennial bunchgrasses in the understory.

Community Phase 2.2: Shadscale dominates overstory while rabbitbrush may become sub-dominate. Bud sagebrush may become minor component with excessive spring grazing. Sandberg bluegrass may dominate the understory whereas Indian ricegrass becomes a minor component. Bare ground interspaces increase in size and connectivity. Annual non-native weeds such as bur buttercup and halogeton increase. Prolonged drought may lead to an overall decline in the plant community. Wet periods may decrease the shadscale component. If present.
Community Phase Pathway 2.2a: Release from drought and/or grazing management that facilitates an increase in perennial grasses and bud sagebrush.
Community Phase Pathway 2.2b: Long term drought and/or inappropriate grazing management will significantly reduce perennial grasses and bud sagebrush in favor of shadscale and rabbitbrush.

Community Phase 2.3 (At-risk):
Shadscale and rabbitbrush dominates the overstory and perennial bunchgrasses and bud sagebrush are reduced, either from competition with shrubs, inappropriate grazing, chronic drought or a combination. Annual non-native species may be stable or increasing due to a lack of competition with perennial bunchgrasses. Bare ground may be significant. This community is at risk of crossing a threshold to either State 3.0 (shrub) or State 4.0 (annual).
Community Phase Pathway 2.3a: Release from drought and/or inappropriate grazing allows for bud sagebrush and perennial grasses to increase. Extreme growing season wet period may reduce shadscale.

T2A: Transition from Current Potential State 2.0 to Shrub State 3.0:
Trigger: Inappropriate grazing management and/or prolonged drought will decrease or eliminate deep rooted perennial bunchgrasses and favor shrub growth and establishment.
Slow variables: Long term decrease in grass density and reduced native species (shrub and grass) recruitment rates. Increased reproduction of non-native invasive species.
Threshold: Loss of deep-rooted perennial bunchgrasses changes nutrient cycling, nutrient redistribution, and reduces soil organic matter.

T2B: Transition from Current Potential State 2.0 to Annual State 4.0:
Trigger: Fire and/or soil disturbing treatments such as drill seeding and plowing (failed seeding attempt). Increased spring moisture may facilitate the increased germination and production of cheatgrass leading to its dominance within the community.
Slow variables: Increased production and cover of non-native annual species.
Threshold: Loss of deep-rooted perennial bunchgrasses and shrubs truncates, spatially and temporally, nutrient capture and cycling within the community. Increased, continuous fine fuels from annual non-native plants modify the fire regime by changing intensity, size and spatial variability of fires.

Shrub State 3.0: This state is characterized by shadscale, bud sagebrush or a sprouting shrub overstory with very little to no understory. The site has crossed a biotic threshold and site processes are being controlled by shrubs. Shrub cover exceeds the site concept and may be decadent, reflecting stand maturity and lack of seedling establishment due to competition with mature plants. The shrub overstory dominates site resources such that soil, water and nutrients are temporally and spatially redistributed. Bare ground has increased.

Community Phase 3.1:
Decadent shadscale and bud sagebrush dominate the overstory. Rabbitbrush and/or other sprouting shrubs may be a significant component or dominant shrub. Deep-rooted perennial bunchgrasses may be present in trace amounts or absent from the community. Annual nonnative species increase. Bare ground is significant.
T3A: Transition from Shrub State 3.0 to Annual State 4.0:
Trigger: Fire and/or soil disturbing treatments.
Slow variables: Increased production and cover of non-native annual species.

Threshold: increased, continuous fine fuels modify the fire regime by changing intensity, size and spatial variability. Changes in plant community composition and spatial variability of vegetation, due to the loss of perennial bunchgrasses, truncate energy capture spatially and temporally thus impacting nutrient cycling and distribution.

Annual State 4.0: This state consists of two general community phases; one dominated by annual forbs and the other dominated by annual grass. Shadscale/rabbitbrush may with the present with the annual understory. In this state, a biotic threshold has been crossed and state dynamics are driven by the dominance and persistence of non-native annuals which is perpetuated by a shortened fire return interval. The herbaceous understory is dominated by annual non-native species such as cheatgrass and halogeton. Bare ground may be abundant.

Community Phase 4.1:
This plant community phase is dominated by non-native annual grasses. This community phase is at-risk of increased erosion and soil loss or redistribution and reoccurring fire driven by fine fuels. Prescribed grazing may be used to reduce fuel loading and the cheatgrass seedbank. However, caution should be exercised; inappropriate grazing management resulting in the complete defoliation of the site will lead to a more degraded state.

Community Phase Pathway 4.1a: Seeding of shrub species may result in an increase in shadscale, forage kochia and other species on this site (probability of success is very low)
Community Phase 4.2:
This community is dominated by shadscale and/or rabbitbrush with annual non-native species dominating the understory. Forage kochia and other seeded species may be present in the community. This site is at risk of increased erosion and soil loss and an increase risk of fire due to the fine fuel loads.
CPP 4.2a: fire or herbicide treatment targeting non-native forbs

## State 1
## Reference Plant Community

### Community 1.1
### Reference Plant Community

The reference plant community is dominated by desert needlegrass and shadscale. Potential vegetative composition is about 55% grasses, 5% forbs and 40% shrubs. Approximate ground cover (basal and crown) is 5 to 15 percent.

**Table 5. Annual production by plant type**

| Plant Type | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|---|---|---|---|
| Grass/Grasslike | 55 | 110 | 220 |
| Shrub/Vine | 40 | 80 | 160 |
| Forb | 5 | 10 | 20 |
| **Total** | **100** | **200** | **400** |

## 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** | | | 90–150 | |
| | desert needlegrass | ACSP12 | *Achnatherum speciosum* | 80–120 | – |
| | Indian ricegrass | ACHY | *Achnatherum hymenoides* | 10–30 | – |
| 2 | **Secondary Perennial Grasses** | | | 4–16 | |
| | squirreltail | ELEL5 | *Elymus elymoides* | 1–6 | – |
| | needle and thread | HECO26 | *Hesperostipa comata* | 1–6 | – |
| | James' galleta | PLJA | *Pleuraphis jamesii* | 1–6 | – |
| | Sandberg bluegrass | POSE | *Poa secunda* | 1–6 | – |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 1–6 | – |
| **Forb** | | | | | |
| 3 | **Perennial** | | | 4–20 | |
| | globemallow | SPHAE | *Sphaeralcea* | 1–8 | – |
| | princesplume | STANL | *Stanleya* | 1–8 | – |
| | squirreltail | ELEL5 | *Elymus elymoides* | 1–6 | – |
| | needle and thread | HECO26 | *Hesperostipa comata* | 1–6 | – |
| | Sandberg bluegrass | POSE | *Poa secunda* | 1–6 | – |
| **Shrub/Vine** | | | | | |
| 4 | **Primary Perennial Shrubs** | | | 65–128 | |
| | shadscale saltbush | ATCO | *Atriplex confertifolia* | 53–88 | – |
| | spiny hopsage | GRSP | *Grayia spinosa* | 4–20 | – |
| | desert-thorn | LYCIU | *Lycium* | 4–10 | – |
| | Nevada jointfir | EPNE | *Ephedra nevadensis* | 4–10 | – |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 1–6 | – |
| 5 | **Secondary Perennial Shrubs** | | | 10–30 | |
| | globemallow | SPHAE | *Sphaeralcea* | 1–8 | – |
| | princesplume | STANL | *Stanleya* | 1–8 | – |
| | yellow rabbitbrush | CHVI8 | *Chrysothamnus viscidiflorus* | 1–6 | – |
| | burrobrush | HYSA | *Hymenoclea salsola* | 1–6 | – |
| | winterfat | KRLA2 | *Krascheninnikovia lanata* | 1–6 | – |
| | littleleaf horsebrush | TEGL | *Tetradymia glabrata* | 1–6 | – |
| | Forb, perennial | 2FP | *Forb, perennial* | 2–4 | – |

## Animal community

Livestock Interpretations:
This site is suitable for Livestock grazing. Grazing management should be keyed to desert needlegrass and indian ricegrass production.
Desert needlegrass produces considerable basal foliage and is good forage while young. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle but rarely grazed by sheep. Indian ricegrass is highly palatable to all classes of livestock in both green and cured condition. It supplies a source of green feed before most other native grasses have produced much new growth. Shadscale is a valuable and palatable browse species for livestock. Shadscale provides good browse for domestic sheep and goats. Shadscale leaves and seeds are an important component of domestic sheep and cattle winter diets. Shadscale is palatable to all domestic grazing animals. Seeds are the most palatable part of shadscale.
Fires in spiny hopsage sites generally occur in late summer when plants are dormant, and sprouting generally does

not occur until the following spring. Spiny hopsage is considered to be somewhat fire tolerant and often survives fires that kill sagebrush. Mature spiny hopsage generally sprout after being burned. Spiny hopsage is reported to be least susceptible to fire during summer dormancy. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats.
Anderson wolfberry is sometimes used as forage by livestock. Palatability of wolfberry browse is presumably fair to low. This species is used as forage only when more desirable species are unavailable. The fruit, however, appears to be moderately palatable.

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:
Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of wildlife. The fruits and leaves are a food source for deer, desert bighorn sheep, pronghorn antelope, small rodents, jackrabbits, game birds, and songbirds. Shadscale is good browse for mule deer, which feed upon shadscale during winter, spring, and fall. Shadscale is a minor component of desert bighorn sheep diets. Although it is not preferred, shadscale may provide winter forage for pronghorn antelope. Shadscale habitats of northeastern Nevada are important home ranges for small mammals. Chisel-toothed kangaroo rats feed on shadscale foliage and use shadscale habitats during the spring, summer, and fall. Deer mice use shadscale habitats all year. Shadscale leaves and seeds are preferred forage for jackrabbits. The Great Basin kangaroo rat also feeds on shadscale foliage. Spiny hopsage provides a palatable and nutritious food source for big game animals. Spiny hopsage is used as forage to at least some extent by domestic goats, deer, pronghorn, and rabbits.
Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Palatability of wolfberry browse is presumably fair to low. This species is used as forage only when more desirable species are unavailable. The fruit, however, appears to be moderately palatable. Wolfberry is sometimes used as forage by feral burros. The red berries are eaten by some birds and mammals. Berries of this plant constituted 2 percent of the diet of chukar partridges. Desert needlegrass is a valuable forage for many browsing and grazing wildlife species. Indian ricegrass is eaten by pronghorn in "moderate" amounts whenever available. In Nevada it is consumed by desert bighorns. A number of heteromyid rodents inhabiting desert rangelands show preference for seed of Indian ricegrass. Indian ricegrass is an important component of jackrabbit diets in spring and summer. In Nevada, Indian ricegrass may even dominate jackrabbit diets during the spring through early summer months. Indian ricegrass seed provides food for many species of birds. Doves, for example, eat large amounts of shattered Indian ricegrass seed lying on the ground.

## Hydrological functions

Available water capacity is very low and runoff is high to very high.

## Recreational uses

This site has potential for upland and big game hunting.

## Other products

Some Native American peoples traditionally ground parched seeds of spiny hopsage to make pinole flour. Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments. Native Americans used the fleshy berries of wolfberry either fresh or boiled and then dried them for later use. This shrub is also used as an ornamental valued chiefly for its showy red berries. Indian ricegrass was traditionally eaten by some Native American peoples. The Paiutes used it's seed as a reserve food source.

## Other information

Revegetation of shadscale communities is inherently difficult. Dry soil surfaces resulting from low humidity, high irradiation, and moderate to strong winds are major obstacles in revegetation projects. Spiny hopsage has moderate potential for erosion control and low to high potential for long-term revegetation projects. It can improve forage, control wind erosion, and increase soil stability on gentle to moderate slopes. Spiny hopsage is suitable for highway plantings on dry sites in Nevada. Nevada ephedra is useful for erosion control, and seedlings have been

successfully planted onto reclaimed strip mines, with survival ranging from 12 to 94%. Atrazine may be effective in controlling Nevada ephedra, though some plants can survive through crown sprouting. Irrigation may increase control by atrazine.
Desert needlegrass seeds are easily germinated and have potential for commercial use. Desert needlegrass may be used for groundcover in areas of light disturbance, but it is susceptible to excessive trampling.

## Inventory data references

NASIS soil component data.

## Type locality

| | |
|---|---|
| Location 1: Mineral County, NV | |
| Township/Range/Section | T6 N. R34 E. S36 |
| General legal description | About 4 miles southwest of Mina, Excelsior Mountains, Mineral County, Nevada. This site also occurs in churchill, Pershing, Storey, and Washoe county, Nevada. |
| Location 2: Lyon County, NV | |
| Township/Range/Section | T18 N. R25 E. S13 |
| General legal description | About 5 miles east of Silver Springs along graveled road leading south off US Highway 50, south end of Virginia Range, Lyon County, Nevada. |

## Other references

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

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

## Contributors

DK

## Approval

Kendra Moseley, 6/03/2024

## 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) | P. NOVAK-ECHENIQUE |
| Contact for lead author | STATE RANGELAND MANAGEMENT SPECIALIST |
| Date | 03/21/2008 |
| Approved by | Kendra Moseley |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:** A few rills can be expected particularly in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Waterflow patterns may commonly occur in areas subjected to summer convection storms. Flow patterns are short and stable. High amounts of surface rock fragments limit development of extensive flow patterns.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare with occurrence typically limited to area within water flow patterns. Frost heaving of shallow rooted plants should not be considered as a normal condition.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground <25% depending on amount of surface rock fragments

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 2 to 4 on most soil textures found on this site. (To be field tested.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically weak or moderate thin, platy structure. Soil surface colors are light grays or pale browns and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse shrub canopy and associated litter break raindrop impact. Deep-rooted perennial grasses aid in infiltration and limit runoff.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compacted layers are none. Massive sub-surface structure, subsoil calcic or argillic horizons are not to be interpreted as compacted layers.

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: Deep-rooted, cool season, perennial bunchgrasses > low-statured salt desert shrubs (shadscale & spiny hopsage) >associated shrubs

    Sub-dominant: shallow-rooted, cool season, perennial grasses>deep-rooted, cool season, perennial forbs=fibrous, shallow-rooted, cool season, annual and perennial forbs

    Other: warm season rhizomatous perennial grasses, warm season bunchgrasses

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 35% of total woody canopy; mature bunchgrasses commonly (±25%) have dead centers.

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14. **Average percent litter cover (%) and depth ( in):** Under canopy and between plant interspaces 10-15%, < ¼ depth

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (February thru May) ± 200 lbs/ac; Favorable years ± 400 lbs/ac; Unfavorable years ± 100 lbs/ac

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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:** Potential invaders include cheatgrass, halogeton, Russian thistle and annual mustards.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years. Little growth or reproduction occurs during extreme or extended drought periods.

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