USDA Natural Resources
Conservation Service

# Ecological site R029XY079NV
# DROUGHTY LOAM 5-8 P.Z.

Accessed: 05/11/2025

## 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.

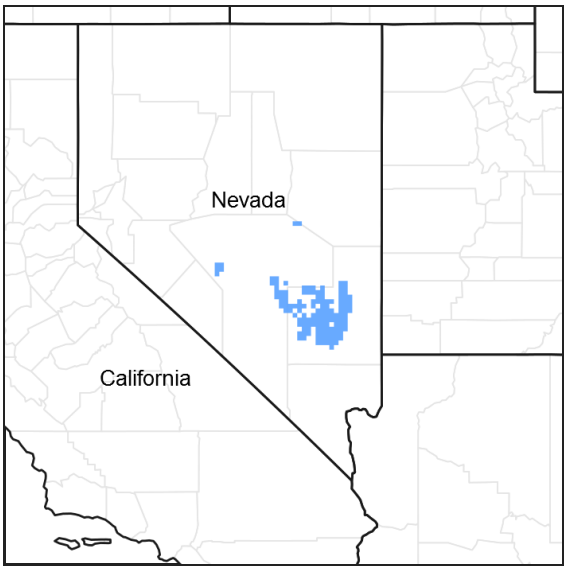


**Figure 1. Mapped extent**

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

## Associated sites

| | |
|---|---|
| R029XY017NV | **LOAMY 5-8 P.Z.** |
| R029XY031NV | **SHALLOW DROUGHTY LOAM 5-8 P.Z.** |
| R029XY074NV | **SHALLOW LOAM 5-8 P.Z.** |
| R029XY080NV | **SHALLOW SANDY LOAM 5-8 P.Z.** |

## Similar sites

| | |
|---|---|
| R029XY031NV | **SHALLOW DROUGHTY LOAM 5-8 P.Z.**<br>GRSP-MESP2 codominant |
| R029XY007NV | **JOSHUA UPLAND**<br>Less productive site; YUBR dominates visual aspect |
| R029XY046NV | **SANDY LOAM 5-8 P.Z.**<br>Less productive site; ATCA2-KRLA2 codominant shrubs |
| R029XY012NV | **SANDY 5-8 P.Z.**<br>ACHY dominant grass; ATCA2 dominant shrub; MUPO2 and YUBA absent |
| R029XY016NV | **LOAMY UPLAND 5-8 P.Z.**<br>MUPO2 and YUBA absent |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Grayia spinosa*<br>(2) *Ephedra nevadensis* |
| Herbaceous | (1) *Achnatherum hymenoides*<br>(2) *Achnatherum speciosum* |

## Physiographic features

This site occurs on inset fans, fan piedmont slopes, and fan skirts. Slope gradients of 0 to 8 percent are typical. Elevations are 4200 to 6000 feet.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Inset fan<br>(2) Fan piedmont<br>(3) Fan skirt |
| Flooding duration | Very brief (4 to 48 hours) |
| Flooding frequency | Very rare |
| Ponding frequency | None |
| Elevation | 4,200–6,000 ft |
| Slope | 0–8% |
| 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 5 to 8 inches. Mean annual air temperature is 52 to 58 degrees F. The average growing season is about 140 to 200 days.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 200 days |
| Freeze-free period (average) | 0 days |
| Precipitation total (average) | 8 in |

## Influencing water features

There are no influencing water features associated with this site.

## Soil features

The soils associated with this site are very shallow to very deep alluvium derived primarily from volcanic rock sources. Soil textures throughout the soil profile are loams to gravelly loams. Some soils may have a restrictive layer below the main plant rooting depth. Water intake rates are moderate and permeability is moderately slow to moderately rapid. Available water holding capacity is very low to low, runoff is very low to very high and the soils are well to excessively drained. Soil series associated with this site include: Delamar, Glotrain, Koyen, Leo and Tybo.

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Gravelly sandy loam<br>(2) Gravelly sandy clay loam<br>(3) Gravelly fine sandy loam |
| Family particle size | (1) Loamy |
| Drainage class | Well drained to excessively drained |
| Permeability class | Moderately slow to moderately rapid |
| Soil depth | 8–84 in |
| Surface fragment cover <=3" | 20–35% |
| Surface fragment cover >3" | 0–9% |
| Available water capacity (0-40in) | 1.2–4.7 in |
| Calcium carbonate equivalent (0-40in) | 0–30% |
| Electrical conductivity (0-40in) | 0–8 mmhos/cm |
| Sodium adsorption ratio (0-40in) | 0–12 |
| Soil reaction (1:1 water) (0-40in) | 7.9–9.6 |
| Subsurface fragment volume <=3" (Depth not specified) | 4–48% |
| Subsurface fragment volume >3" (Depth not specified) | 0–9% |

## Ecological dynamics

Where management results in abusive grazing use by cattle and /or feral horses, littleleaf horsebrush, Douglas rabbitbrush, Anderson wolfberry and galleta increase, while spiny hopsage, fourwing saltbush, Indian ricegrass and Nevada ephedra decrease. Species likely to invade this site are annuals such as brome grasses, Russian thistle and mustards. This site, when in deteriorated condition, subjected to wildfire, may become a nearly solid stand of horsebrush, snakeweed, and rabbitbrush with annuals or galleta occurring within the shrub interspaces.

Fire Ecology:
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 top-kills or kills fourwing saltbush, depending upon ecotype. Fourwing saltbush may sprout after top-kill. Fourwing saltbush probably establishes primarily from seed after fire, with some populations also regenerating vegetatively. Winterfat is either killed or top-killed by fire, depending on fire severity. Severe fire can kill the perennating buds located several inches above the ground surface and thus kills the plant. In addition, severe fire usually destroys seed on the plant. Low-severity fire scorches or only partially consumes the aboveground portions of winterfat and thus does not cause high mortality. Budsage is killed by fire. 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. 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. Fire top-kills bush muhly. A nonrhizomatous species, bush muhly regenerates following fire from soil-stored seed. Burning causes at least short-term decline of bush muhly. Recovery time is thought to vary considerably and is probably dependent on postfire weather and competition. When ungrazed, bush muhly's dense growth may contribute to fire spread. It may be most susceptible to fire damage when growing beneath shrubs because of increased fuels and higher temperatures as shrubs burn. Galleta is a rhizomatous perennial which can resprout

after top-kill by fire.

## State and transition model

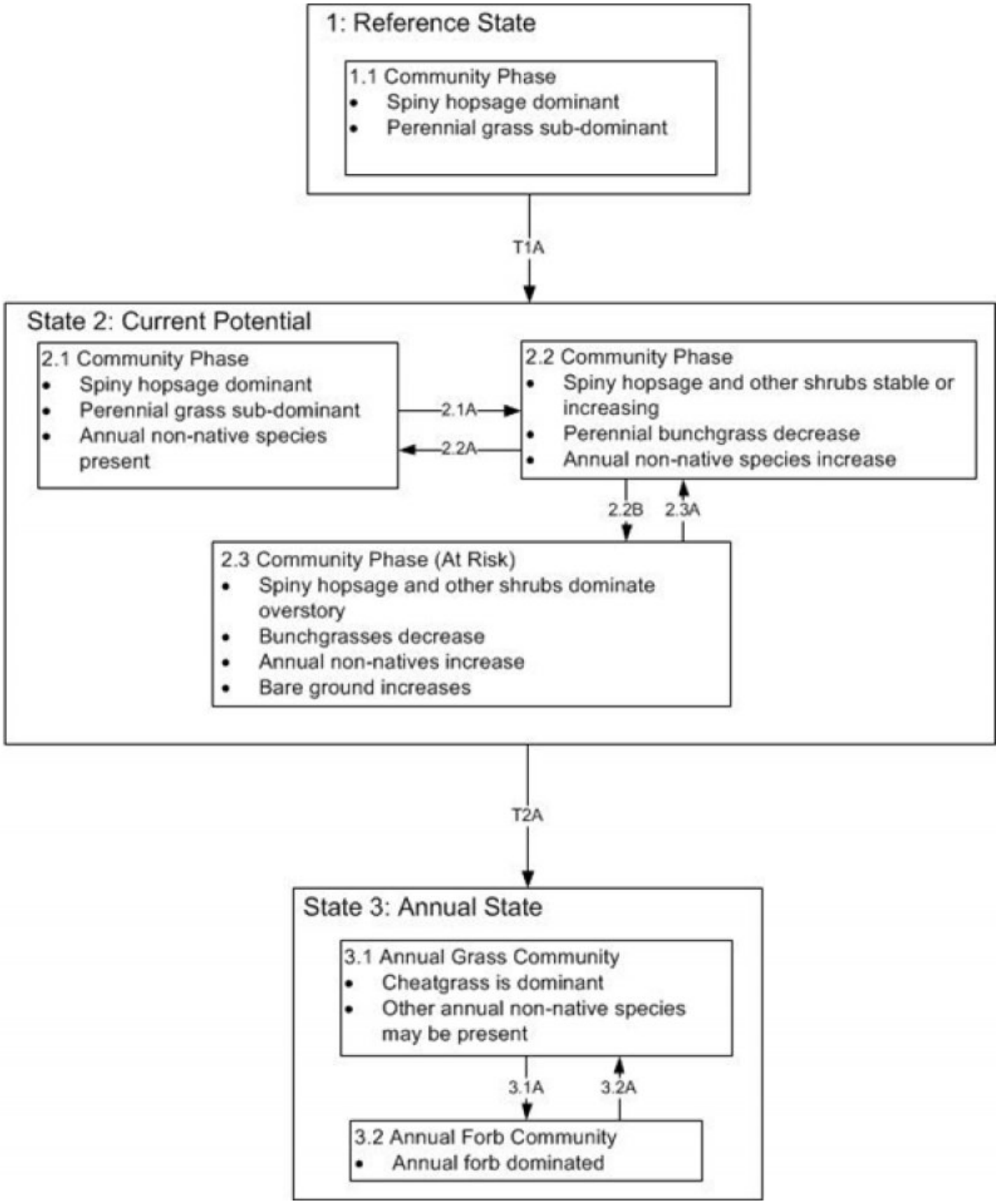


**Figure 3. DRAFT STM**

T1A: introduction of non-native species

2.1A: prolonged drought/ inadequate rest and recovery from defoliation
2.2A: rest and recovery
2.2B:prolonged drought/ inadequate rest and recovery from defoliation
2.3A: recovery or changes in management

T2A: Inadequate rest and recovery from defoliation and/or prolonged drought/Catastrophic wildfire.

3.1A: fire or cheatgrass die off
3.2A: time

**Figure 4. DRAFT STM LEGEND**

### State 1
### Reference State

### Community 1.1
### Reference Plant Community

The reference plant community is dominated by spiny hopsage, Nevada ephedra, Indian ricegrass and desert needlegrass. Potential vegetative composition is about 45% grasses, 5% forbs and 50% shrubs. Approximate ground cover (basal and crown) is 20 to 30 percent.

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

| Plant Type | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|---|---|---|---|
| Shrub/Vine | 225 | 350 | 450 |
| Grass/Grasslike | 202 | 315 | 405 |
| Forb | 23 | 35 | 45 |
| **Total** | **450** | **700** | **900** |

### State 2
### Current Potenital State

### State 3
### Annual State

## 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** | | | 190–406 | |
| | Indian ricegrass | ACHY | *Achnatherum hymenoides* | 105–175 | – |
| | desert needlegrass | ACSP12 | *Achnatherum speciosum* | 70–140 | – |
| | bush muhly | MUPO2 | *Muhlenbergia porteri* | 14–56 | – |
| | James' galleta | PLJA | *Pleuraphis jamesii* | 1–35 | – |
| 2 | **Secondary Perennial Grasses** | | | 14–56 | |
| | squirreltail | ELEL5 | *Elymus elymoides* | 4–21 | – |
| | needle and thread | HECO26 | *Hesperostipa comata* | 4–21 | – |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 4–21 | – |
| **Forb** | | | | | |
| 3 | **Perennial** | | | 14–56 | |
| | James' galleta | PLJA | *Pleuraphis jamesii* | 0–35 | – |
| | globemallow | SPHAE | *Sphaeralcea* | 4–14 | – |
| 4 | **Annual** | | | 1–21 | |
| | Indian ricegrass | ACHY | *Achnatherum hymenoides* | 105–175 | – |
| | desert needlegrass | ACSP12 | *Achnatherum speciosum* | 70–140 | – |
| | squirreltail | ELEL5 | *Elymus elymoides* | 4–21 | – |
| | needle and thread | HECO26 | *Hesperostipa comata* | 4–21 | – |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 4–21 | – |
| **Shrub/Vine** | | | | | |
| 5 | **Primary Shrubs** | | | 156–371 | |
| | spiny hopsage | GRSP | *Grayia spinosa* | 105–175 | – |
| | Nevada jointfir | EPNE | *Ephedra nevadensis* | 35–70 | – |
| | fourwing saltbush | ATCA2 | *Atriplex canescens* | 14–56 | – |
| | winterfat | KRLA2 | *Krascheninnikovia lanata* | 1–35 | – |
| | bud sagebrush | PIDE4 | *Picrothamnus desertorum* | 1–35 | – |
| 6 | **Secondary Shrubs** | | | 14–70 | |
| | yellow rabbitbrush | CHVI8 | *Chrysothamnus viscidiflorus* | 7–21 | – |
| | threadleaf snakeweed | GUMI | *Gutierrezia microcephala* | 7–21 | – |
| | burrobrush | HYSA | *Hymenoclea salsola* | 7–21 | – |
| | water jacket | LYAN | *Lycium andersonii* | 7–21 | – |
| | littleleaf horsebrush | TEGL | *Tetradymia glabrata* | 7–21 | – |
| | banana yucca | YUBA | *Yucca baccata* | 7–21 | – |

## Animal community

Livestock Interpretations:
This site is suited for livestock grazing. Grazing management should be keyed to perennial grass production. Indian ricegrass has good forage value for domestic sheep, cattle and horses. It supplies a source of green feed before most other native grasses have produced much new growth. 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. Bush muhly is readily eaten by livestock throughout the year when available; however, it is usually not abundant enough to provide much forage. It is grazed heavily in winter when other species become scarce. Because of its branching habit, it is extremely

susceptible to heavy grazing. Bush muhly is damaged when continuously grazed to a stubble height of less than 4 inches (10 cm). When actively growing, galleta provides good to excellent forage for cattle and horses and fair forage for domestic sheep. Although not preferred, all classes of livestock may use galleta when it is dry. Domestic sheep show greater use in winter than summer months and typically feed upon central portions of galleta tufts, leaving coarser growth around the edges. Galleta may prove somewhat coarse to domestic sheep. Spiny hopsage provides a palatable and nutritious food source for livestock, particularly during late winter through spring. Domestic sheep browse the succulent new growth of spiny hopsage in late winter and early spring. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Fourwing saltbush is one of the most palatable shrubs in the West. Its protein, fat, and carbohydrate levels are comparable to alfalfa. It provides nutritious forage for all classes of livestock. Palatability is rated as good for domestic sheep and domestic goats; fair for cattle; fair to good for horses in winter, poor for horses in other seasons. Winterfat is an important forage plant for livestock, especially during winter when forage is scarce. Abusive grazing practices have reduced or eliminated winterfat on some areas even though it is fairly resistant to browsing. Effects depend on severity and season of grazing.

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:
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. Fourwing saltbush provides valuable habitat and year-round browse for wildlife. Fourwing saltbush also provides browse and shelter for small mammals. Additionally, the browse provides a source of water for black-tailed jackrabbits in arid environments. Granivorous birds consume the fruits. Wild ungulates, rodent and lagomorphs readily consume all aboveground portions of the plant. Palatability is rated good for deer, elk, pronghorn and bighorn sheep. Winterfat is an important forage plant for wildlife, especially during winter when forage is scarce. Winterfat seeds are eaten by rodents and are a staple food for black-tailed jackrabbits. Mule deer and pronghorn antelope browse winterfat. Winterfat is used for cover by rodents. It is potential nesting cover for upland game birds, especially when grasses grow up through its crown. Indian ricegrass is eaten by pronghorn in moderate amounts whenever available. 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. 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. Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Desert bighorn sheep graze desert needlegrass. The palatability of bush muhly for wildlife species is rated fair to poor. Galleta provides moderately palatable forage when actively growing and relatively unpalatable forage during dormant periods. Galleta provides poor cover for most wildlife species.

## Hydrological functions

Runoff is very low to very high. Permeability is moderately slow to moderately rapid.

## Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs 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.

## 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. Fourwing saltbush is traditionally important to Native Americans. They ground the seeds for flour. The leaves, placed on coals, impart a salty flavor to corn and other roasted food. Top-growth produces a yellow dye. Young leaves and shoots were used to dye wool and other materials. The roots and flowers were ground to soothe insect bites. Indian ricegrass was traditionally eaten by some Native American peoples. The Paiutes used seed as a reserve food source.

## Other information

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. Fourwing saltbush is widely used in rangeland and riparian improvement and reclamation projects, including burned area recovery. It is probably the most widely used shrub for restoration of winter ranges and mined land reclamation. Winterfat adapts well to most site conditions, and its extensive root system stabilizes soil. However, winterfat is intolerant of flooding, excess water, and acidic soils. Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. 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.

## Type locality

| Location 1: Lincoln County, NV | |
|---|---|
| Township/Range/Section | T4S R61E S18 |
| Latitude | 37° 35′ 58″ |
| Longitude | 115° 10′ 56″ |
| General legal description | Section 18, T4S. R61E. MDBM. West side of Sixmile Flat, about 3 miles north of USHwy 93, Lincoln County, Nevada. |

## Other references

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

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

## Contributors

BO'D/RRK
BO'D/RRK

## 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 | 05/15/2013 |
| Approved by | |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:** Rills are rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Water flow patterns are none to rare and may occur in areas subjected to summer convection storms. Flow patterns short (<3 m) and stable.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare with occurrence typically limitec to areas within water flow patterns.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 25 to 50% depending on amount of surface rock fragments (variable 15 to over 40%)

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 (< 5 m) 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. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. (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 platy. Soil surface colors are 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 provide some protection from raindrop impact.

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. Platy or massive sub-surface horizons 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: deciduous shrubs (spiny hopsage)

    Sub-dominant: deep-rooted, cool season, bunchgrasses > associated shrubs > warm season grasses > deep-rooted, perennial forbs = fibrous, shallow-rooted, perennial forbs = annual forbs

    Other: succulents

    Additional:

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.

14. **Average percent litter cover (%) and depth ( in):** Between plant interspaces (20-30%) and depth (<¼-inch)

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (thru May) ± 700 lbs/ac; Favorable years ± 900 lbs/ac and unfavorable years ± 450 lbs/ac

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 halogeton; Russian thistle, red brome, red stem filaree, annual mustards, and cheatgrass.

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