USDA Natural Resources Conservation Service

Ecological site R027XY047NV
ERODED GRANITIC SLOPE

Last updated: 6/03/2024
Accessed: 06/30/2024

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): 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 Eroded Granitic Slope site occurs on pediments, plateaus, sideslopes of hills and lower elevation mountains on all but northerly aspects. Slope gradients of 30 to 75 percent are typical. Elevations are 4300 to 7000 feet. The soils are predominantly very shallow to shallow and well drained. Surface soils are moderately coarse.

Associated sites

R027XY007NV	**LOAMY SLOPE 8-10 P.Z.** Less productive site

Similar sites

R027XY017NV	**SOUTH SLOPE 4-8 P.Z.** ATCO dominant shrub
R027XY027NV	**BARREN GRAVELLY SLOPE 4-8 P.Z.** ATCO dominant shrub; ACHY dominant grass; less productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Grayia spinosa* (2) *Tetradymia glabrata*
Herbaceous	(1) *Achnatherum speciosum*

Physiographic features

The Eroded Granitic Slope site occurs on pediments, plateaus, sideslopes of hills and lower elevation mountains on all but northerly aspects. Slopes range from 2 to 75, but slopes gradients of 30 to 75 percent are typical. Elevations are 4300 to 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Pediment (2) Plateau (3) Hill
Runoff class	Medium to very high
Elevation	4,300–7,000 ft
Slope	2–75%

Water table depth	72 in
Aspect	W, E, S

Climatic features

The climate associated with this site is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is 4 to about 8 inches. Mean annual air temperature is 47 to 54 degrees F. The average growing season is about 80 to 130 days.

Table 3. Representative climatic features

Frost-free period (average)	130 days
Freeze-free period (average)	
Precipitation total (average)	8 in

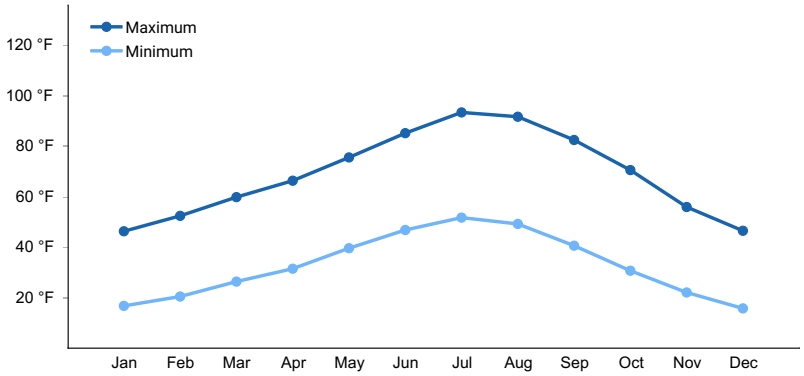


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are predominantly very shallow to shallow, well drained and have formed in colluvium and residuum from granitic or volcanic parent material. Surface soils are moderately coarse. Available water capacity is very low. Permeability is moderately slow to moderately rapid and surface runoff is medium to very high. Potential for sheet and rill erosion is high. Soil stability values should be 1 to 4 on the coarse surface soil textures found on this site. The soil series associated with this site inlcude: Celeton, Osobb, Stingdorn, Uripnes, and Weena.

Table 4. Representative soil features

Parent material	(1) Colluvium–granite (2) Residuum–granite (3) Colluvium–volcanic rock (4) Residuum–volcanic rock
Surface texture	(1) Extremely stony fine sandy loam (2) Very stony very fine sandy loam (3) Very stony sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Depth to restrictive layer	4–20 in

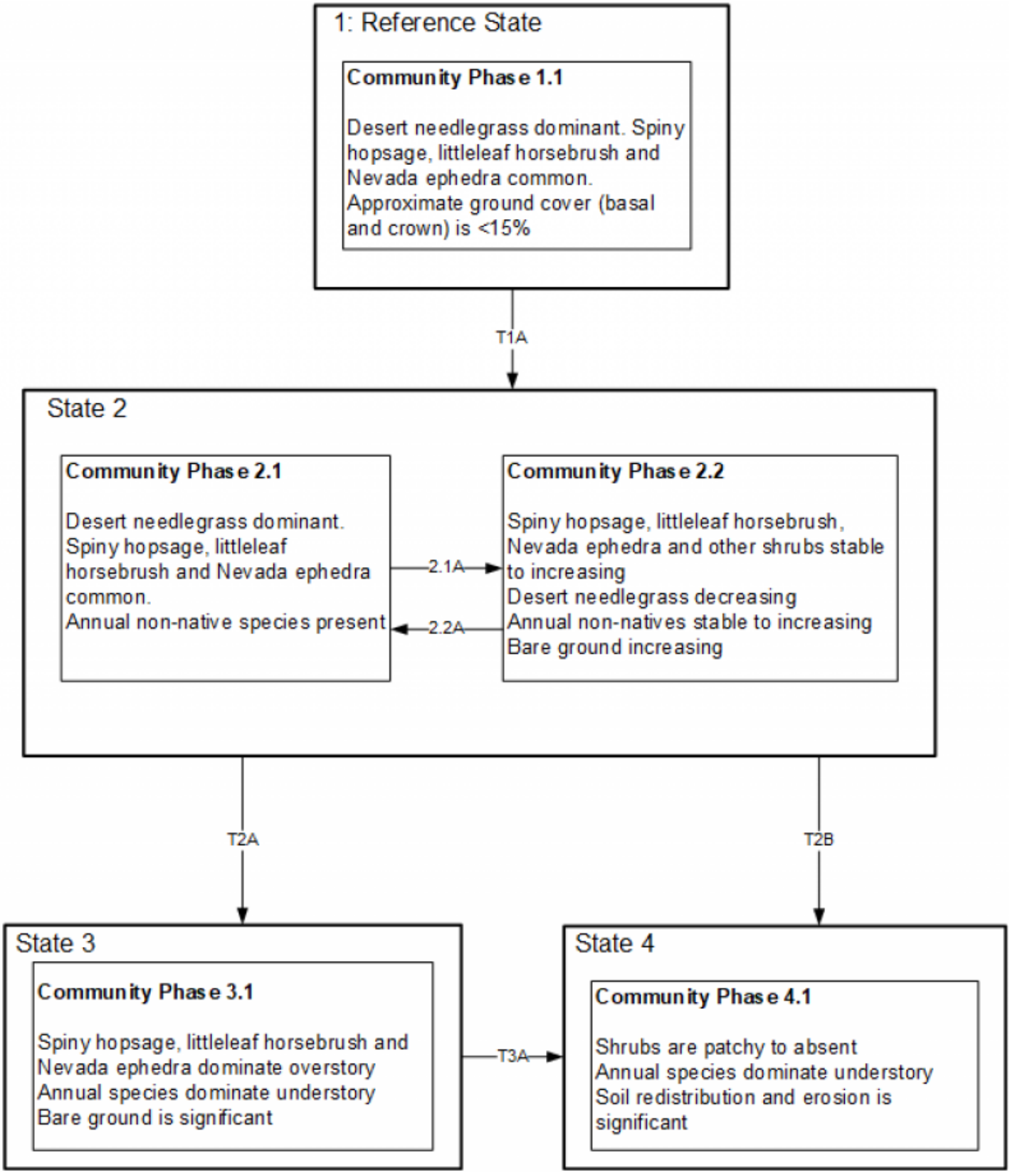
Soil depth	4–20 in
Surface fragment cover <=3"	0–72%
Surface fragment cover >3"	0–42%
Available water capacity (0-40in)	0.2–1.1 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–12
Soil reaction (1:1 water) (0-40in)	6.1–9.6
Subsurface fragment volume <=3" (Depth not specified)	11–45%
Subsurface fragment volume >3" (Depth not specified)	2–40%

Ecological dynamics

As ecological condition declines, littleleaf horsebrush, Anderson's wolfberry, and rabbitbrush increase, while desert needlegrass decreases. This potential plant community often develops as a result of major disturbance (i.e., wildfire and ensuing surface soil erosion) to a Granitic Slope 8-10" P.Z. (027XY065NV) or South Slope 8-10" P.Z (027XY051NV) ecological site. Severe erosion of the soils supporting these sites and continuing soil instability restricts Wyoming big sagebrush reproduction yet offers a suitable growing environment for more drought tolerant and "early seral" shrub species such as Nevada ephedra, Anderson's wolfberry, horsebrush, and burrobrush. Species most likely to invade this site are cheatgrass, snakeweed, halogeton, Russian thistle, bassia, filaree, and annual mustards.

Fire Ecology:
Fire return intervals are long due to the sparse vegetation. 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.
Horsebrush species are rarely killed by fire. Littleleaf horsebrush is dormant in summer and fall, so fires in those seasons have almost no effect on established plants. When top-killed by fire, littleleaf horsebrush establishes by sprouting from the root crown. Fire top-kills littleleaf horsebrush. Horsebrush species are rarely killed by fire. Littleleaf horsebrush is dormant in summer and fall, so fires in those seasons have almost no effect on established plants. When top-killed by fire, littleleaf horsebrush establishes by sprouting from the root crown. Nevada ephedra generally sprouts after fire damages aboveground vegetation. However, severe fires may kill the shallow regenerative structures. Fire typically destroys aboveground parts of Anderson wolfberry, but the degree of damage to the plant depends on fire severity. 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.

State and transition model



Reference State: 1.0
State 1.0 is representative of the natural range of variability under pristine conditions. The site is dominated by deep-rooted cool season, perennial bunchgrasses and drought tolerant shrubs with high root to shoot ratios. 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 are primarily driven by drought. Wet years will increase grass production, while drought years will reduce production. Shrub production will also increase during wet years; however, extreme growing season wet periods has been shown to cause shadscale death. Fire is rare and not a important driver in this community.

Community Phase 1.1:
Community phase 1.1 is stable and long-lived. It is dominated by desert needlegrass. Associated shrubs include spiny hopsage, littleleaf horsebrush, Nevada ephedra and Anderson's wolfberry. 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 invasive weeds. 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 State Community Phase 1.1 with the presence of non-native species in trace amounts. It is dominated by desert needlegrass. Associated shrubs include spiny hopsage, littleleaf horsebrush, Nevada ephedra and Anderson's wolfberry. 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: Long-term drought and/or excessive growing season grazing favor shrubs over perennial bunchgrass.

Community Phase 2.2:
Desert needlegrass and other perennial grasses decrease, shrubs are increasing. Bare ground increases along with non-native annuals. Prolonged drought may lead to an overall decline in the plant community. Prolonged wet periods will decrease the shadscale component.
Community Phase Pathway 2.2a: Release from drought and/or appropriate grazing management that facilitates an increase in perennial grasses and desirable shrub species.

T2A: Transition from Current Potential State 2.0 to Shrub State 3.0:
Trigger: Long-term inappropriate grazing and/or long-term drought will decrease or eliminate deep rooted perennial bunchgrasses and favor shrub growth and establishment.
Slow variables: Long term decrease in deep-rooted perennial grass density.
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. An unusually wet spring 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 has one community phase that is characterized by shrubs 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, nutrient capture, nutrient cycling and soil organic matter are temporally and spatially redistributed. Bare ground has increased.
Community Phase 3.1:
Decadent shrubs, spiny hopsage, littleleaf horsebrush, Nevada ephedra and/or Anderson's wolfberry, dominate the overstory. Rabbitbrush and/or other sprouting shrubs may be a significant component. 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 such as drill seeding and plowing. An unusually wet spring 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: Increased, continuous fine fuels modify the fire regime by changing intensity, size and spatial variability of fires. Changes in plant community composition and spatial variability of vegetation due to the loss of perennial bunchgrasses and shadscale truncate energy capture spatially and temporally thus impacting nutrient cycling and distribution.

Annual State 4.0: In this state, a biotic threshold has been crossed and state dynamics are driven by the dominance and persistence of the annual plant community 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. Resiliency has declined and further degradation from fire facilitates a cheatgrass and sprouting shrub plant community. The fire return interval has shortened due to the dominance of cheatgrass in the understory and is a driver in site dynamics.

Community Phase 4.1:
This community is dominated by annual non-native species. Sprouting shrubs maybe be present in patches but are not contributing to site function. Annual non-native species dominated the understory. Bare ground may be abundant, especially during low precipitation years. Soil erosion from wind and soil temperature are driving factors in site function.

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by desert needlegrass. Anderson's wolfberry, spiny hopsage, Nevada ephedra and littleleaf horsebrush are important shrubs associated with this site. Potential vegetative composition is about 50% grasses, 5% forbs and 45% shrubs. Approximate ground cover (basal and crown) is less than 15 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	100	175	250
Shrub/Vine	90	157	225
Forb	10	17	25
Total	**200**	**349**	**500**

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**			140–175	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	140–175	–
2	**Secondary Perennial Grasses**			7–35	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–11	–
	squirreltail	ELEL5	*Elymus elymoides*	2–11	–
	needle and thread	HECO26	*Hesperostipa comata*	2–11	–
	James' galleta	PLJA	*Pleuraphis jamesii*	2–11	–
	Sandberg bluegrass	POSE	*Poa secunda*	2–11	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–11	–
	James' galleta	PLJA	*Pleuraphis jamesii*	1–6	–
Forb					
3	**Perennial**			7–28	
	globemallow	SPHAE	*Sphaeralcea*	2–7	–
	princesplume	STANL	*Stanleya*	2–7	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	1–5	–
Shrub/Vine					
4	**Primary Shrubs**			91–187	
	littleleaf horsebrush	TEGL	*Tetradymia glabrata*	35–53	–
	spiny hopsage	GRSP	*Grayia spinosa*	35–53	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	7–35	–
	water jacket	LYAN	*Lycium andersonii*	7–28	–
	prickleleaf	HESH	*Hecastocleis shockleyi*	7–18	–
	Forb, perennial	2FP	*Forb, perennial*	3–14	–
	spear globemallow	SPHA	*Sphaeralcea hastulata*	2–7	–
	princesplume	STANL	*Stanleya*	2–7	–
5	**Secondary Shrubs**			18–53	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	2–11	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	2–11	–
	buckwheat	ERIOG	*Eriogonum*	2–11	–
	burrobrush	HYSA	*Hymenoclea salsola*	2–11	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	2–11	–

Animal community

Livestock Interpretations:
This site is marginally suited for livestock grazing due to steep slopes and low forage production. Grazing management should be keyed to desert needlegrass 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. 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. Littleleaf horsebrush is undesirable for livestock consumption. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Anderson wolfberry is sometimes used as forage by livestock. Palatability of Anderson 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:
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 Anderson 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. Anderson 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. In some areas of southern Nevada, the fleshy leaves and juicy berries provide part of the succulence permitting Gambel quail to occupy desert areas devoid of drinking water. In desert washes Anderson wolfberry grows in dense thorny thickets which provide good cover for quail and other small wildlife. Desert needlegrass is palatable to wildlife and is grazed during the spring.

Hydrological functions

Rills are common on steeper slopes and most frequently occur in areas subjected to summer convection storms or rapid spring snowmelt. Water flow patterns are rare to slight. Pedestals are rare to slight and most frequently occur in areas subjected to summer convection storms or rapid spring snowmelt. Fine litter (foliage from grasses and annual and perennial forbs) are expected to move the distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during catastrophic events. Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e. desert needlegrass] slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

Recreational uses

This site offers opportunities for photography and nature study.

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 Anderson 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.

Other information

Spiny hopsage has moderate potential for erosion control and low to high potential for long-term re-vegetation projects. It can improve forage, control wind erosion, and increase soil stability on gentle to moderate slopes. Horsebrush provide critically needed ground cover and protection from erosion on dry sites that are otherwise often sparsely vegetated.
Nevada ephedra is useful for erosion control, and seedlings have been successfully planted onto reclaimed strip mines, with survival ranging from 12 to 94%. Nevada ephedra is easily propagated in the nursery or greenhouse, but root and shoot systems of the seedlings are fragile and easily damaged during transplanting. Seedlings are drought tolerant and generally establish well after fall or winter plantings.
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	T14N R32E S36
General legal description	About 2 miles west of NV HWY 839, south slopes of Big Kosack Mountain, Sand Springs Range, Mineral County, Nevada. This site also occurs in Churchill and Pershing Counties, 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

DK/GD

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)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	06/20/2006
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are common on steeper slopes and most frequently occur in areas subjected to summer convection storms or rapid spring snowmelt.

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2. **Presence of water flow patterns:** Water flow patterns are rare to slight.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare to slight and most frequently occur in areas subjected to summer convection storms or rapid spring snowmelt.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground ± 75%; surface rock fragments less than 10%; shrub canopy <15%; foliar cover for perennial herbaceous plants <25%.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) is expected to move the distance of slope length during intense summer storms. Persistent litter (large woody material) will remain in place except during catastrophic 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 1 to 4 on the coarse surface 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 single grain. Soil surface colors are light and the soils are typified by an ochric epipedon. Organic carbon of the surface 2 to 3 inches is typically less than 1 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., desert needlegrass] slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None

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: Reference Plant Community: Deep-rooted, cool season, perennial bunchgrasses = mixed population of salt desert shrubs. (By above ground production)

    Sub-dominant: Shallow-rooted, cool season, perennial grasses = deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, annual and perennial forbs > shallow-rooted, warm season, perennial grasses. (By above ground production)

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs are common and standing dead shrub canopy material may be as

much as 30% of total woody canopy; some of the mature bunchgrasses (to 25%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (± 5%)

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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 (March thru May) ± 350 lbs/ac; Spring moisture significantly affects total 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:** Cheatgrass, halogeton, Russian thistle, filaree, snakeweed, annual mustards, and bassia are invaders on this site. Douglas"" rabbitbrush and horsebrush are increasers on this site.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years.
