

## Ecological site R027XY043NV COARSE GRAVELLY LOAM 3-5 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 Coarse Gravelly Loam 3-5 P.Z. site occurs on lower piedmont slopes, fan skirts, inset fans, and lake terraces. Slope gradients of 2 to 8 percent are typical. Elevations are 3400 to 5600 feet. The soils are predominantly very deep, well drained to somewhat excessively drained and formed in mixed alluvium. The surface soil is typically gravelly and moderately coarse textured. The soils are neutral to strongly alkaline.

### Associated sites

R029XY032NV	<b>SODIC LOAM 3-5 P.Z.</b> Less productive site
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### Similar sites

R027XY050NV	<b>COARSE GRAVELLY LOAM 4-8 P.Z.</b> More productive site; LYSH rare to absent
R027XY076NV	<b>GRAVELLY SODIC TERRACE</b> Less productive site; soil surface covered with cobbles and stones
R027XY018NV	<b>GRAVELLY LOAM 4-8 P.Z.</b> LYSH minor shrub, if present

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex confertifolia</i> (2) <i>Lycium shockleyi</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i>

### Physiographic features

The Coarse Gravelly Loam 3-5 P.Z. site occurs on lower piedmont slopes, fan skirts, inset fans, and lake terraces. Slopes range from 0 to 30 percent, but slope gradients of 2 to 8 percent are typical. Elevations are 3400 to 5600 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan skirt (2) Inset fan (3) Lake terrace
Runoff class	Negligible to very high

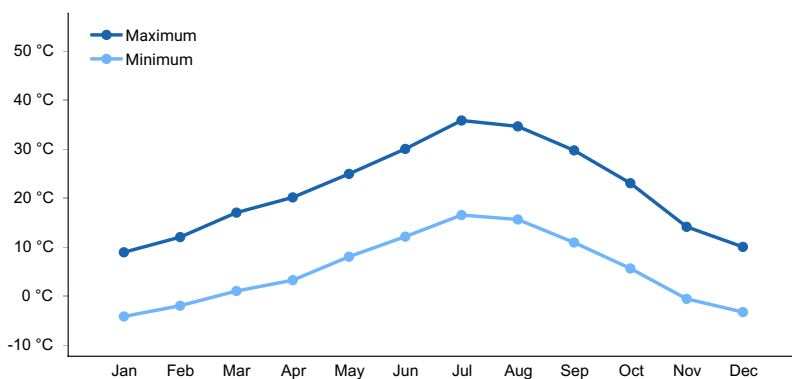
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare
Ponding frequency	None
Elevation	1,036–1,707 m
Slope	0–30%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

## Climatic features

The climate associated with this site is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is 3 to 5 inches. Mean annual air temperature is 50 to 57 degrees F. The average growing season is about 100 to 160 days.

**Table 3. Representative climatic features**

Frost-free period (average)	160 days
Freeze-free period (average)	
Precipitation total (average)	127 mm



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

## Influencing water features

This site may receive additional moisture by flooding and ponding due to its occurrence on lake terraces.

## Soil features

The soils associated with this site are predominantly very deep, well drained to somewhat excessively drained and formed in mixed alluvium. The surface soil is typically gravelly and moderately coarse textured. The soils are neutral to strongly alkaline. Available water capacity is low to high and surface runoff is negligible to very high. Potential for sheet and rill erosion is slight. The soil moisture regime is typic aridic and the soil temperature regime is mesic. The soil series associated with this site include: Bango, Biddleman, Bluewing, Eastgate, Gynelle, Luning, and Roic.

A representative soil series is Bluewing, a sandy-skeletal, mixed, mesic Typic Torriorthents. An ochric epipedon occurs from the soil surface to 18 cm. Subsoil textures are sands.

**Table 4. Representative soil features**

Parent material	(1) Alluvium (2) Colluvium (3) Residuum (4) Eolian deposits (5) Lacustrine deposits
Surface texture	(1) Gravelly fine sandy loam (2) Loamy sand
Family particle size	(1) Loamy
Drainage class	Moderately well drained to excessively drained
Permeability class	Moderately slow to rapid
Soil depth	10–183 cm
Surface fragment cover ≤3"	0–25%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–5 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	8.4–9
Subsurface fragment volume ≤3" (Depth not specified)	10–60%
Subsurface fragment volume >3" (Depth not specified)	0–5%

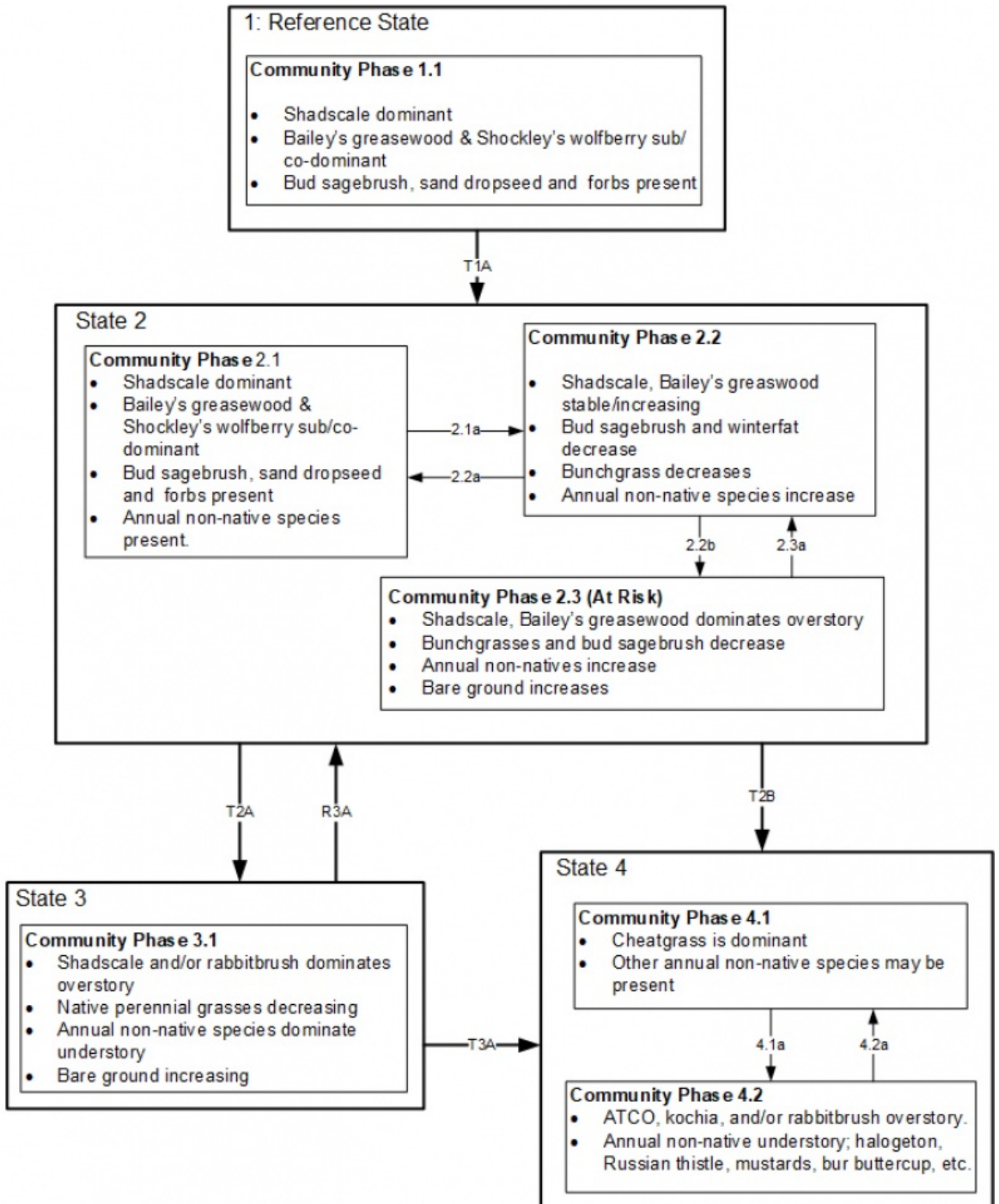
## Ecological dynamics

As ecological condition deteriorates, Bailey's greasewood, wolfberry, and shadscale increase as Indian ricegrass decreases. Species most likely to invade this site are cheatgrass, snakeweed, halogeton, filaree, bassia, Russian thistle, and annual mustards.

### Fire Ecology:

The mean fire return interval for shadscale-greasewood communities range from 35 to over 100 years. Increased presence of non-native annual grasses, such as cheatgrass, can alter fire regimes by increasing fire frequency under wet to near-normal summer moisture conditions. When fire does occur, the effect on the ecosystem may be extreme. Bailey's greasewood may be killed by severe fires, but it commonly sprouts soon after low to moderate-severity fire. Fire typically destroys aboveground parts of Shockley's wolfberry, but the degree of damage to the plant depends on fire severity. Budsage is killed by fire. Budsage communities rarely burn due to insufficient fire loads. Indian ricegrass can be killed by fire, depending on severity and season of burn. Alkali sacaton is classified as tolerant of, but not resistant to, fire. Top-killing by fire is probably frequent, and the plants can be killed by severe fire.

## 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, Bailey's greasewood and winterfat are important, but minor components within this community. Community phase changes are primarily a function of chronic drought. Drought forces shrubs to die and grasses to die. However, the drought will result in a...

function or 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-dominant. 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, Bailey's greasewood and rabbitbrush or other sprouting shrubs.

#### 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, Bailey's greasewood, wolfberry and other 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 shrubs, shadscale, Bailey's greasewood, wolfberry, etc., 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 such as drill seeding and plowing.

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.

R3A: Restoration from Shrub state 3.0 to Seeded State 5.0: Shrub management and seeding of desired species with minimal soil disturbance. This pathway has a low probability of success due to limited annual precipitation and soil moisture.

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 plant community 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.

Community Phase Pathway 4.2: fire or herbicide treatment targeting non-native forbs.

## State 1

### Reference State

#### Community 1.1

##### Reference Plant Community

The reference plant community is dominated by Indian ricegrass, shadscale, Shockley's wolfberry and Bailey's greasewood. Potential vegetative composition is about 20% grasses, 5% forbs and 75% shrubs. Approximate ground cover (basal and crown) is less than 15 percent. Bare ground is approximately 70%, surface rock fragments are less than 25%, shrub canopy 15%, basal area for perennial herbaceous plants <10%. 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 (approximately 35%) commonly have dead centers. Between plant interspaces litter is approximately trace to 1% cover.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	168	252	379
Grass/Grasslike	45	67	101
Forb	11	17	25
<b>Total</b>	<b>224</b>	<b>336</b>	<b>505</b>

### Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Primary Perennial Grasses</b>			40–101	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	34–84	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	7–17	–
2	<b>Secondary Perennial Grasses</b>			7–34	
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	2–10	–
	King's eyelashgrass	BLKI	<i>Blepharidachne kingii</i>	2–10	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	2–10	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	2–10	–
<b>Forb</b>					
3	<b>Perennial</b>			7–34	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	2–10	–
	buckwheat	ERIOG	<i>Eriogonum</i>	2–7	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	2–7	–
	princesplume	STANL	<i>Stanleya</i>	2–7	–
<b>Shrub/Vine</b>					
4	<b>Primary Shrubs</b>			168–303	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	67–101	–
	Shockley's desert-thorn	LYSH	<i>Lycium shockleyi</i>	34–67	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	17–50	–
	King's eyelashgrass	BLKI	<i>Blepharidachne kingii</i>	2–10	–
5	<b>Secondary Shrubs</b>			17–50	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	2–10	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	2–10	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	2–10	–
	burrobrush	HYSA	<i>Hymenoclea salsola</i>	2–10	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	2–10	–
	Nevada dalea	PSPO	<i>Psorothamnus polydenius</i>	2–10	–
	horsebrush	TETRA3	<i>Tetradymia</i>	2–10	–
	buckwheat	ERIOG	<i>Eriogonum</i>	1–10	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	1–10	–
	princesplume	STANL	<i>Stanleya</i>	1–10	–

## Animal community

### Livestock Interpretations:

This site is suited for livestock grazing. Grazing management should be keyed to Indian ricegrass production. Indian ricegrass is often used most heavily in the late winter, when succulent and nutritious new green leaves are produced. It supplies a source of green feed before most other native grasses have produced much new growth. Alkali sacaton is a valuable forage species in arid and semiarid regions. Plants are tolerant to moderate grazing and can produce abundant herbage utilized by livestock. Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of livestock. Shadscale provides good browse for domestic sheep. Shadscale leaves and seeds are an important component of domestic sheep and cattle winter diets. Indian ricegrass has Good forage value for domestic sheep, cattle and horses. It can be important cattle forage in winter, particularly in salt desert communities. Bailey's greasewood is an important winter browse plant for domestic sheep and cattle. It also receives light to moderate use by domestic sheep and cattle during spring and summer months.



Greasewood contains soluble sodium and potassium oxalates that may cause poisoning and death in domestic sheep and cattle if large amounts are consumed in a short time. Shockley's wolfberry is sometimes used as forage by livestock. Palatability of Shockley's 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. Budsage is palatable and nutritious forage for domestic sheep in the winter and spring although it is known to cause mouth sores in lambs. Budsage can be poisonous or fatal to calves when eaten in quantity. Budsage, while desired by cattle in spring, is poisonous to cattle when consumed alone.

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 particularly during spring and summer before the hardening of spiny twigs. It supplies browse, seed, and cover for birds, small mammals, rabbits, deer, and pronghorn antelope. Bailey's greasewood is an important winter browse plant for big game animals and a food source for many other wildlife species. It also receives light to moderate use by mule deer and pronghorn during spring and summer months. Palatability of shockley's 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. Shockley's 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. Budsage is palatable, nutritious forage for upland game birds, small game and big game in winter. Budsage is rated as "regularly, frequently, or moderately taken" by mule deer in Nevada in winter and is utilized by bighorn sheep in summer, but the importance of budsage in the diet of bighorns is not known. Bud sage comprises 18 – 35% of a Pronghorn's diet during the spring where it is available. Chukar will utilize the leaves and seeds of bud sage. Budsage is highly susceptible to effects of browsing. It decreases under browsing due to year-long palatability of its buds and is particularly susceptible to browsing in the spring when it is physiologically most active. 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. Sand dropseed provides poor forage for wildlife. Large mammals in general show little use of sand dropseed. Sand dropseed is not preferred by pronghorn, elk, and deer. Small mammals and birds utilize sand dropseed to a greater extent than large mammals.

## Hydrological functions

Rills are rare on this site. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt. Water flow patterns are none to rare. Pedestals are rare with occurrence typically limited to areas affected by wind scouring. Gullies are rare in areas of this site that occur on stable landforms. Where this site occurs on inset fans, gullies and head cuts associated with ephemeral channel entrenchment are common. Gullies and head cuts should be healing or stable. 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., Indian ricegrass] slow runoff and increase infiltration. The sparse shrub canopy and associated litter break raindrop impact and provide a limited opportunity for snow catch and accumulation on this site.

## Recreational uses

This site offers opportunities for photography and nature study. This site has potential for off-road vehicle use and hiking.

## Other products

Shadscale seeds were used by Native Americans of Arizona, Utah and Nevada for bread and mush. The leaves, seeds and stems of greasewood are edible. Indian ricegrass was traditionally eaten by some Native American

peoples. The Paiutes used seed as a reserve food source.

## Other information

Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement.

Re-vegetation of shadscale communities is inherently difficult. Dry soil surfaces resulting from low humidity, high irradiation, and moderate to strong winds are major obstacles in re-vegetation projects.

## Inventory data references

NASIS soil component data.

## Type locality

Location 1: Mineral County, NV	
Township/Range/Section	T12N R32E S3
General legal description	About 1 mile northeast of Murphy's Well, Gabbs Valley, Mineral County, Nevada.
Location 2: Mineral County, NV	
Township/Range/Section	T8N R30E S19
General legal description	About 1 mile southeast of Babbitt, Hawthorne Army Depot, Mineral County, Nevada. This site also occurs in Churchill, Esmeralda, and Nye 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 none to rare.

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2. **Presence of water flow patterns:** Water flow patterns none to rare.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas affected by wind scouring.

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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  $\pm$  70% depending on amount of surface rock fragments.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Rare to slight

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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 large rainfall events.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 1 to 4 on the coarse surface soil textures found on this site. (To be field tested.)

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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 less than 1 percent.

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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., Indian ricegrass] slow runoff and increase infiltration. The sparse shrub canopy and associated litter break raindrop impact and provide a limited opportunity for snow catch and accumulation on site.

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

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant: Reference Plant Community: Low-statured salt desert shrubs. (By above ground production)

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

Other:

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 are common and standing dead shrub canopy material may be as much as 30% of total woody canopy; some of the mature bunchgrasses (to 35%) have dead centers.
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14. **Average percent litter cover (%) and depth ( in):** Under canopy and between plant interspaces (5-15%)
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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)  $\pm$  300 lbs/ac; Spring moisture significantly affects total production. Favorable years  $\pm$  450 lbs/ac and unfavorable years  $\pm$  200 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, red-stem filaree, annual mustards, and bassia.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years. Little growth or reproduction occurs in drought years.
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