USDA Natural Resources
Conservation Service

Ecological site R027XY050NV
COARSE GRAVELLY LOAM 4-8 P.Z.

Last updated: 6/03/2024
Accessed: 05/10/2025

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.

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 4-8 P.Z. site occurs on fan remnants, inset fans, lake terraces, and erosional fan piedmonts. Slope gradients are less than 15 percent. Elevations are 3500 to about 6000 feet. The soils are very deep with typically 18 to over 40 inches to a soil layer restrictive to root development. The soil surface is usually gravelly and moderately coarse to coarse textured.

Associated sites

R027XY013NV	**LOAMY 4-8 P.Z.** ATCO-PIDE4 codominant shrubs; SAVEB minor shrub, if present
R027XY018NV	**GRAVELLY LOAM 4-8 P.Z.** Less productive site; SAVEB-ATCO typically codominant

Similar sites

R027XY043NV	**COARSE GRAVELLY LOAM 3-5 P.Z.** LYSH-SAVEB codominant shrubs with ATCO
R027XY017NV	**SOUTH SLOPE 4-8 P.Z.** ACSP12 dominant grass
R027XY019NV	**STONY SLOPE 4-8 P.Z.** Less productive site
R027XY015NV	**STONY LOAM 4-8 P.Z.** PLJA important grass

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus var. baileyi*
Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

The Coarse Gravelly Loam 4-8 P.Z. site occurs on fan remnants, inset fans, lake terraces, and erosional fan piedmonts. Slope gradients of 0 to 15 percent are typical. Elevations are 3500 to about 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (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	3,500–6,000 ft
Slope	0–15%
Water table depth	72 in
Aspect	Aspect is not a significant factor

Climatic features

The climate is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is 4 to 8 inches. Mean annual air temperature is 48 to 55 degrees F. The average growing season is about 90 to 120 days.

Table 3. Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	8 in

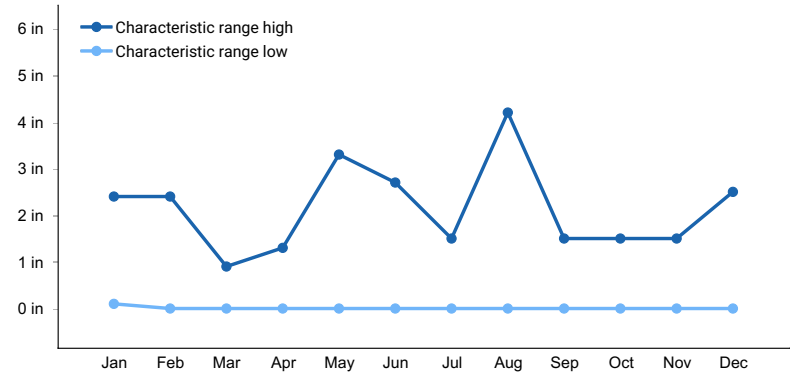


Figure 1. Monthly precipitation range

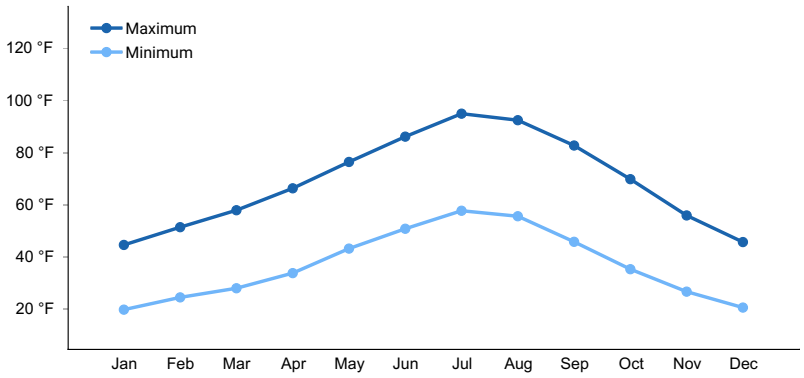


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very deep with typically 18 to over 40 inches to a soil layer restrictive to root development. These soils are well to somewhat excessively drained. The soil surface is usually gravelly and moderately coarse to coarse textured. Available water capacity is very low to moderate. Surface runoff is low and permeability is slow to very rapid. Potential for sheet and rill erosion is low. Soil stability values should be 1 to 4 on the sandy soil textures found on this site. The soil series associated with this site include: Bango, Biga, Bluewing, Dorper, Granshaw, Inmo, Labkey, Mazuma, Swingler, and Trocken.

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Alluvium–granite (3) Residuum–granodiorite
Surface texture	(1) Very gravelly sandy loam (2) Loamy sand (3) Gravelly coarse sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Slow to very rapid
Soil depth	72–84 in
Surface fragment cover <=3"	3–67%
Surface fragment cover >3"	2–17%
Available water capacity (0-40in)	1.3–6.5 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–45
Soil reaction (1:1 water) (0-40in)	7.4–9.6
Subsurface fragment volume <=3" (Depth not specified)	3–40%
Subsurface fragment volume >3" (Depth not specified)	2–7%

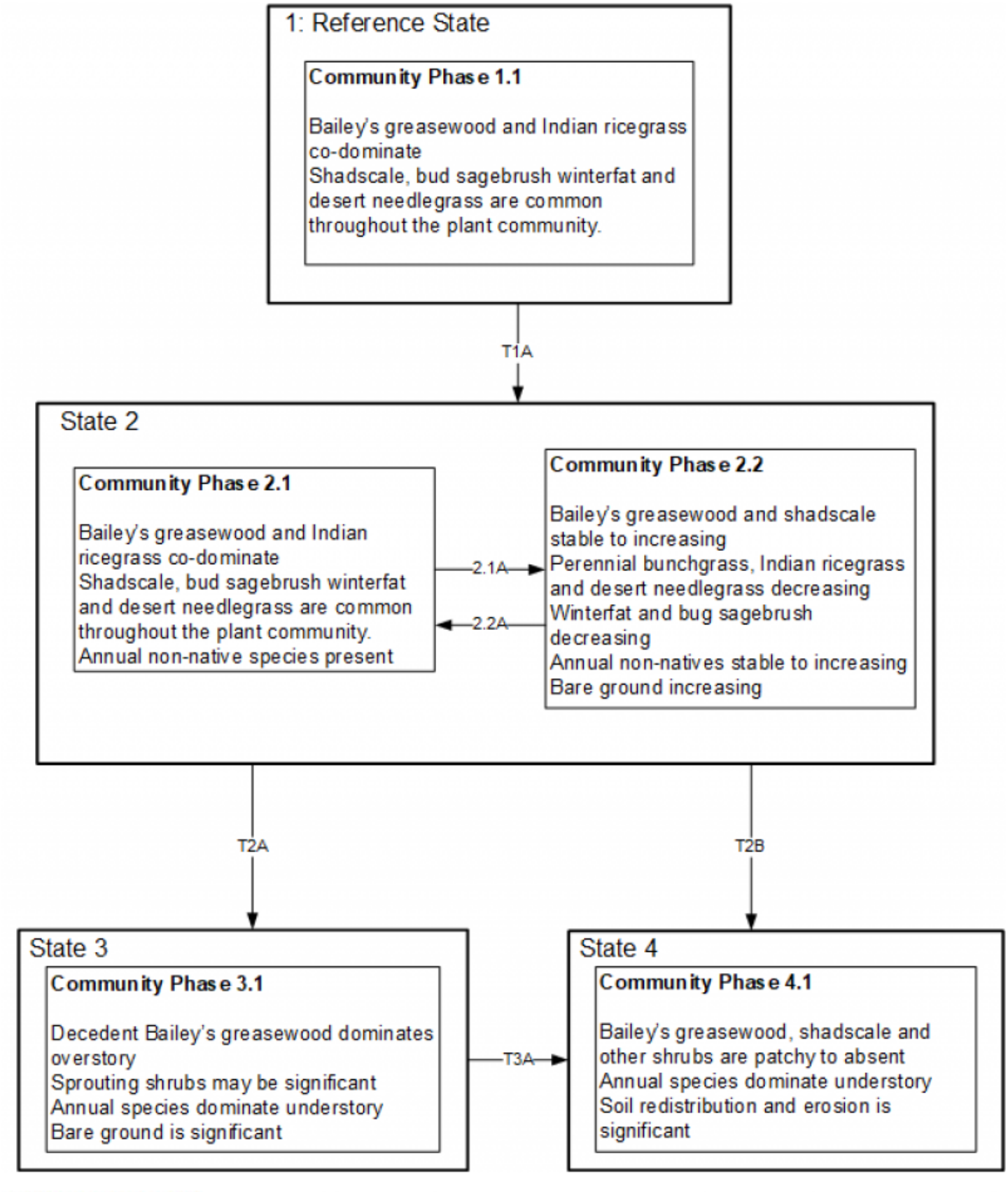
Ecological dynamics

As ecological condition deteriorates, Bailey's greasewood will increase while Indian ricegrass and other deep-rooted herbaceous plants decrease. Species most likely to invade this site are cheatgrass, filaree, snakeweed, halogeton, Russian thistle, bassia and annual mustards. Douglas' rabbitbrush and horsebrush are increasers on thi site.

Fire Ecology:
The mean fire return interval for shadscale-greasewood communities ranges 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.
Greasewood may be killed by severe fires, but it commonly sprouts soon after low to moderate-severity fire. Budsage is killed by fire. Budsage communities rarely burn due to insufficient fire loads. 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. 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. Needlegrasses are damaged by burning due to the dense plant material that can burn slowly and long, charring to the growing points. Late summer and early fall fires are least harmful.

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 shadscale and Bailey's greasewood with an understory of Indian ricegrass. Bud sagebrush, winterfat and desert needlegrass are also an important part of this plant 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 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. This community is characterized by Bailey's greasewood with an understory of Indian ricegrass. Shadscale, bug sagebrush, desert needlegrass and non-native annuals are also present. 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 excessive growing season grazing favor shrubs over perennial bunchgrass.

Community Phase 2.2:
Shadscale and Bailey's greasewood increase while Indian ricegrass, desert needlegrass and other deep-rooted perennial grasses decrease. Bare ground increases along with non-native annuals. Prolonged drought may lead to an overall decline in the plant community. Prolonged wet periods may 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 such as drill seeding or 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: 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 Bailey's greasewood 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, nutrient capture, nutrient cycling and soil organic matter are temporally and spatially redistributed. Bare ground has increased.
Community Phase 3.1:
Decadent shrubs, Bailey's greasewood and shadscale 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. 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. Bailey's greasewood, which can sprout after fire, maybe be present in patches but are not contributing to site function. Shadscale may be increasing within the community. Annual non-native species dominated the understory. Halogeton most commonly invades these sites. Bare ground may be abundant, especially during low precipitation years. Soil erosion from wind and water, as well as, increased 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 Bailey's greasewood and Indian ricegrass. Shadscale, bud sagebrush, and winterfat, are important shrub species associated with this plant community. Potential vegetative composition is about 50% grasses, 5% forbs and 45% shrubs. Approximate ground cover (basal and crown) is 10 to 20 percent. Bare ground is approximately 50%, surface rock fragments are less than 10%, shrub canopy 30 to 40%, and basal area for perennial herbaceous plants approximately 12%. Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 30% of total woody canopy, mature bunchgrasses (approximately 25%) commonly have dead centers. Between plant interspaces (approximately 10%) and depth of litter is approximately one-half inch.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	100	200	300
Shrub/Vine	90	180	270
Forb	10	20	30
Total	**200**	**400**	**600**

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**			100–182	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	100–160	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–32	–
2	**Secondary Perennial Grasses**			8–32	
	squirreltail	ELEL5	*Elymus elymoides*	2–12	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–12	–
Forb					
3	**Perennial**			8–32	
	buckwheat	ERIOG	*Eriogonum*	2–8	–
	globemallow	SPHAE	*Sphaeralcea*	2–8	–
	princesplume	STANL	*Stanleya*	2–8	–
Shrub/Vine					
4	**Primary Shrubs**			128–272	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	20–60	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	20–60	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	8–32	–
5	**Secondary Shrubs**			8–32	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	2–12	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	2–12	–
	spiny hopsage	GRSP	*Grayia spinosa*	2–12	–
	Nevada dalea	PSPO	*Psorothamnus polydenius*	2–12	–
	littleleaf horsebrush	TEGL	*Tetradymia glabrata*	2–12	–

Animal community

Livestock Interpretations:
This site is suited to domestic livestock grazing. Grazing management should be keyed to Indian ricegrass, desert needlegrass, and winterfat production. 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.
Desert needlegrass provides a palatable and nutritious feed for livestock during the spring. 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.

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. 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. 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:
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. 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. 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. Winterfat is an important forage plant for Wildlife, especially during winter when forage is scarce. Winterfat seeds are eaten by rodents. Winterfat is a staple food for black-tailed jackrabbit. 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. 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. Desert needlegrass is palatable to wildlife and is grazed during the spring.

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

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers during the spring and early summer.This site is used for camping and hiking and has potential for upland and big game hunting.

Other products

The leaves, seeds and stems of greasewood are edible. Seeds of shadscale were used by Native Americans of

Arizona, Utah and Nevada for bread and mush. Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used seed as a reserve food source.

Other information

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.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Lyon County, NV	
Township/Range/Section	T18N R25E S14
General legal description	About 5 miles east of Silver Springs along USHwy 50, Lyon County County, Nevada. This site also occurs in Churchill, Mineral, Pershing, Storey, and Washoe 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

GKB

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 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 none to rare.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 45-60%; surface rock fragments 15-25%; shrub canopy 10 to 20%

5. **Number of gullies and erosion associated with gullies:** 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.

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 3 on the sandy 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 weak, thin, platy. Soil surface colors are light and soils are typified by an ochric epipedon. Organic carbon of the surface 2 to 3 inches is typically 1 to 1.5 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., Indian ricegrass] 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 = low-statured salt desert shrubs. (By above groudn production)

Sub-dominant: Shallow-rooted, cool season, perennial grasses > deep-rooted, cool season, perennial forbs=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 common and standing dead shrub canopy material may be as much as 30% of total woody canopy; some of the mature bunchgrasses (25%) have dead centers.

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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (± 15-20%) and depth of litter is ±.25 inch.

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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) ± 400 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, annual mustards, and bassia are invaders on this site. Bailey greasewood, 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.
