USDA Natural Resources Conservation Service

Ecological site R027XY024NV
SODIC TERRACE

Last updated: 6/03/2024
Accessed: 07/17/2024

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 Sodic Terrace site occurs on basin-floor remnants, beach terraces, beach plains, alluvial flats, and lake plain terraces. Slope gradients range from 0 to 4 percent, however, 0 to 2 percent slope are most typical. Elevations are 3300 to 5300 feet. The soils are very deep and moderately well drained to well drained. The soils are moderately to very strongly alkaline.

Associated sites

R027XY010NV	**BEACH TERRACE** ATCO dominant plant; less productive site
R027XY012NV	**SODIC SANDS** ATCO minor shrub if present

Similar sites

R027XY076NV	**GRAVELLY SODIC TERRACE** Less productive site; very high surface cover of cobbles and stones
R027XY036NV	**DRY SODIC TERRACE** Less productive site; LYSH important shrub
R027XY025NV	**SODIC FLAT** SAVE4 dominant plant; DISP dominant grass
R027XY013NV	**LOAMY 4-8 P.Z.** ATCO-ARSP5 codominant shrubs; SAVE4 minor shrub if present.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex confertifolia* (2) *Sarcobatus vermiculatus*
Herbaceous	(1) *Achnatherum hymenoides*

Physiographic features

The Sodic Terrace site occurs on basin-floor remnants, beach terraces, beach plains, alluvial flats, and lake plain terraces. Slope gradients range from 0 to 4 percent, however, 0 to 2 percent slope are most typical. Elevations are 3300 to 5300 feet.

Table 2. Representative physiographic features

Landforms	(1) Basin-floor remnant (2) Lake terrace (3) Alluvial flat
Runoff class	Very low to very high
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	1,006–1,615 m
Slope	0–4%
Water table depth	122–168 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 about 4 to 8 inches. Mean annual air temperature is 49 to 55 degrees F. The average growing season is about 100 to 130 days.

Table 3. Representative climatic features

Frost-free period (average)	130 days
Freeze-free period (average)	
Precipitation total (average)	203 mm

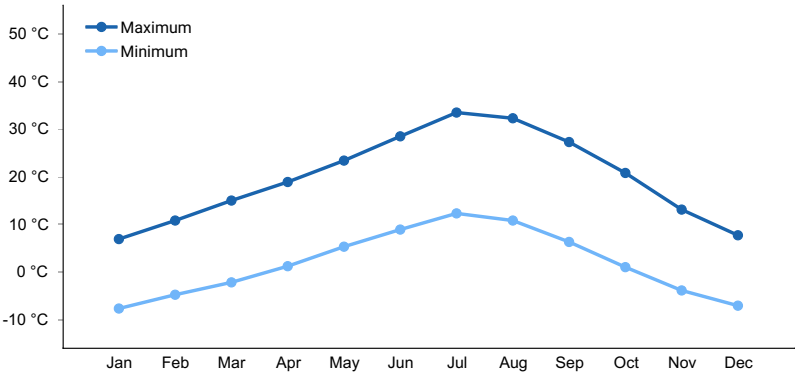


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

This site may receive additional moisture by flooding due to it's occurrence on beach terraces, beach plains, alluvial flats, and lake plains.

Soil features

The soils associated with this site are very deep and moderately well drained to well drained. These soils have formed in mixed alluvium or lacustrine materials. The soils are moderately to very strongly alkaline. Available water capacity is very low to high. Surface runoff is very low to very high. The 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 Appian, Biddleman, Boton, Chuckles, Hooten, Lox, Mazuma, Orizaba, Slawmaster, Swingler, Trocken, and Vigor.

The representative soil series is Appian, a fine-loamy, over sandy or sandy-skeletal, mixed, superactive, mesic Typic Natargids. An ochric epipedon occurs from the soil surface to 8 cm and a natric horizon occurs from 8 to 28

cm. Secondary carbonates are present from 8 to 28 cm.

Table 4. Representative soil features

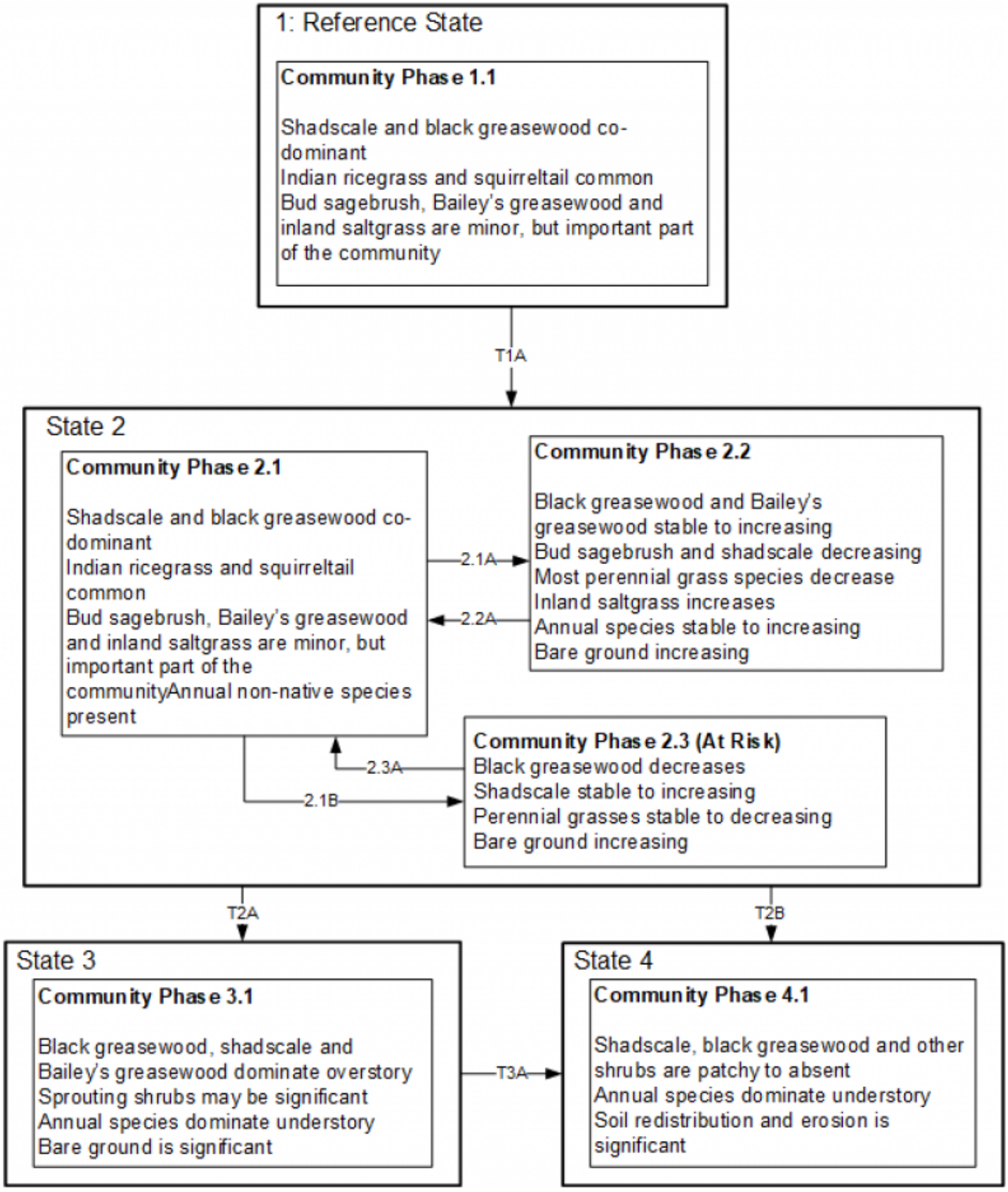
Parent material	(1) Alluvium (2) Lacustrine deposits
Surface texture	(1) Loam (2) Sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	183–213 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–20.07 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–32 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	13–90
Soil reaction (1:1 water) (0-101.6cm)	8.4–9.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

As ecological condition declines, Indian ricegrass and bottlebrush squirreltail decrease as shadscale and black greasewood increase. Species likely to invade this site are halogeton, annual mustards and cheatgrass.

Fire Ecology:
The mean fire return interval for shadscale-greasewood communities range from 35 to over 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. Black 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. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas. Low culm density in Indian ricegrass reduces charring of crowns below soil, thereby protecting the growing points during a fire. Bottlebrush squirreltail's small size, coarse stems, and sparse leafy material aid in its tolerance of fire. Postfire regeneration occurs from surviving root crowns and from on- and off-site seed sources. Frequency of disturbance greatly influences postfire response of bottlebrush squirreltail. Undisturbed plants within a 6 to 9 year age class generally contain large amounts of dead material, increasing bottlebrush squirreltail's susceptibility to fire. Saltgrass rhizomes occur deep in the soil where they are insulated from the heat of most fires. Saltgrass survives fire by sending up new growth from rhizomes.

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 black greasewood with an understory of Indian ricegrass and squirreltail. Bud sagebrush, Bailey's greasewood and inland saltgrass are important, but minor components within this community. Community phase changes are primarily a function of chronic drought. Drought favors shrubs over perennial bunchgrasses. However, long-term drought will result in an overall decline in plant community production, regardless of functional group. Extreme growing season wet periods may also reduce the shadscale component. Fire is very infrequent to non-existent.

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

Current Potential State 2.0:
This state is similar to the Reference State 1.0. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of 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 shadscale and black greasewood with an understory of Indian ricegrass, squirreltail and non-native annuals. 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. Long term drought will also decrease the perennial bunchgrasses in the understory.
Community Phase Pathway 2.1b: Chronic drought and/or lowering of water table will decrease the black greasewood component of the overstory.

Community Phase 2.2:
Greasewood increase while Indian ricegrass 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 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.

Community Phase 2.3 (At-risk):
Shadscale, greasewood and rabbitbrush dominate the overstory and perennial bunchgrasses, are reduced, either from competition with shrubs or from inappropriate grazing, chronic drought or both. 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 appropriate grazing management allows for 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: 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 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: 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 shadscale, black greasewood, 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, black greasewood, 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 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: This state has one community phase. 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. Black greasewood and 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 soil temperature are driving factors in site function.

State 1
Reference State

Community 1.1
Reference Plant Community

The reference plant community is dominated by shadscale, black greasewood and Indian ricegrass. Black greasewood typically dominates the visual aspect. Potential vegetative composition is about 25% grasses, 5% forbs and 70% shrubs. Approximate ground cover (basal and crown) is 10 to 20 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	118	275	392
Grass/Grasslike	43	98	140
Forb	8	20	28
Total	**169**	**393**	**560**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			48–150	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	20–59	–
	squirreltail	ELEL5	*Elymus elymoides*	20–39	–
	saltgrass	DISP	*Distichlis spicata*	8–31	–
2	**Secondary Perennial Grasses**			8–31	
	basin wildrye	LECI4	*Leymus cinereus*	2–8	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–8	–
Forb					
3	**Perennial**			8–31	
	saltgrass	DISP	*Distichlis spicata*	8–31	–
	globemallow	SPHAE	*Sphaeralcea*	2–8	–
	princesplume	STANL	*Stanleya*	2–8	–
	thelypody	THELY	*Thelypodium*	2–8	–
4	**Annual**			0–12	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–12	–
Shrub/Vine					
5	**Primary Perennial Shrubs**			165–316	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	78–138	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	78–138	–
	globemallow	SPHAE	*Sphaeralcea*	2–8	–
	princesplume	STANL	*Stanleya*	2–8	–
	thelypody	THELY	*Thelypodium*	2–8	–
6	**Secondary Perennial Shrubs**			8–31	
	Forb, annual	2FA	*Forb, annual*	1–12	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	2–12	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	2–12	–
	spiny hopsage	GRSP	*Grayia spinosa*	2–12	–
	Shockley's desert-thorn	LYSH	*Lycium shockleyi*	2–12	–
	seepweed	SUAED	*Suaeda*	2–12	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass and palatable shrub 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. Bottlebrush squirreltail is very palatable winter forage for domestic sheep of Intermountain ranges. Domestic sheep relish the green foliage. Overall, bottlebrush squirreltail is considered moderately palatable to livestock. Saltgrass's value as forage depends primarily on the relative availability of other grasses of higher nutritional value and palatability. It can be an especially important late summer grass in arid environments after other forage grasses have deceased. Saltgrass is rated as a fair to good forage species only because it stays green after most other grasses dry. Livestock generally avoid saltgrass due to its coarse foliage. Saltgrass is described as an increaser under grazing pressure. Shadscale provides good browse for domestic sheep. Shadscale leaves and seeds are an important

component of domestic sheep and cattle winter diets. Black 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. Black 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. Indian ricegrass has good forage value for domestic sheep, cattle and horses. Black 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. Black 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. 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. 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.

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:
The shadscale fruits and leaves are a food source for deer, pronghorn antelope, small rodents, jackrabbits, game birds, and songbirds. Black greasewood is an important winter browse plant for big game animals. It also receives light to moderate use by mule deer and pronghorn during spring and summer months. Black 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. 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. 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. 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. Bottlebrush squirreltail is a dietary component of several wildlife species. Bottlebrush squirreltail may provide forage for mule deer and pronghorn. Saltgrass provides cover for a variety of bird species, small mammals, and arthropods and is on occasion used as forage for several big game wildlife species.

Hydrological functions

Surface runoff is negligible to low. Rills are none. Water flow patterns are often numerous in areas subjected to summer convection storms. Flow patterns are short and stable. Pedestals are rare with occurrence typically limited to areas within water flow patterns. Sparse shrub canopy and associated litter provide some protection from raindrop impact. Medium to fine textured surface soils have moderate to slow infiltration and medium runoff.

Recreational uses

This site has potential for upland and big game hunting.

Other products

Shadscale seeds were used by Native Americans of Arizona, Utah and Nevada for bread and mush.
The leaves, seeds and stems of black greasewood are edible. The leaves, seeds and stems of black greasewood are edible. 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

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.
Black greasewood is useful for stabilizing soil on wind-blown areas. It successfully revegetates processed oil shale and is commonly found on eroded areas and sites too saline for most plant species. Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Bottlebrush squirreltail is tolerant of disturbance and is a suitable species for revegetation. Given its extensive system of rhizomes and roots which form a dense sod, saltgrass is considered a suitable species for controlling wind and water erosion.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Pershing County, NV	
Township/Range/Section	T27N R31E S9
General legal description	Approximately 5 miles northwest of Lovelock, about 260 feet east and 100 feet north of the southwest corner of Section 9, T27N, R31E, Pershing County, Nevada. This site also occurs in Churchill, Lyon, Mineral, 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

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.

2. **Presence of water flow patterns:** Water flow patterns are often numerous in areas subjected to summer convection storms. Flow patterns short and stable.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas within water flow patterns.

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

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** None 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 convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 2 to 4 on most soil textures found on this site. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. Soils having thin surface sand sheet will have lower stability values. (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 moderate thick platy. Soil surface colors are grays and soils are typified by an ochric epipedon. Organic carbon of the soil (2 to 3 inches) is less than 1 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse shrub canopy and associated litter provide some protection from raindrop impact.

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

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

    Dominant: Reference Plant Community: Salt desert shrubs (shadscale & black greasewood). (By above ground production)

    Sub-dominant: Cool season perennial grasses > associated shrubs = rhizomatous grasses = deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, annual and perennial forbs. (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 35% of total woody canopy; mature bunchgrasses commonly (±25%) have dead centers.

14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (10-20%) ± and depth (± ¼ in.)

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (February thru April [May]) ± 350 lbs/ac; Spring moisture significantly affects total production. Favorable years ± 500 lbs/ac and unfavorable years ± 150 lbs/ac.

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Potential invaders include halogeton, Russian thistle, annual mustards, and cheatgrass.

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