

Ecological site R027XY036NV DRY SODIC TERRACE

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 Dry Sodic Terrace site occurs on alluvial flats, fan remnants, and fan skirts. Slope gradients of less than 4 percent are typical. Elevations are 4000 to 5800 feet. The soils are very deep, well to somewhat excessively drained and formed in mixed alluvium. The soil surface is very gravelly.

Associated sites

R027XY010NV	BEACH TERRACE ATCO dominant plant
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Similar sites

R027XY010NV	BEACH TERRACE ATCO dominant plant
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Sarcobatus vermiculatus</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i>

Physiographic features

The Dry Sodic Terrace site occurs on alluvial flats, fan remnants, and fan skirts. Slope gradients of 0 to 4 percent are typical. Elevations are 4000 to 5800 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial flat (2) Fan skirt (3) Fan remnant
Runoff class	Very low
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	4,000–5,800 ft
Slope	0–4%

Water table depth	72 in
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 3 to about 5(6) inches. Mean annual air temperature is 50 to 60 degrees F. The average growing season is about 150 to 200 days.

Table 3. Representative climatic features

Frost-free period (average)	200 days
Freeze-free period (average)	
Precipitation total (average)	5 in

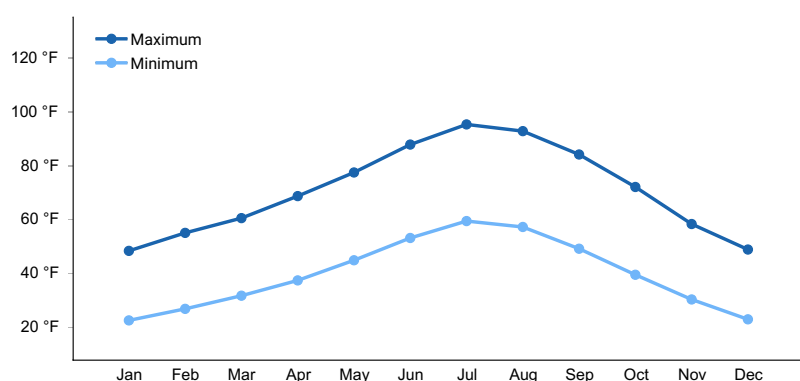


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very deep, well to somewhat excessively drained and formed in mixed alluvium. The soil surface is very gravelly. Available water capacity is very low to low. A water table is found at 15 to 20 feet below the soil surface. Potential for sheet and rill erosion is slight. Runoff is negligible to very low. The soil series associated with this site include: Cirac and Gynelle.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Fine sandy loam (2) Very gravelly loamy sand (3) Very cobbly fine sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	72–84 in
Surface fragment cover ≤3"	7–52%
Surface fragment cover >3"	3–21%

Available water capacity (0-40in)	1.6–4.7 in
Calcium carbonate equivalent (0-40in)	0–20%
Electrical conductivity (0-40in)	0–16 mmhos/cm
Sodium adsorption ratio (0-40in)	1–45
Soil reaction (1:1 water) (0-40in)	7.9–9.6
Subsurface fragment volume <=3" (Depth not specified)	7–45%
Subsurface fragment volume >3" (Depth not specified)	3–21%

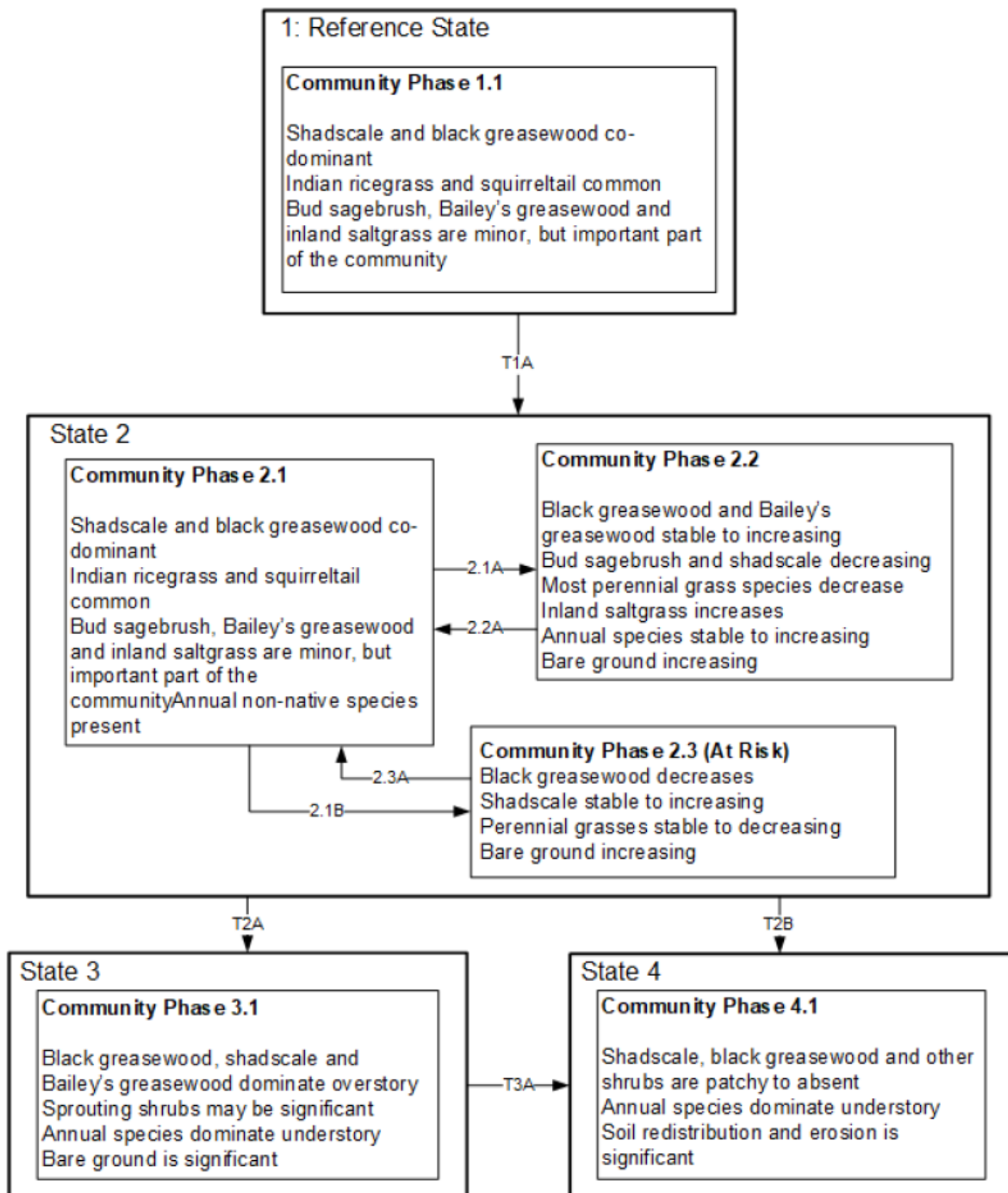
Ecological dynamics

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

Fire Ecology:

The mean fire return interval for shadscale-greasewood communities ranges from 35 to 100 years. Black and bailey's greasewood may be killed by severe fires, but it commonly sprouts soon after low to moderate-severity fire. 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. Fire typically destroys aboveground parts of Shockley's wolfberry, but the degree of damage to the plant depends on fire severity. 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. 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.

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 Plant Community

Community 1.1 Reference Plant Community

The reference plant community is dominated by black greasewood, shadscale, Cooper wolfberry and Indian ricegrass. Potential vegetative composition is about 20% grasses, 5% forbs and 75% shrubs. Approximate ground cover (basal and crown) is less than 10 percent (~6%).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	37	75	150
Grass/Grasslike	10	20	40
Forb	3	5	10
Total	50	100	200

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			12–23	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	10–15	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	10–15	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	2–8	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	2–8	–
2	Secondary Perennial Grasses			2–8	
	saltgrass	DISP	<i>Distichlis spicata</i>	1–3	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	1–3	–
Forb					
3	Perennial			2–10	
	globemallow	SPHAE	<i>Sphaeralcea</i>	1–5	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	1–4	–
4	Annual			0–8	
Shrub/Vine					
5	Primary Shrubs			52–93	
	greasewood	SAVE4	<i>Sarcobatus vermiculatus</i>	30–45	–
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	15–25	–
	Shockley's desert-thorn	LYSH	<i>Lycium shockleyi</i>	5–15	–
6	Secondary Shrubs			2–8	
	Torrey's saltbush	ATTO	<i>Atriplex torreyi</i>	1–3	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	1–3	–
	seepweed	SUAED	<i>Suaeda</i>	1–3	–

Animal community

Livestock Interpretations:

This site has low potential for livestock grazing due to the low forage production. Grazing management should be keyed to Indian ricegrass and bottlebrush squirreltail 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. 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.

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. 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. 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:

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.

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.

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. In some areas of southern Nevada, the fleshy leaves and juicy berries provide part of the succulence permitting Gambel quail to occupy desert areas devoid of drinking water. In desert washes shockley's wolfberry grows in dense thorny thickets which provide good cover for quail and other small wildlife. 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.

Hydrological functions

Runoff is negligible to very low.

Recreational uses

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

Other products

The leaves, seeds and stems of black greasewood are edible. Seeds of shadscale 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 Americans. The Paiutes used seed as a reserve food source.

Other information

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. Bottlebrush squirreltail is tolerant of disturbance and is a suitable species for revegetation.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Mineral County, NV

Other references

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

Contributors

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)	Patti Novak-Echenique
Contact for lead author	State Rangeland Management Specialist
Date	07/19/2013
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

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

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to 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 70-80%.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage of grasses and annual & perennial forbs) expected to move distance of slope length during periods of intense summer convection storms. Persistent litter (large woody material) will remain in place except during unusually severe flooding 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 will range from 1 to 4. (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):** Structure of soil surface is medium to thick platy. Soil surface colors are light and are typified by an ochric epipedon. Organic matter is typically 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:** This site may be ponded for very short periods in the late winter. In areas with herbaceous cover (although sparse) of deep-rooted perennial bunchgrasses and/or rhizomatous grasses, these plants can increase infiltration.
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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):** Compacted layers are none. Platy, subangular blocky, prismatic, or massive subsurface layers are normal for this site and are not to be interpreted as compaction.
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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: Tall shrubs (big sagebrush, black greasewood)
- Sub-dominant: deep-rooted, cool season, perennial bunchgrasses > shallow-rooted, cool season, perennial grasses > cool season, perennial rhizomatous grasses > deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, perennial and annual forbs
- 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 35% of total woody canopy.
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14. **Average percent litter cover (%) and depth (in):** Between plant interspaces (< 5%) and depth of litter is <¼ 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 (through end of June) ± 100 lbs/ac; Favorable years ± 200 lbs/ac and unfavorable years ± 50 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 halogeton, Russian thistle, annual mustards, and cheatgrass.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years. Reduced growth and reproduction occur during extended or extreme drought periods.
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