USDA Natural Resources Conservation Service

Ecological site R027XY070NV
DROUGHTY CLAYPAN 8-10 P.Z.

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 027X–Fallon-Lovelock Area

Physiography
Found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus this area is characterized by isolated uplifted fault block mountain ranges trending north to south that are separated by broad, hydrologically closed basins. The entire area occurs in the rain-shadow of the Sierra Nevada mountains and is influenced by Pleistocene Lake Lahontan which reached its most recent high stand about 12,000 years ago. There is substantial evidence suggesting the western Great Basin has been the site of pluvial-interpluvial cycles for at least the past two million years.
The mountains and valleys are dissected by the Humboldt, Truckee, Carson, and Walker Rivers and their tributaries, all of which terminate within MLRA 27. Extensive playas can be found throughout this area and are the result of drying of ancient Lake Lahontan. Elevation generally ranges from 3,300 to 5,900 feet (1,005 to 1,800 meters) in valleys, but on some mountain peaks it is more than 7,870 feet (2,400 meters).

Geology
Landforms and soils of this MLRA have been heavily influenced by fluctuating lake level over the last 40,000 years. There is a level line evident on the higher slopes marking the former extent of glacial Lake Lahontan. Almost half of this area has surface deposits of alluvial valley fill influenced by lacustrine sediment. The rest has andesite and basalt rocks of different ages. Mesozoic and Tertiary intrusives are concentrated along the western border of the area, and Lower Volcanic Rocks (17 to 43 million years old) are common on the eastern side of the area. Also, some scattered outcrops of Mesozoic sedimentary and volcanic rocks and tuffaceous sedimentary rocks are in the mountains within the interior of this MLRA.

Climate
The average annual precipitation is 5 to 10 inches (125 to 255 millimeters) in most of the area but is as much as 19 inches (485 millimeters) on high mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The amount of precipitation is very low from summer to midautumn. The precipitation in winter occurs mainly as snow. The average annual temperature is 43 to 54 degrees F (6 to 12 degrees C). The freeze-free period averages 155 days and ranges from 110 to 195 days, decreasing in length with elevation.

Water
The amount of precipitation is very low, and water for irrigation is obtained principally from diversions on the four large rivers in the area and from water stored in the Lahontan, Rye Patch, and Weber Reservoirs. Pyramid Lake and Walker Lakes are terminal lakes for the Truckee and Walker Rivers, respectively. Much of the annual flow of both rivers is diverted for irrigation, causing lake levels to fall and levels of dissolved salts to increase causing problems for the native Lahontan cutthroat trout.

Soils
The dominant soil orders are Aridisols and Entisols. The soils in the area are predominantly a mesic temperature

regime, aridic moisture regime, and have a mixed mineralogy. They are generally well drained, loamy or sandy, commonly skeletal, and shallow to very deep. Accumulation of salts, tufa deposits, and eolian sediments with soluble salts over lacustrine deposits influence most of the soils in the basin landforms of this MLRA. Soils on bedrock-controlled landforms are typically comprised of volcanic or tuffaceous sedimentary colluvium over residuum.

Biological Resources
This area supports extensive areas of salt-desert shrub vegetation. Shadscale and Bailey's greasewood are widespread, occurring both individually and together. Grasses are generally sparse, although Indian ricegrass is prominent, especially on the sandy soils. Fourwing saltbush, winterfat, spiny hopsage, wolfberry, ephedra, dalea, and bud sagebrush are common shrubs. Basin wildrye, creeping wildrye, alkali sacaton, saltgrass, black greasewood, rubber rabbitbrush, and big saltbush are important plants on saline bottom lands and terraces. A few marsh areas support cattail, bulrushes, sedges, and rushes. Big sagebrush, along with scattered Utah juniper and singleleaf pinyon, is associated with Thurber needlegrass, desert needlegrass, Sandberg bluegrass, and squirreltail on the higher elevation piedmont slopes and mountains.

Ecological site concept

The Droughty Claypan 8-10 P.Z. site occurs on mountain slopes and hills. At upper elevations (5500 to 7000 feet) this site is usually restricted to southerly exposures. Slope gradients of 8 to 30 percent are typical. Elevations are 4000 to about 7000 feet. The soils are typically shallow to very shallow and well drained. Soil surfaces may be gravelly, cobbly, or stony and are usually medium to moderately coarse textured. Subsurface layers reflect an increase in clay content in relation to the surface soil.

Associated sites

R027XY013NV	**LOAMY 4-8 P.Z.** Found on piedmont slopes, alluvial plains, and relict alluvial fans.

Similar sites

R027XY079NV	**GRAVELLY CLAYPAN 8-10 P.Z.** ACTH7 dominant grass
R027XY061NV	**SHALLOW CALCAREOUS SLOPE 8-10 P.Z.** ARNO4 dominant shrub
R027XY049NV	**COBBLY CLAYPAN 8-10 P.Z.** ARAR8 dominant shrub; ACTH7 dominant grass
R027XY032NV	**SHALLOW CALCAREOUS LOAM 10-12 P.Z.** ARNO4 dominant shrub
R027XY020NV	**SHALLOW CLAYPAN 8-10 P.Z.** SAVEB & ATCO minor shrubs, if present
R027XY068NV	**GRANITIC CLAYPAN 8-10 P.Z.** More productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia arbuscula ssp. longicaulis*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Achnatherum speciosum*

Physiographic features

The Droughty Claypan 8-10 P.Z. site occurs mountain slopes and hills. At upper elevations (5500 to 7000 feet) this site is usually restricted to southerly exposures. Slope gradients of 8 to 30 percent are typical. Elevations are 4000 to about 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain (3) Fan piedmont
Runoff class	High to very high
Elevation	1,219–2,134 m
Slope	8–30%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is semiarid with cool, moist winters and warm, dry summers. Average annual precipitation is 8 to 10 inches. Mean annual air temperature is 42 to 50 degrees F. The average growing season is about 90 to 120 days. No available climate station.

Table 3. Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	254 mm

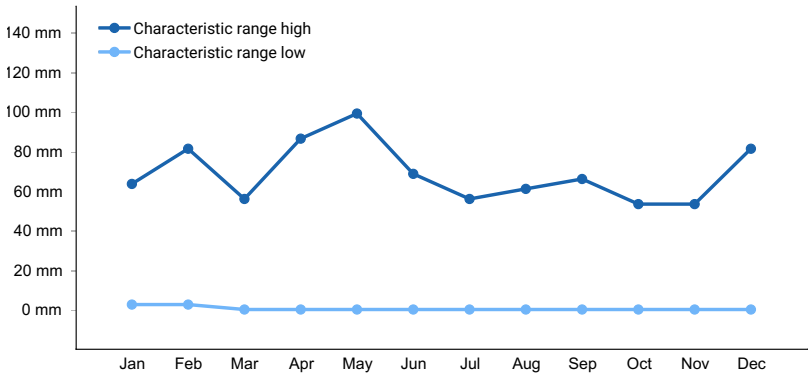


Figure 1. Monthly precipitation range

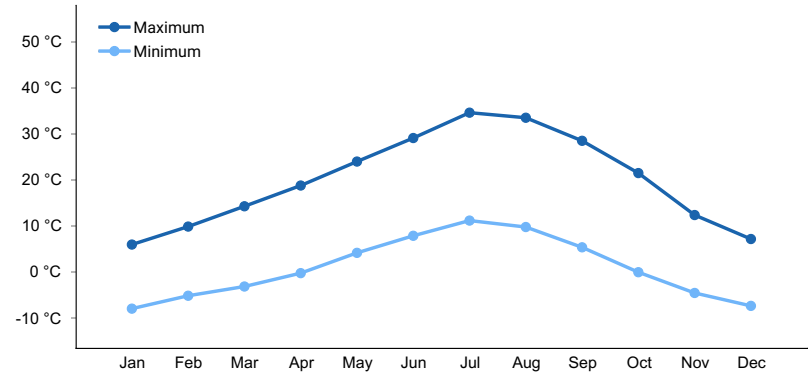


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils are typically shallow to very shallow and well drained. Soil surfaces may be gravelly, cobbly, or stony and are usually medium to moderately coarse textured. Subsurface layers reflect an increase in clay content in relation to the surface soil. Available water holding capacity is very low. Surface runoff is very high and the potential for sheet and rill erosion ranges from moderate to high depending on slope gradient. The soil series associated with this site include: Ceejay, Grumblen, Jungo, and Wesfil.

Table 4. Representative soil features

Parent material	(1) Colluvium–volcanic rock (2) Residuum–volcanic rock (3) Residuum–andesite
Surface texture	(1) Very gravelly loam (2) Very stony loam (3) Very gravelly clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Very slow to moderate
Soil depth	25–51 cm
Surface fragment cover <=3"	45–48%
Surface fragment cover >3"	3–11%
Available water capacity (0-101.6cm)	1.02–8.13 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–12
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	6–37%
Subsurface fragment volume >3" (Depth not specified)	3–18%

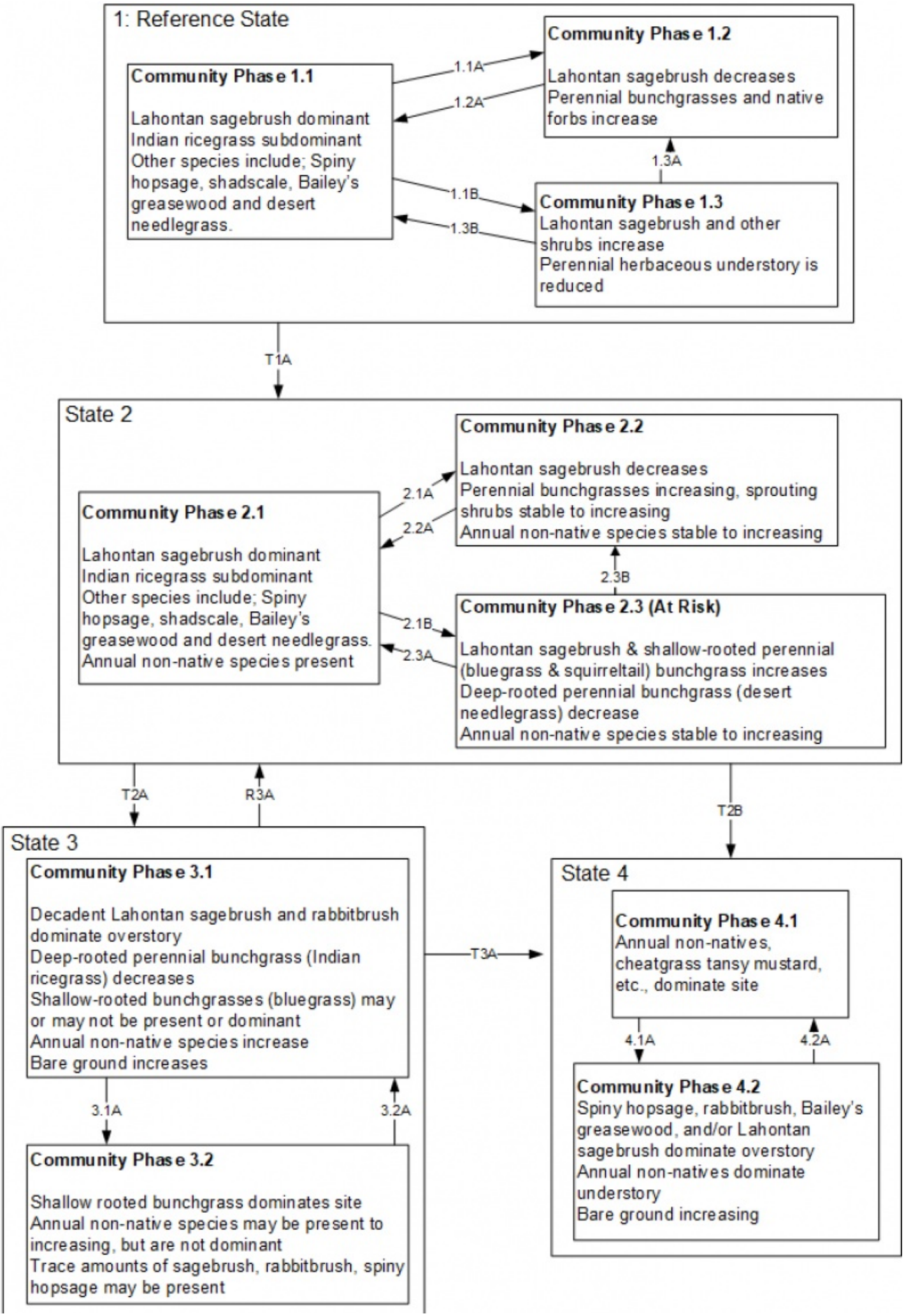
Ecological dynamics

As ecological condition deteriorates, Lahontan sagebrush and Bailey's greasewood increase as desert needlegrass and Indian ricegrass decrease. With continued site degradation, deep-rooted perennial grasses and forbs become scarce. Species likely to invade this site are cheatgrass, filaree, and annual mustards.

Fire Ecology:
The mean fire return intervals for Lahontan sagebrush communities have been estimated to be from 35 to over 100 years. Fire most often occurs during wet years with high forage production. Lahontan sagebrush is very susceptible to fire damage. Lahontan sagebrush is usually killed by fire and does not re-sprout. The recovery in burned areas is usually via small, light, wind-dispersed seed for all low sagebrush subspecies. Partially injured Lahontan sagebrush may re-grow from living branches, but sprouting does not occur.
Greasewood may be killed by severe fires, but it commonly sprouts soon after low to moderate-severity fire.
Nevada ephedra generally sprouts after fire damages aboveground vegetation. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. However, severe fires may kill shallowly buried regenerative structures.
Shadscale is fire intolerant and it does not readily recover from fire, except for establishment through seed. Fall

prescribed burning killed 100% of shadscale on study plots in a basin big sagebrush community. Spring burning left a few surviving shadscale plants but greatly reduced shadscale density and frequency.
Spiny hopsage is considered to be somewhat fire tolerant and often survives fires that kill sagebrush. Mature spiny hopsage generally sprout after being burned. Spiny hopsage is reported to be least susceptible to fire during summer dormancy.
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.
Desert needlegrass has persistent dead leaf bases, which make it susceptible to burning. Fire removes the accumulation; a rapid, cool fire will not burn deep into the root crown. Most perennial grasses have root crowns that can survive wildfire.
Sandberg bluegrass is generally unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Its rapid maturation in the spring also reduces fire damage, since it is dormant when most fires occur.

State and transition model


1: Reference State
Community Phase 1.1
Lahontan sagebrush dominant
Indian ricegrass subdominant
Other species include; Spiny hopsage, shadscale, Bailey's greasewood and desert needlegrass.
Community Phase 1.2
Lahontan sagebrush decreases
Perennial bunchgrasses and native forbs increase
Community Phase 1.3
Lahontan sagebrush and other shrubs increase
Perennial herbaceous understory is reduced
1.1A
1.2A
1.3A
1.1B
1.3B
T1A
State 2
Community Phase 2.1
Lahontan sagebrush dominant
Indian ricegrass subdominant
Other species include; Spiny hopsage, shadscale, Bailey's greasewood and desert needlegrass.
Annual non-native species present
Community Phase 2.2
Lahontan sagebrush decreases
Perennial bunchgrasses increasing, sprouting shrubs stable to increasing
Annual non-native species stable to increasing
Community Phase 2.3 (At Risk)
Lahontan sagebrush & shallow-rooted perennial (bluegrass & squirreltail) bunchgrass increases
Deep-rooted perennial bunchgrass (desert needlegrass) decrease
Annual non-native species stable to increasing
2.1A
2.2A
2.3B
2.1B
2.3A
T2A
R3A
T2B
State 3
Community Phase 3.1
Decadent Lahontan sagebrush and rabbitbrush dominate overstory
Deep-rooted perennial bunchgrass (Indian ricegrass) decreases
Shallow-rooted bunchgrasses (bluegrass) may or may not be present or dominant
Annual non-native species increase
Bare ground increases
Community Phase 3.2
Shallow rooted bunchgrass dominates site
Annual non-native species may be present to increasing, but are not dominant
Trace amounts of sagebrush, rabbitbrush, spiny hopsage may be present
3.1A
3.2A
T3A
State 4
Community Phase 4.1
Annual non-natives, cheatgrass tansy mustard, etc., dominate site
Community Phase 4.2
Spiny hopsage, rabbitbrush, Bailey's greasewood, and/or Lahontan sagebrush dominate overstory
Annual non-natives dominate understory
Bare ground increasing
4.1A
4.2A

Reference State 1.0: This state is a representative of the natural range of variability under pristine conditions. State dynamics are maintained by interactions between climatic patterns and disturbance regimes, including fires set by Native peoples. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Plant community phase changes are primarily driven by fire, periodic drought and/or insect or disease attack.

Community Phase 1.1:
Lahontan sagebrush and Indian ricegrass dominate the site. Bailey's greasewood and desert needlegrass are common. Shadscale and Nevada ephedra are associated species. Forbs are present but not abundant. This site is tolerant of dry conditions, but prolonged drought will result in an overall decline, with possible mortality, in the plant community.
Community Phase Pathway 1.1a: Fire would decrease or eliminate the overstory of sagebrush and allow the perennial bunchgrasses to dominate the site. Fires would typically be small and patchy due to low fuel loads. A fire following an unusually wet spring may be more severe and reduce sagebrush cover to trace amounts. A severe infestation of Aroga moth could also reduce large areas of sagebrush canopy cover, giving a competitive advantage to the perennial grasses and forbs.
Community Phase Pathway 1.1b: Time and lack of disturbance such as fire allows for sagebrush to increase and become decadent. Long-term drought, herbivory, or combinations of these would cause a decline in perennial bunchgrasses and fine fuels and lead to a reduced fire frequency allowing big sagebrush to dominate the site.

Community Phase 1.2: This community phase is characteristic of a post-disturbance, early seral community phase. Indian ricegrass, desert needlegrass and other perennial grasses dominate. Depending on fire severity or intensity of Aroga moth infestation, patches of intact sagebrush may remain.
Community Phase Pathway 1.2a: Absence of disturbance over time coupled with natural regeneration allows sagebrush to increase. Patches of mature sagebrush required for a seed source are important for recovery to community phase 1.1.

Community Phase 1.3:
Lahontan sagebrush increases in the absence of disturbance. Decadent sagebrush dominates the overstory and the deep-rooted perennial bunchgrasses in the understory are reduced either from competition with shrubs and/or from herbivory.
Community Phase 1.3a: Fire would decrease or eliminate the overstory of sagebrush and allows perennial bunchgrasses to dominate the site. Under natural conditions fires are typically low severity resulting in a mosaic pattern due to low fine fuel loads. A fire following an unusually wet spring favoring an increase in fine fuels, may be more severe and reduce sagebrush cover to trace amounts. A severe infestation of Aroga moth could also cause a large decrease in sagebrush within the community, giving a competitive advantage to the perennial grasses and forbs.
Community Phase Pathway 1.3b: A low severity patchy fire, Aroga moth or combination would reduce the sagebrush overstory and create a sagebrush/grass mosaic with sagebrush and perennial bunchgrasses co-dominant.

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 weeds, such as cheatgrass, mustards, bur buttercup and halogeton.
Slow variables: Over time the annual non-native plants will increase within the community.
Threshold: Any amount of introduced non-native species causes an immediate decrease in the resilience of the site. Annual non-native species cannot be easily removed from the system and have the potential to significantly alter disturbance regimes from their historic range of variation.

Current Potential State 2.0:
This state is similar to the Reference State 1.0. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of non-natives. 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: Lahontan sagebrush and Indian ricegrass dominate the site. Spiny hopsage, shadscale, and Bailey's greasewood are associated species. Forbs are present but not abundant. Non-native annual species are present.
Community Phase Pathway 2.1a: Fire reduces shrub overstory and allows for perennial bunchgrasses to dominate the site. Fires are typically low severity resulting in a mosaic pattern due to low fuel loads. A fire following an unusually wet spring or a change in management favoring an increase in fine fuels, may be more severe and reduce sagebrush cover to trace amounts. A severe infestation of Aroga moth could also cause a large decrease in sagebrush In sagebrush cover, reducing competition with perennial grasses and forbs. Annual non-native species are likely to increase after fire.
Community Phase Pathway 2.1b: Natural regeneration over time and lack of disturbance such as fire allows for sagebrush to increase and become decadent. Chronic drought reduces fine fuels and leads to a reduced fire frequency allowing sagebrush to dominate the site. Inappropriate growing season grazing reduces the deep-rooted perennial bunchgrass understory; conversely Sandberg bluegrass may increase in the understory depending on grazing management. Excessive sheep grazing favors Sandberg bluegrass; however, where cattle and/or horses are the dominant grazers, cheatgrass often increases.

Community Phase 2.2: This community phase is characteristic of a post-disturbance, early seral community phase. Indian ricegrass and other perennial grasses dominate. Lahontan sagebrush may be present in trace amounts depending on fire severity or intensity of Aroga moth infestations. Rabbitbrush may be sprouting. Forbs may increase post-fire but will likely return to pre-burn levels within a few years. Annual non-native species generally respond well after fire and may be stable or increasing within the community.
Community Phase Pathway 2.2a: Natural regeneration over time and lack of disturbance and/or grazing management that favors the establishment and growth of sagebrush allows the shrub component to recover. The establishment of Lahontan sagebrush can take many years and is dependent on multiple years of favorable weather conditions.

Community Phase 2.3 (at risk): This community is at risk of crossing a threshold to another state. Sagebrush dominates the overstory and deep-rooted perennial bunchgrasses in the understory are reduced, either from competition with shrubs or from inappropriate grazing management, or from both. Rabbitbrush may be a significant component. Sandberg bluegrass may increase and become co-dominate with deep rooted bunchgrasses. Annual non-natives species may be stable or increasing due to lack of competition with perennial bunchgrasses. This site is susceptible to further degradation from excessive grazing, prolonged drought, and/or fire.

Community Phase Pathway 2.3a: A change in grazing management that decreases shrubs would allow the perennial bunchgrasses in the understory to increase. Heavy late-fall/winter grazing may cause mechanical damage and subsequent death to sagebrush, facilitating an increase in the herbaceous understory. An infestation of Aroga moth or a low severity fire would reduce some sagebrush overstory and allow perennial grasses to increase in the community. Brush management with minimal soil disturbance would also decrease sagebrush and release the herbaceous perennial understory. Annual non-native species are present and may increase in the community.

Community Phase Pathway 2.3b: Fire would decrease or eliminate the overstory of sagebrush and allow perennial bunchgrasses to dominate the site. Fires would typically be small and patchy due to low fuel loads. A fire following an unusually wet spring or a change in management may be more severe and reduce sagebrush cover to trace amounts. A severe infestation of Aroga moth could also cause a large decrease in sagebrush within the community, giving a competitive advantage to the perennial grasses and forbs.

T2A: Transition from Current Potential State 2.0 to Shrub State 3.0
Trigger: Inappropriate, long-term grazing of perennial bunchgrasses during the growing season favors an increase in sagebrush.
Slow variables: Long term decrease in deep-rooted perennial grass density.
Threshold: Loss of deep-rooted perennial bunchgrasses changes spatial and temporal nutrient cycling and nutrient redistribution, and reduces soil organic matter.
T2B: Transition from Current Potential State 2.0 to Annual State 4.0
Trigger: To Community Phase 4.1: Severe fire and/or soil disturbing treatments that cause Lahontan sagebrush mortality. To Community Phase 4.2: Inappropriate grazing management that favors shrubs in the presence of non-native species.
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.

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Shrub State 3.0:
This state is a product of many years of heavy grazing during time periods harmful to perennial bunchgrasses. Sandberg bluegrass may increase with a reduction in deep rooted perennial bunchgrass competition and may become the dominate grass or the herbaceous understory may be completely eliminated. Sagebrush dominates the overstory and spiny hopsage, Nevada ephedra, Bailey's greasewood and/or rabbitbrush may be a significant component. Sagebrush cover exceeds 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 may be significant with soil redistribution occurring between interspace and canopy locations.

Community Phase 3.1:
Lahontan sagebrush dominates overstory and spiny hopsage, Bailey's greasewood and/or rabbitbrush may be a significant component. Deep-rooted perennial bunchgrasses may be present in trace amounts or absent from the community. Sandberg bluegrass may dominate the understory. Annual nonnative species are present and may be co-dominant. Bare ground is significant.
Community Phase Pathway 3.1a: Fire, heavy fall grazing causing mechanical damage to shrubs, and/or brush treatments with minimal soil disturbance, will greatly reduce the overstory shrubs to trace amounts and allow Sandberg bluegrass to dominate the site.
Community Phase 3.2
Bluegrass dominates the site; annual non-native species may be present but are not dominant.
Trace amounts of sagebrush may be present. Sprouting shrubs such as spiny hopsage, Nevada ephedra, horsebrush or rabbitbrush may be dominant. Shadscale may be increasing
Community Phase Pathway 3.2a: Time and lack of disturbance and/or grazing management that favors the establishment and growth of sagebrush allows the shrub component to recover. The re-establishment of Lahontan sagebrush can take many years.

T3A: Transition from Shrub State 3.0 to Annual State 4.0
Trigger: Severe/repeated fire and/or soil disturbing treatments. Possible soil disturbing treatments include attempted restoration with drought tolerant perennials, such as crested wheatgrass. Restoration attempts causing soil disturbance will likely initiate a transition to an annual state. Probability of success very low. Inappropriate grazing management in the presence of annual non-native species.
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 sagebrush truncate energy capture spatially and temporally thus impacting nutrient cycling and distribution.

R3A: Restoration from Shrub State 3.0 to Current Potential State 2.0
Brush management with minimal soil disturbance, coupled with seeding of deep rooted perennial native bunchgrasses. Probability of success very low. Mechanical bush management, mowing, etc., should be considered carefully. There are multiple reports of Lahontan sagebrush sprouting from the root-crown following mowing, perpetuating the shrub state.

Annual State 4.0:
This community is characterized by the dominance of annual non-native species such as cheatgrass and tansy mustard in the understory. Sprouting shrubs such as rabbitbrush, spiny hopsage and Bailey's greasewood may be present but are not contributing to site function. Spatial distribution of nutrient and water resources are being controlled by the dominance of annual non-natives.
Community Phase 4.1
Annual non-native plants such as cheatgrass or tansy mustard dominate the site. Rabbitbrush may or may not be present.
Community Phase Pathway 4.1a: Time and lack of fire allows for the sagebrush to establish.
Probability of sagebrush establishment is extremely low.
Community Phase 4.2: Sprouting shrubs such as spiny hopsage and rabbitbrush, along with shadscale dominate overstory. Lahontan sagebrush may be a minor component. Annual non-native species dominate understory. Trace amounts of desirable bunchgrasses may be present. Bare ground is significant.
Community Phase Pathway 4.2a: Fire removes sagebrush and allows for annual non-native species to dominate the site.

State 1
Reference State

Community 1.1
Reference Plant Community

The reference plant community is dominated by Lahontan sagebrush, Indian ricegrass and desert needlegrass. Sandberg bluegrass, Bailey greasewood and Nevada ephedra are important species associated with this site. Potential vegetative composition is about 40% grasses, 5% forbs and 55% 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	62	155	247
Grass/Grasslike	45	112	179
Forb	6	13	22
Total	**113**	**280**	**448**

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**			48–121	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	28–56	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	15–43	–
	Sandberg bluegrass	POSE	*Poa secunda*	6–22	–
2	**Secondary Perennial Grasses**			0–15	
	squirreltail	ELEL5	*Elymus elymoides*	1–9	–
Forb					
3	**Perennial Forbs**			6–22	
	buckwheat	ERIOG	*Eriogonum*	1–11	–
	phlox	PHLOX	*Phlox*	1–11	–
	globemallow	SPHAE	*Sphaeralcea*	1–11	–
Shrub/Vine					
4	**Primary Shrubs**			146–242	
	little sagebrush	ARARL3	*Artemisia arbuscula ssp. longicaulis*	101–135	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	6–22	–
	spiny hopsage	GRSP	*Grayia spinosa*	6–15	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	6–15	–
5	**Secondary Shrubs**			15–43	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	1–9	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	1–9	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	1–9	–

Animal community

Livestock Interpretations:
This site is suitable for livestock grazing. Grazing management should be keyed to indian ricegrass and desert needlegrass 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. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. Sandberg bluegrass is a widespread forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species. Sandberg bluegrass is a palatable species, but its production is closely tied to weather conditions. It produces little forage in drought years, making it a less dependable food source than other perennial bunchgrasses. 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. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Shadscale provides good browse for domestic sheep. Shadscale leaves and seeds are an important component of domestic sheep and cattle winter diets. Spiny hopsage provides a palatable and nutritious food source for livestock, particularly during late winter through spring. Domestic sheep browse the succulent new growth of spiny hopsage in late winter and early spring.

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:
Indian ricegrass is eaten by pronghorn in moderate amounts whenever available. 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. 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. Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Sandberg bluegrass is desirable for pronghorn antelope and mule deer in the spring. 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. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of livestock. 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. Spiny hopsage provides a palatable and nutritious food source for big game animals. Spiny hopsage is used as forage to at least some extent by domestic goats, deer, pronghorn, and rabbits.

Hydrological functions

Runoff is very high. Permeability is very slow to moderate.

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 greasewood are edible.
Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the seed as a reserve food source.
Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments.
Seeds of shadscale were used by Native Americans for bread and mush.
Some Native American peoples traditionally ground parched seeds of spiny hopsage to make pinole flour.

Other information

Spiny hopsage has moderate potential for erosion control and low to high potential for long-term revegetation projects. It can improve forage, control wind erosion, and increase soil stability on gentle to moderate slopes. Spiny hopsage is suitable for highway plantings on dry sites in Nevada.
Nevada ephedra is useful for erosion control, and seedlings have been successfully planted onto reclaimed strip mines, with survival ranging from 12 to 94%. Atrazine may be effective in controlling Nevada ephedra, though some plants can survive through crown sprouting. Irrigation may increase control by atrazine.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Churchill County, NV	
General legal description	This site also occurs in Lyon, 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

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)	
Contact for lead author	
Date	08/17/2024
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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

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

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-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:**

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17. **Perennial plant reproductive capability:**
