USDA Natural Resources Conservation Service

Ecological site R027XY051NV
SOUTH SLOPE 8-10 P.Z.

Last updated: 6/03/2024
Accessed: 05/13/2025

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 South Slope 8-10 P.Z. site occurs on hills and mountains on all aspects. Slope gradients of 15 to 50 percent are typical. Elevations are 4400 to 7200 feet. The soils are very shallow to moderately deep and are well drained.

Associated sites

R027XY007NV	**LOAMY SLOPE 8-10 P.Z.** GRSP-TEGL-EPNE dominant shrubs

Similar sites

R027XY067NV	**GRANITIC LOAM 8-10 P.Z.** ACSP12 dominant plant; more productive site; gentler slopes
R027XY007NV	**LOAMY SLOPE 8-10 P.Z.** ACTH7 dominant grass; more productive site
R027XY065NV	**GRANITIC SLOPE 8-10 P.Z.** ACSP12 dominant plant; more productive site

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. wyomingensis*
Herbaceous	(1) *Achnatherum speciosum*

Physiographic features

The South Slope 8-10 P.Z. site occurs on hills and mountains on all aspects. Slope gradients of 15 to 50 percent are most typical. Elevations are 4400 to 7200 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Runoff class	High to very high
Elevation	1,341–2,195 m
Slope	15–50%
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 temperatures are 48 to 55 degrees F. The average growing season is about 90 to 120 days.

Table 3. Representative climatic features

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

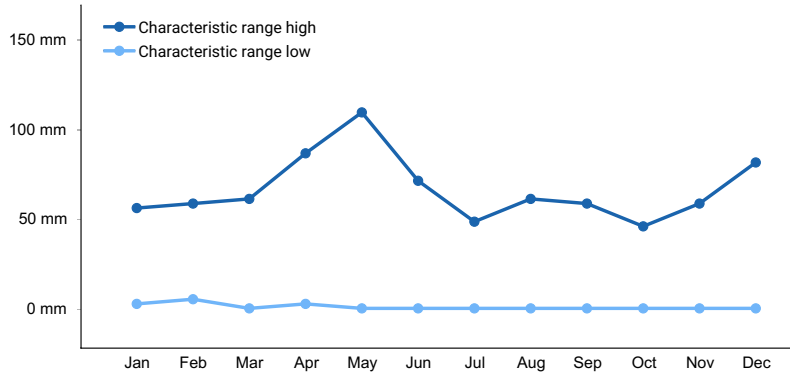


Figure 1. Monthly precipitation range

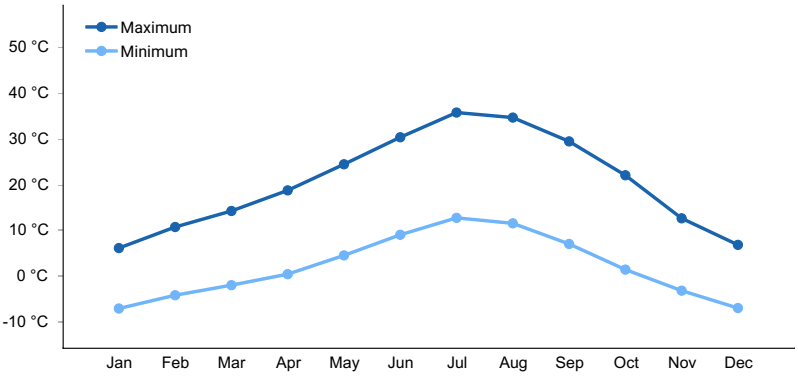


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very shallow to moderately deep and are well drained. Available water capacity is very low. Permeability is moderately slow to moderate and surface runoff is high to very high. Potential for sheet and rill erosion is moderate to high. The soil series associated with this site include: Bombadil, Colvar, Nicanor, and Old Camp.

Table 4. Representative soil features

Parent material	(1) Colluvium–volcanic rock (2) Residuum–volcanic rock

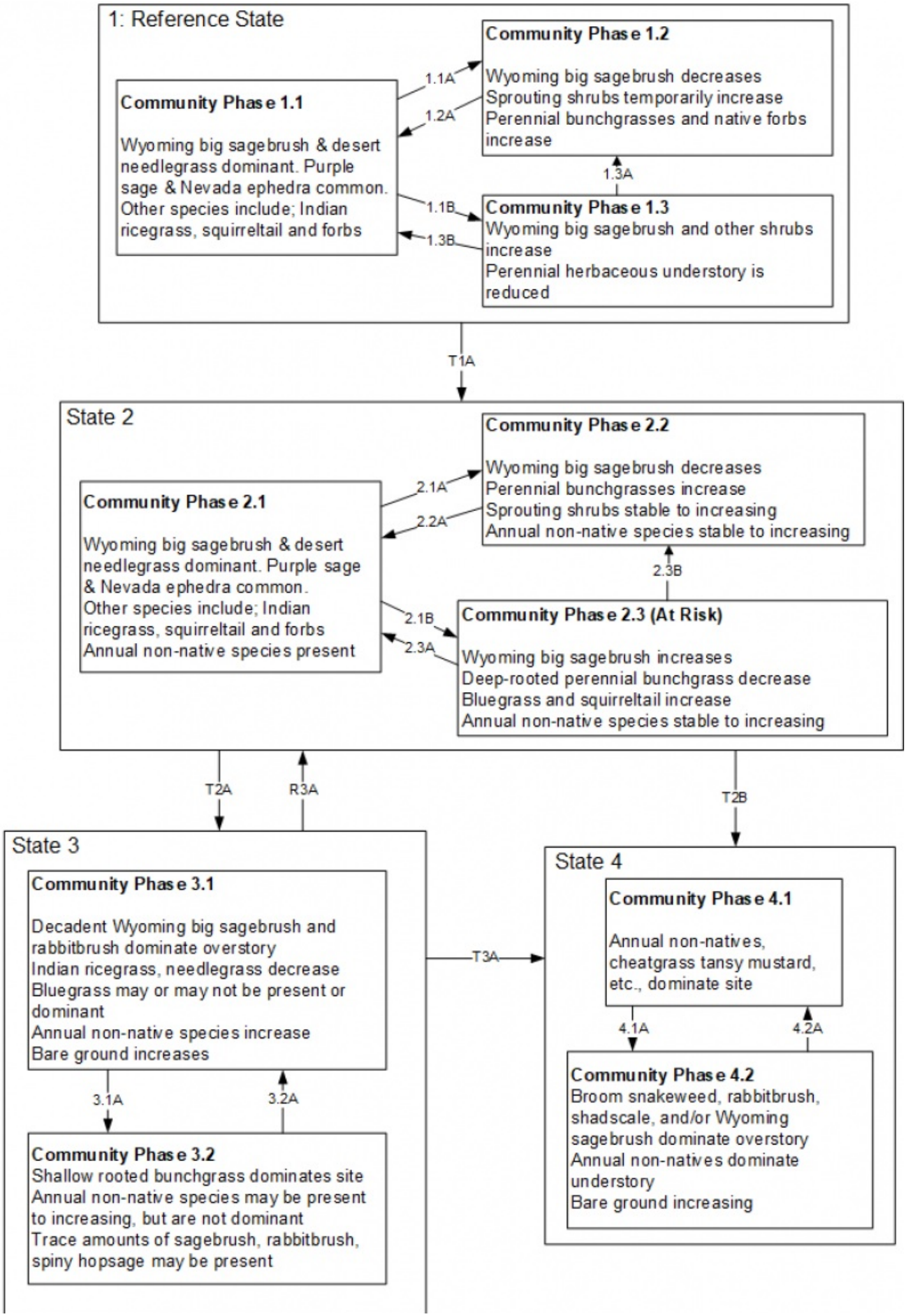
Surface texture	(1) Stony loam (2) Very cobbly loam (3) Very stony loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	13–102 cm
Surface fragment cover <=3"	5–23%
Surface fragment cover >3"	2–23%
Available water capacity (0-101.6cm)	2.03–7.11 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	5–23%
Subsurface fragment volume >3" (Depth not specified)	2–33%

Ecological dynamics

As ecological condition declines, overstory shrubs such as Wyoming big sagebrush, littleleaf horsebrush, and Douglas' rabbitbrush increase as Sandberg's bluegrass and bottlebrush squirreltail increase in the understory. After wildfire, Douglas' rabbitbrush, littleleaf horsebrush, spiny hopsage and Nevada ephedra often dominate the aspect. If excessive erosion occurs following disturbance such as wildfire, the potential plant community may permanently be altered to that characterized by the Eroded Granitic Slope (027XY047NV) ecological site. Species likely to invade this site are annuals such as cheatgrass and filaree.

Fire Ecology:
The fire return interval for Wyoming big sagebrush communities ranges from 10 to 70 years. Fire is the principal means of renewal for decadent stands of Wyoming big sagebrush.
Wyoming big sagebrush is killed by fire and establishes after fire from a seedbank; from seed produced by remnant plants that escaped fire; and from plants adjacent to the burn that seed in.
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.

State and transition model


1: Reference State
Community Phase 1.1
Wyoming big sagebrush & desert needlegrass dominant. Purple sage & Nevada ephedra common. Other species include; Indian ricegrass, squirreltail and forbs
1.1A
1.2A
Community Phase 1.2
Wyoming big sagebrush decreases
Sprouting shrubs temporarily increase
Perennial bunchgrasses and native forbs increase
1.3A
1.1B
1.3B
Community Phase 1.3
Wyoming big sagebrush and other shrubs increase
Perennial herbaceous understory is reduced
T1A
State 2
Community Phase 2.1
Wyoming big sagebrush & desert needlegrass dominant. Purple sage & Nevada ephedra common.
Other species include; Indian ricegrass, squirreltail and forbs
Annual non-native species present
2.1A
2.2A
Community Phase 2.2
Wyoming big sagebrush decreases
Perennial bunchgrasses increase
Sprouting shrubs stable to increasing
Annual non-native species stable to increasing
2.3B
2.1B
2.3A
Community Phase 2.3 (At Risk)
Wyoming big sagebrush increases
Deep-rooted perennial bunchgrass decrease
Bluegrass and squirreltail increase
Annual non-native species stable to increasing
T2A
R3A
T2B
State 3
Community Phase 3.1
Decadent Wyoming big sagebrush and rabbitbrush dominate overstory
Indian ricegrass, needlegrass decrease
Bluegrass may or may not be present or dominant
Annual non-native species increase
Bare ground increases
3.1A
3.2A
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
T3A
State 4
Community Phase 4.1
Annual non-natives, cheatgrass tansy mustard, etc., dominate site
4.1A
4.2A
Community Phase 4.2
Broom snakeweed, rabbitbrush, shadscale, and/or Wyoming sagebrush dominate overstory
Annual non-natives dominate understory
Bare ground increasing

Reference State 1.0: The Reference State 1.0 is a representative of the natural range of variability under pristine conditions. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. 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:
Wyoming big sagebrush and desert needlegrass dominate the site. Indian ricegrass, purple sage and Nevada ephedra are also common. 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. Under natural conditions fires are typically 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 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 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:
Wyoming big 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 allow the perennial bunchgrasses to dominate the site. Fires would typically be low severity resulting in a mosaic pattern due to low fine 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 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: Wyoming big sagebrush and desert needlegrass dominate the site. Indian ricegrass and purple sage may be significant components while squirreltail and forbs make up smaller percentages by weight of the understory. Non-native annual species are present.
Community Phase Pathway 2.1a: Fire reduces the 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 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 Wyoming big sagebrush to dominate the site. Inappropriate grazing management reduces the 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. Desert needlegrass and other perennial grasses dominate. Wyoming big sagebrush is present in trace amounts. Depending on fire severity or intensity of Aroga moth infestations, patches of intact sagebrush may remain. 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 Wyoming big 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 an alternative stable state. Sagebrush dominates the overstory and 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 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 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 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. 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.

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 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:
Wyoming big sagebrush dominates overstory and ephedra 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.
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 Wyoming big sagebrush can take many years and is dependent on multiple years of favorable precipitation.

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.

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, shadscale, broom snakeweed and spiny hopsage may dominate the overstory.
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 or other shrubs to establish. Probability of sagebrush establishment is extremely low.
Community Phase 4.2: Sprouting shrubs such as ephedra, spiny hopsage, horsebrush and rabbitbrush dominate overstory. Shadscale may be increasing. Wyoming big 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 shrubs and allows for annual non-native species to dominate the site.

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by Wyoming big sagebrush and desert needlegrass. Purple sage and Nevada ephedra are important shrubs. Potential vegetative composition is about 45% grasses, 5% forbs and 50% shrubs. Approximate ground cover (basal and crown) is 5 to 15 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	112	196	280
Grass/Grasslike	101	176	252
Forb	11	20	28
Total	**224**	**392**	**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**			100–197	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	59–99	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	20–59	–
	squirreltail	ELEL5	*Elymus elymoides*	20–39	–
2	**Secondary Perennial Grasses**			8–43	
	needle and thread	HECO26	*Hesperostipa comata*	2–12	–
	basin wildrye	LECI4	*Leymus cinereus*	2–12	–
	Sandberg bluegrass	POSE	*Poa secunda*	2–12	–
Forb					
3	**Perennial Forbs**			8–43	
	buckwheat	ERIOG	*Eriogonum*	2–8	–
	phlox	PHLOX	*Phlox*	2–8	–
Shrub/Vine					
4	**Primary Shrubs**			139–216	
	Nevada jointfir	EPNE	*Ephedra nevadensis*	20–39	–
	purple sage	SADOI	*Salvia dorrii ssp. dorrii var. incana*	20–39	–
5	**Secondary Shrubs**			20–39	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	2–12	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	2–12	–
	buckwheat	ERIOG	*Eriogonum*	2–12	–
	spiny hopsage	GRSP	*Grayia spinosa*	2–12	–
	littleleaf horsebrush	TEGL	*Tetradymia glabrata*	2–12	–

Animal community

Livestock Interpretations:
Due to its southerly exposure, this site loses its snow cover earlier in the spring and plant growth is initiated before that of most adjacent sites. Thus, livestock may concentrate on this site during early spring grazing periods. Grazing management should be keyed to desert needlegrass production. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep. Livestock browse Wyoming big sagebrush, but may use it only lightly when palatable herbaceous species are available.

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:
Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Desert bighorn sheep graze desert needlegrass.
Wyoming big sagebrush is preferred browse for wild ungulates. Pronghorn usually browse Wyoming big sagebrush heavily. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Meadows surrounded by sagebrush may be used as feeding and strutting grounds. Sagebrush is a crucial component of their diet year-round, and sage-grouse select sagebrush almost exclusively for cover. Sage-grouse prefer mountain big sagebrush and Wyoming big sagebrush communities to basin big sagebrush communities.

Hydrological functions

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

Other products

Native Americans made tea from big sagebrush leaves. They used the tea as a tonic, an antiseptic, for treating colds, diarrhea, and sore eyes and as a rinse to ward off ticks. Big sagebrush seeds were eaten raw or made into meal.

Other information

Wyoming big sagebrush is used for stabilizing slopes and gullies and for restoring degraded wildlife habitat, rangelands, mine spoils and other disturbed sites. It is particularly recommended on dry upland sites where other shrubs are difficult to establish.

Inventory data references

NASIS soil component data.

Type locality

Location 1: Churchill County, NV	
Township/Range/Section	T14N R32E S20
General legal description	About 3 miles north of Rawhide (site), Sand Springs Range, Churchill County, Nevada. This site also occurs in Lyon, Mineral, Pershing and Storey 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)	P NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	07/12/2012
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are none to rare. A few can occur on steeper slopes and most frequently occur in areas subjected to summer convection storms or rapid spring snowmelt.

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2. **Presence of water flow patterns:** Waterflow patterns are none to rare. A few will occur in areas subjected to summer convection storms or rapid spring snowmelt.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare and most frequently occur in areas subjected to summer convection storms or rapid spring snowmelt.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground ± 50-60% depending on amount of surface rock fragments.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None to slight deposition at base of shrubs on steeper slopes.

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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length (<10 ft) during intense summer storms. Persistent litter (large woody material) will remain in place except during large rainfall events.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 4 to 6 on the coarse surface soil textures found on this site.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is moderate tin to weak medium platy. Soil surface colors are light and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is typically less than 1.5 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial herbaceous plants (especially deep-rooted bunchgrasses [i.e., desert needlegrass, Indian ricegrass] slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

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

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: Deep-rooted, cool season, perennial bunchgrasses >> Wyoming big sagebrush > associated shrubs

    Sub-dominant: shallow-rooted, cool-season perennial bunchgrasses > perennial forbs = annual forbs

    Other: After wildfires, perennial bunchgrasses and sprouting shrubs (ephedra, rabbitbrush, horsebrush) will dominate. Big sagebrush will be removed for several years.

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 30% of total woody canopy; some of the mature bunchgrasses (to 25%) have dead centers.

14. **Average percent litter cover (%) and depth (in):** Under canopy and between plant interspaces15-25%; 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 ± 350 lbs/ac; Favorable years ±500 lbs/ac and unfavorable years ±200 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:** Cheatgrass, annual mustards, and red-stem filaree are potential invaders on this site.

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 extreme or extended drought periods.