USDA Natural Resources Conservation Service

Ecological site R026XY091NV
CHURNING CLAYPAN 10-12 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): 026X–Carson Basin and Mountains

The area lies within western Nevada and eastern California, with about 69 percent being within Nevada, and 31 percent being within California. Almost all this area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. Isolated north-south trending mountain ranges are separated by aggraded desert plains. The mountains are uplifted fault blocks with steep side slopes. Most of the valleys are drained by three major rivers flowing east across this MLRA. A narrow strip along the western border of the area is in the Sierra Nevada Section of the Cascade-Sierra Mountains Province of the Pacific Mountain System. The Sierra Nevada Mountains are primarily a large fault block that has been uplifted with a dominant tilt to the west. This structure leaves an impressive wall of mountains directly west of this area. This helps create a rain shadow affect to MLRA 26. Parts of this eastern face, but mostly just the foothills, mark the western boundary of this area. Elevations range from about 3,806 feet (1,160 meters) on the west shore of Pyramid Lake to 11,653 feet (3,552 meters) on the summit of Mount Patterson in the Sweetwater Mountains.

Valley areas are dominantly composed of Quaternary alluvial deposits with Quaternary playa or alluvial flat deposits often occupying the lowest valley bottoms in the internally drained valleys, and river deposited alluvium being dominant in externally drained valleys. Hills and mountains are dominantly Tertiary andesitic flows, breccias, ash flow tuffs, rhyolite tuffs or granodioritic rocks. Quaternary basalt flows are present in lesser amounts, and Jurassic and Triassic limestone and shale, and Precambrian limestone and dolomite are also present in very limited amounts. Also of limited extent are glacial till deposits along the east flank of the Sierra Nevada Mountains, the result of alpine glaciation.

The average annual precipitation in this area is 5 to 36 inches (125 to 915 millimeters), increasing with elevation. Most of the rainfall occurs as high-intensity, convective storms in spring and autumn. Precipitation is mostly snow in winter. Summers are dry. The average annual temperature is 37 to 54 degrees F (3 to 12 degrees C). The freeze-free period averages 115 days and ranges from 40 to 195 days, decreasing in length with elevation.

The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an aridic or xeric soil moisture regime, and mixed or smectitic mineralogy. They generally are well drained, are clayey or loamy and commonly skeletal, and are very shallow to moderately deep.

This area supports shrub-grass vegetation characterized by big sagebrush. Low sagebrush and Lahontan sagebrush occur on some soils. Antelope bitterbrush, squirreltail, desert needlegrass, Thurber needlegrass, and Indian ricegrass are important associated plants. Green ephedra, Sandberg bluegrass, Anderson peachbrush, and several forb species also are common. Juniper-pinyon woodland is typical on mountain slopes. Jeffrey pine, lodgepole pine, white fir, and manzanita grow on the highest mountain slopes. Shadscale is the typical plant in the drier parts of the area. Sedges, rushes, and moisture-loving grasses grow on the wettest parts of the wet flood plains and terraces. Basin wildrye, alkali sacaton, saltgrass, buffaloberry, black greasewood, and rubber rabbitbrush grow on the drier sites that have a high concentration of salts.

Some of the major wildlife species in this area are mule deer, coyote, beaver, muskrat, jackrabbit, cottontail, raptors, pheasant, chukar, blue grouse, mountain quail, and mourning dove. The species of fish in the area include trout and catfish. The Lahontan cutthroat trout in the Truckee River is a threatened and endangered species.

LRU notes

The Sierra Influenced Ranges LRU is characterized by wooded great basin mountains with climatic and biotic affinities to the Sierra Nevada mountain range. The Sierra Influences Ranges LRU receives greater precipitation that the mountain ranges of central NV. Amount of precipitation varies in relation to the local strength of the Sierra NV rain shadow, characterized by pinyon and juniper trees. The White, Sweetwater, Pine Nut, Wassuk, and Virginia ranges of Nevada support varying amounts of Sierra Nevada flora, such as ponderosa pine. Elevations range from 1610 to 2420 meters and slopes range from 5 to 49 percent, with a median value of 22 percent. Frost free days (FFD) ranges from 92 to 163.

Ecological site concept

The Churning Claypan 10-12 P.Z. site occurs on mountain slopes. Slope gradients range from 2 to 15 percent. The soils are heavy textured throughout and are subject to extreme shrink and swell action as they are wetted and then dry. The vertical and horizontal soil movement from alternative wetting and drying shears fine and very fine roots and the establishment of plants with extensive lateral root systems is restricted. The dominant vegetation is little sagebrush (Artemisia arbusula ssp. longicaulis) and Sandberg's bluegrass (Poa secunda).

Associated sites

F026XY092NV	**Juniperus osteosperma/Artemisia arbuscula/Achnatherum thurberianum-Poa fendleriana**
R026XY010NV	**LOAMY 10-12 P.Z.**
R026XY023NV	**CLAYPAN 10-12 P.Z.**
R026XY050NV	**GRAVELLY CLAY 10-12 P.Z.**

Similar sites

R026XY050NV	**GRAVELLY CLAY 10-12 P.Z.** ACTH7 dominant grass; more productive site
R026XY097NV	**CHURNING CLAYPAN 8-10 P.Z.** Lower elevations; shadscale important shrub on site
R026XY047NV	**DROUGHTY CLAYPAN 8-10 P.Z.** Less productive site; ATCO and PIDE4 important shrubs on site.
R026XY101NV	**SANDY LOAM 8-10 P.Z.** ACSP12 dominant grass; sandy surface soil
R026XY033NV	**SANDY CLAYPAN 8-10 P.Z.** ACHY dominant grass; ATCA2 major shrub; sandy surface soil.
R026XY088NV	**CLAY SLOPE 10-12 P.Z.** GLSPA important shrub; ACTH7 dominant grass
R026XY095NV	**GRANITIC CLAYPAN 8-12 P.Z.** ACSP12 dominant grass

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia arbuscula ssp. longicaulis*
Herbaceous	(1) *Poa secunda*

Physiographic features

The Churning Claypan 10-12 P.Z. site occurs on mountain slopes. Slope gradients range from 2 to 15 percent. Slope gradients of 2 to 8 percent are most typical. Elevations are 4400 to 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain
Elevation	1,341–1,829 m
Slope	2–8%
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid, characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 10 to about 12 inches. Mean annual air temperature is 47 to 51 degrees F. The average growing season is about 90 to 130 days.

Nevada’s climate is predominantly arid, with large daily ranges of temperature, infrequent severe storms, heavy snowfall in the higher mountains, and great location variations with elevation. Three basic geographical factors largely influence Nevada’s climate: continentality, latitude, and elevation. Continentality is the most important factor. The strong continental effect is expressed in the form of both dryness and large temperature variations. Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the climate of the State. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation occurs and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the West but throughout the state, with the result that the lowlands of Nevada are largely desert or steppes. The temperature regime is also affected by the blocking of the inland-moving maritime air. Nevada sheltered from maritime winds, has a continental climate with well-developed seasons and the terrain responds quickly to changes in solar heating.

Nevada lies within the mid-latitude belt of prevailing westerly winds which occur most of the year. These winds bring frequent changes in weather during the late fall, winter and spring months, when most of the precipitation occurs. To the south of the mid-latitude westerlies, lies a zone of high pressure in subtropical latitudes, with a center over the Pacific Ocean. In the summer, this high-pressure belt shifts northward over the latitudes of Nevada, blocking storms from the ocean. The resulting weather is mostly clear and dry during the summer and early fall, with scattered thundershowers. The eastern portion of the state receives significant summer thunderstorms generated from monsoonal moisture pushed up from the Gulf of California, known as the North American monsoon. The monsoon system peaks in August and by October the monsoon high over the Western U.S. begins to weaken and the precipitation retreats southward towards the tropics (NOAA 2004).

Table 3. Representative climatic features

Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	254-305 mm
Frost-free period (average)	110 days
Freeze-free period (average)	
Precipitation total (average)	279 mm

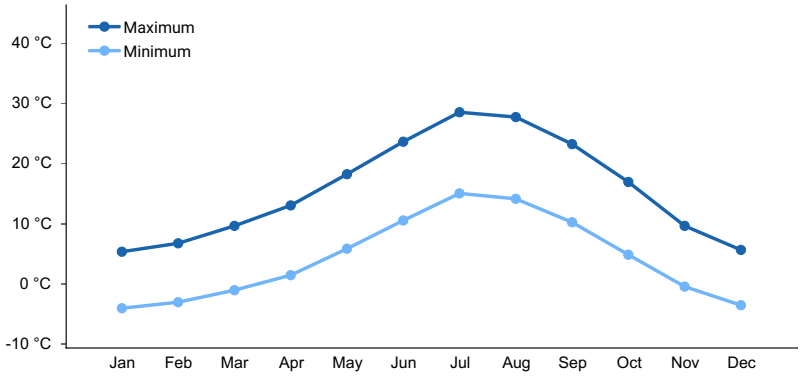


Figure 1. Monthly average minimum and maximum temperature

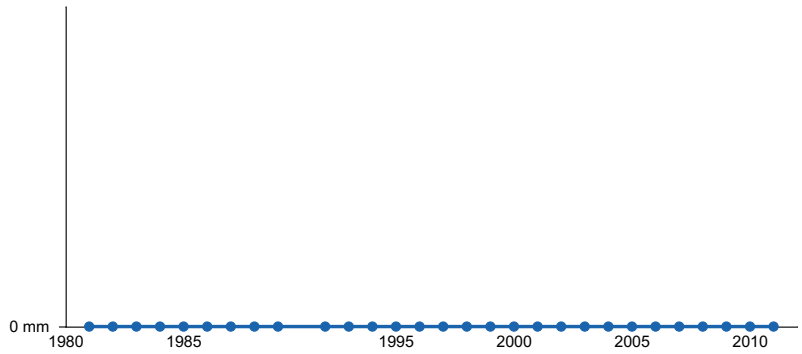


Figure 2. Annual precipitation pattern

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are deep and well drained. Available water capacity is moderate. The soils have more than 50 percent cobbles and stones on the surface. The soils are heavy textured throughout and are subject to extreme shrink and swell action as they are wetted and then dry. The vertical and horizontal soil movement from alternative wetting and drying shears fine and very fine roots and the establishment of plants with extensive lateral root systems is restricted. Soil series associated with this site includes Manogue.

Table 4. Representative soil features

Parent material	(1) Colluvium–basalt
Surface texture	(1) Very cobbly clay
Drainage class	Well drained
Permeability class	Very slow
Soil depth	150–180 cm
Surface fragment cover <=3"	0–18%
Surface fragment cover >3"	0–25%
Available water capacity (0-101.6cm)	12.95–14.99 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

As ecological condition declines, Washoe rabbitbrush and littleleaf horsebrush increase as Lahonton sagebrush and perennial grasses decrease. Cheatgrass is species most likely to invade this site.

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. 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 Narrative Group 3

This is a text description of the states, phases, transitions, and community pathways possible in the State and Transition model for the MLRA 26 Disturbance Response Group 3.

Reference State 1.0:
The Reference State 1.0 is representative of the natural range of variability under pristine conditions. The reference state has three general community phases: a shrub-grass dominant phase, a perennial grass dominant phase and a shrub dominant phase. 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:
This community is dominated by low sagebrush, bottlebrush squirreltail and Sandberg bluegrass. Forbs and other grasses make up smaller components.

Community Phase Pathway 1.1a, from Phase 1.1 to 1.2:
Fire will decrease or eliminate the overstory of sagebrush and allow for the perennial bunchgrasses to dominate the site. Fires will typically be low severity resulting in a mosaic pattern due to low fuel loads. A fire following an unusually wet spring may be more severe and reduce sagebrush cover to trace amounts.

Community Phase Pathway 1.1b, from Phase 1.1 to 1.3:
Time and lack of disturbance such as fire allows for sagebrush to increase and become decadent. Long-term drought, herbivory, or combinations of these will cause a decline in perennial bunchgrasses and fine fuels leading to a reduced fire frequency and allowing sagebrush to dominate the site.

Community Phase 1.2:
This community phase is characteristic of a post-disturbance, early/mid-seral community. Bottlebrush squirreltail, Sandberg bluegrass and other perennial bunchgrasses dominate. Depending on fire severity patches of intact sagebrush may remain. Rabbitbrush and other sprouting shrubs may be sprouting. Perennial forbs may be a significant component for a number of years following fire.

Community Phase Pathway 1.2a, from Phase 1.2 to 1.1:
Time and lack of disturbance will allow sagebrush to increase.

Community Phase 1.3:
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 Pathway 1.3a, from Phase 1.3 to 1.2:
Fire will decrease or eliminate the overstory of sagebrush and allow for the perennial bunchgrasses to dominate the site. Fires may be high severity in this community phase due to the dominance of sagebrush resulting in removal of overstory shrub community.

T1A: Transition from the 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 cheatgrass, mustards, and bur buttercup (*Ceratocephala testiculata*).
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. This state has the same three general community phases. These non-native species can be highly flammable, and 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 phase is similar to the Reference State Community Phase 1.1, with the presence of non-native species in trace amounts. Sagebrush, bottlebrush squirreltail and Sandberg bluegrass dominate the site. Forbs and other shrubs and grasses make up smaller components of this site.

Community Phase Pathway 2.1a, from Phase 2.1 to 2.2:
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. Annual non-native species are likely to increase after fire.

Community Phase Pathway 2.1b, from Phase 2.1 to 2.3:
Time and lack of disturbance allows for sagebrush to increase and become decadent. Long-term drought reduces fine fuels and leads to a reduced fire frequency, allowing sagebrush to dominate the site. Inappropriate grazing management reduces the perennial grass understory.

Community Phase 2.2:
This community phase is characteristic of a post-disturbance, early to mid-seral community where annual non-native species are present. Sagebrush is present in trace amounts; bottlebrush squirreltail, Sandberg bluegrass and other perennial bunchgrasses dominate the site. Depending on fire severity patches of intact sagebrush may remain. Rabbitbrush may be sprouting or dominant in the community. Perennial forbs may be a significant component for a number of years following fire. Annual non-native species are stable or increasing within the community.

Community Phase Pathway 2.2a, from Phase 2.2 to 2.1:
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 low sagebrush can take many years.

Community Phase 2.3 (At Risk):
This community is at risk of crossing a threshold to another state. Sagebrush dominates the overstory and perennial bunchgrasses in the understory are reduced, either from competition with shrubs, from inappropriate grazing, or from both. Rabbitbrush may be a significant component. Bare ground increases. Annual non-native species may be stable or increasing due to lack of competition with perennial bunchgrasses. Pinyon and/or juniper may be present. This site is susceptible to further degradation from grazing, drought, and fire.

Community Phase Pathway 2.3a, from Phase 2.3 to 2.2:
Fire eliminates/reduces the overstory of sagebrush and allows for the understory perennial grasses to increase. Fires may be high severity in this community phase due to the dominance of sagebrush resulting in removal of overstory shrub community. Annual non-native species respond well to fire and may increase post burn.

T2A: Transition from Current Potential State 2.0 to Shrub State 3.0:
Trigger: To Community Phase 3.1: Inappropriate grazing will decrease or eliminate deep rooted perennial bunchgrasses, increase Sandberg bluegrass and favor shrub growth and establishment. To Community Phase 3.2: Severe fire in Community Phase 2.3 will remove sagebrush overstory. Annual non-native species will increase.
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 or soil disturbing treatment would transition to Community Phase 4.1.
Slow variables: Increased production and cover of non-native annual species.
Threshold: Loss of deep-rooted perennial bunchgrasses and shrubs changes temporal and spatial nutrient capture and cycling within the community. Increased, continuous fine fuels modify the fire regime by increasing frequency, size and spatial variability of fires.

Shrub State 3.0:
This state has two community phases, a shrub-dominated phase and a grass-dominated phase. This state is a product of many years of heavy grazing during time periods harmful to perennial bunchgrasses. Sagebrush dominates the overstory and 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 and bottlebrush squirreltail or western wheatgrass understory dominate site resources such that soil water, nutrient capture, nutrient cycling and soil organic matter are temporally and spatially redistributed.

Community Phase 3.1 (At Risk):
Decadent sagebrush dominates the overstory. Rabbitbrush may be a significant component. Deep-rooted perennial bunchgrasses may be present in trace amounts or absent from the community. Western wheatgrass and annual non-native species increase. Bare ground is significant. Pinyon and/or juniper may be present.

Community Phase Pathway 3.1a, from Phase 3.1 to 3.2:
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 grasses to dominate the site.

Community Phase 3.2:
Bottlebrush squirreltail and/or western wheatgrass dominate the site; annual non-native species may be present but are not dominant. Trace amounts of sagebrush or rabbitbrush may be present. Bare ground may be significant.

Community Phase Pathway 3.2a, from Phase 3.2 to 3.1:
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 low sagebrush can take many years.

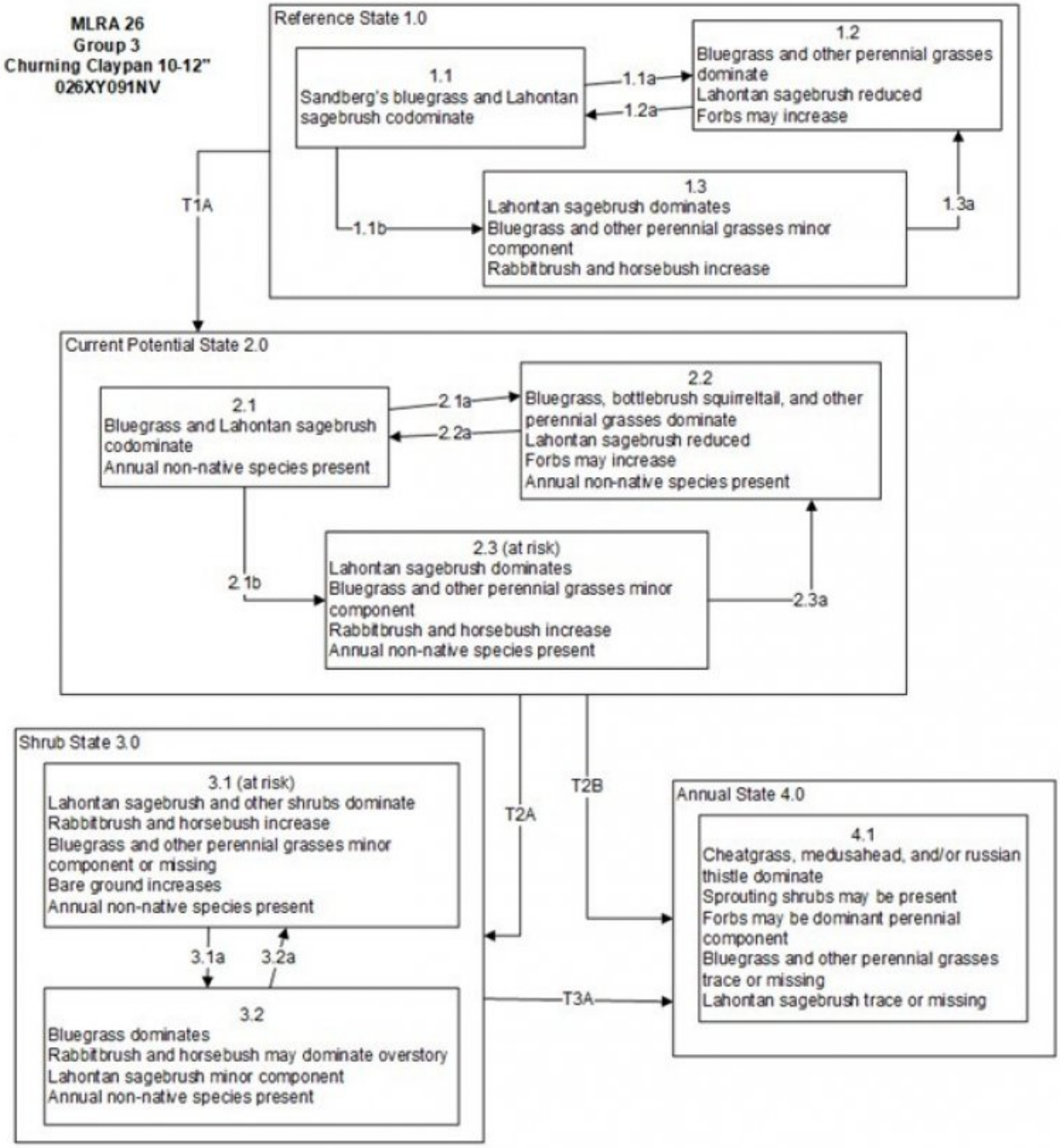
T3A: Transition from Shrub State 3.0 to Annual State 4.0:
Trigger: Fire and/or treatments that disturb the soil and existing plant community.
Slow variables: Increased seed production (following a wet spring) and cover of annual non-native species.

Threshold: Increased, continuous fine fuels modify the fire regime by changing frequency, 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 and impact the temporal and spatial aspects of nutrient cycling and distribution.

Annual State 4.0:
This state has one community phase dominated by annual plants. An abiotic threshold has been crossed and state dynamics are driven by fire and time. The herbaceous understory is dominated by annual non-native species such as cheatgrass, medusahead, Russian thistle, and mustards. Resiliency has declined and further degradation from fire facilitates a cheatgrass and sprouting shrub plant community. Fire return interval has shortened due to the dominance of annual grasses in the understory and is a driver in site dynamics.

Community Phase 4.1:
Annual plants like cheatgrass, medusahead, and Russian thistle dominate. Bottlebrush squirreltail and perennial forbs may still be present in trace amounts. Surface erosion may increase with summer convection storms and would be evidenced by increased pedestalling of plants, rill formation, or extensive water flow paths.

State and transition model


MLRA 26
Group 3
Churning Claypan 10-12"
026XY091NV
Reference State 1.0
1.1
Sandberg's bluegrass and Lahontan sagebrush codominate
1.2
Bluegrass and other perennial grasses dominate
Lahontan sagebrush reduced
Forbs may increase
1.3
Lahontan sagebrush dominates
Bluegrass and other perennial grasses minor component
Rabbitbrush and horsebush increase
1.1a
1.2a
1.1b
1.3a
T1A
Current Potential State 2.0
2.1
Bluegrass and Lahontan sagebrush codominate
Annual non-native species present
2.2
Bluegrass, bottlebrush squirreltail, and other perennial grasses dominate
Lahontan sagebrush reduced
Forbs may increase
Annual non-native species present
2.3 (at risk)
Lahontan sagebrush dominates
Bluegrass and other perennial grasses minor component
Rabbitbrush and horsebush increase
Annual non-native species present
2.1a
2.2a
2.1b
2.3a
Shrub State 3.0
3.1 (at risk)
Lahontan sagebrush and other shrubs dominate
Rabbitbrush and horsebush increase
Bluegrass and other perennial grasses minor component or missing
Bare ground increases
Annual non-native species present
3.2
Bluegrass dominates
Rabbitbrush and horsebush may dominate overstory
Lahontan sagebrush minor component
Annual non-native species present
3.1a
3.2a
T2A
T2B
T3A
Annual State 4.0
4.1
Cheatgrass, medusahead, and/or russian thistle dominate
Sprouting shrubs may be present
Forbs may be dominant perennial component
Bluegrass and other perennial grasses trace or missing
Lahontan sagebrush trace or missing

026XY027NV

Reference State 1.0 Community Phase Pathways
1.1a: Low severity fire creates sagebrush/grass mosaic; high severity fire significantly reduces sagebrush cover and leads to early/mid-seral community, dominated by grasses and forbs.
1.1b: Time and lack of disturbance such as fire. Excessive herbivory and/or long-term drought may also reduce perennial understory.
1.2a: Time and lack of disturbance allows for shrub regeneration.
1.3a: Low severity fire would create sagebrush/grass mosaic.
1.3b: High severity fire significantly reduces sagebrush cover leading to early/mid-seral community.

Transition T1A: Introduction of non-native annual species.

Current Potential State 2.0 Community Phase Pathways
2.1a: Low severity fire creates sagebrush/grass mosaic; high severity fire significantly reduces sagebrush cover and leads to early/mid-seral community dominated by grasses and forbs; non-native annual species present.
2.1b: Time and lack of disturbance. Inappropriate grazing management and/or long-term drought may also reduce perennial understory.
2.2a: Time and lack of disturbance allows for regeneration of sagebrush.
2.3a: Low severity fire creates sagebrush/grass mosaic, herbivory or combinations. Brush management with minimal soil disturbance reduces sagebrush.

Transition T2A: Inappropriate grazing management (3.1), or high severity fire (3.2).
Transition T2B: Fire or brush management causing severe soil disturbance.

Shrub State 3.0 Community Phase Pathways
3.1a: Low severity fire.
3.2a: Time and lack of disturbance.

Transition T3A: Catastrophic fire and/or treatments that disturb the existing plant community.

Annual State 4.0 Community Phase Pathways
None.

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by Lahontan sagebrush and Sandberg's bluegrass. Potential vegetative composition is about 30% grasses, 10% forbs and 55% shrubs and trees.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	146	233	350
Grass/Grasslike	99	157	235
Forb	28	45	67
Tree	8	13	20
Total	**281**	**448**	**672**

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**			121–224	
	Sandberg bluegrass	POSE	*Poa secunda*	90–157	–
	squirreltail	ELEL5	*Elymus elymoides*	22–45	–
	mountain brome	BRMA4	*Bromus marginatus*	9–22	–
2	**Secondary Perennial Grasses**			9–22	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	2–9	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	2–9	–
	Webber needlegrass	ACWE3	*Achnatherum webberi*	2–9	–
Forb					
3	**Primary Perennial Forbs**			9–22	
	sunflower	HELIA3	*Helianthus*	9–22	–
4	**Secondary Perennial Forbs**			9–36	
	rockcress	ARABI2	*Arabis*	2–13	–
	balsamroot	BALSA	*Balsamorhiza*	2–13	–
	desertparsley	LOMAT	*Lomatium*	2–13	–
	beardtongue	PENST	*Penstemon*	2–13	–
Shrub/Vine					
5	**Primary Shrubs**			161–269	
	little sagebrush	ARARL3	*Artemisia arbuscula ssp. longicaulis*	135–202	–
	rubber rabbitbrush	ERNAW	*Ericameria nauseosa ssp. nauseosa var. washoensis*	9–22	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	9–22	–
	littleleaf horsebrush	TEGL	*Tetradymia glabrata*	9–22	–
6	**Secondary Shrubs**			9–45	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	4–13	–
	mormon tea	EPVI	*Ephedra viridis*	4–13	–
	spiny hopsage	GRSP	*Grayia spinosa*	4–13	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	4–13	–
	currant	RIBES	*Ribes*	4–13	–
Tree					
7	**Evergeen**			2–13	
	Utah juniper	JUOS	*Juniperus osteosperma*	2–13	–

Animal community

Livestock Interpretations:
This site is suited to livestock grazing. Grazing management should be keyed to Sandberg's bluegrass production. Bluegrass is a widespread and drought resistant forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species.

Domestic sheep and to a much lesser degree cattle consume lahontan sagebrush, particularly during the spring, fall and winter.

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:
Lahontan sagebrush is considered a valuable browse plant for wild ungulates during the spring, fall and winter months. In some areas it is of little value in winter due to heavy snow. Lahontan sagebrush is an important food source for sage grouse throughout the year, especially between October and April. Mule deer utilize and sometimes prefer lahontan sagebrush, particularly in winter and early spring. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Open Wyoming sagebrush communities are preferred nesting habitat. 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. Leks are often located on lahontan sagebrush sites, grassy openings, dry meadows, ridgetops, and disturbed sites. Sandberg's bluegrass is also an important forage species for several wildlife species.

Hydrological functions

Runoff is very high. Permeability is very low. Rills and water flow patterns are rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt. Pedestals are rare with occurrence typically limited to area within water flow patterns. Frost heaving of shallow rooted plants should not be considered as normal condition. Gullies are rare in areas of this site that occur on stable landforms. Where this site occurs on inset fans gullies and head cuts associated with ephemeral channel entrenchment are common. Gullies and head cuts should be healing or stable. Perennial herbaceous plants slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site. Coarse textured surface soils allow medium to rapid infiltration.

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 is used for camping and hiking and has potential for upland and big game hunting.

Type locality

Location 1: Storey County, NV	
Township/Range/Section	T18N R21E S26
General legal description	About 6 miles northeast of Virginia City. Virginia Range, Storey County, Nevada. This site also occurs in Washoe County, 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

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Approval

Kendra Moseley, 4/10/2024

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	GK BRACKLEY
Contact for lead author	State Rangeland Management Specialist
Date	02/21/2007
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are rare. A few can be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Water flow patterns are rare but can be expected in areas subjected to summer convection storms or rapid snowmelt.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to area within water flow patterns. Frost heaving of shallow rooted plants should not be considered as normal condition.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 50%; surface rock fragments <25%; shrub canopy to >20%; basal area for perennial herbaceous plants ±5%.

5. **Number of gullies and erosion associated with gullies:** Gullies are rare in areas of this site that occur on stable landforms. Where this site occurs on inset fans gullies and head cuts associated with ephemeral channel entrenchment are common. Gullies and head cuts should be healing or stable.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) is expected to move the distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during catastrophic events.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 3 to 6 on most soil textures found on this site. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. (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):** Surface structure is typically prismatic to columnar or subangular blocky. Soil surface colors are light. Organic carbon of the surface 2 to 3 inches is typically 1 to 1.5 percent dropping off quickly below. Organic matter content can be more or less depending on micro-topography.

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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 slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site. Coarse textured surface soils allow medium to rapid 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 not typical. Platy or massive sub-surface horizons, subsoil argillic horizons or hardpans shallow to the surface are not to be interpreted as compacted.

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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: Reference Plant Community: Lahontan sagebrush > shallow-rooted, cool season, perennial bunchgrasses. (By above ground production)

    Sub-dominant: Associated shrubs > deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, annual and perennial forbs = deep-rooted, cool season, perennial grasses. (By above ground production)

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs are common and standing dead shrub canopy material may be as much as 25% of total woody canopy; some of the mature bunchgrasses (<20%) have dead centers.

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

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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, ±400 lbs/ac; Spring moisture significantly affects total production.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if**

their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: Cheatgrass, and annual mustards are invaders in this site. Washoe rabbitbrush, horsebrush and utah juniper wills increase on this site.

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