

Ecological site R026XF060CA Ashy Claypan 12-14 P.Z.

Last updated: 4/10/2024
Accessed: 05/19/2024

General information

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

MLRA notes

Major Land Resource Area (MLRA): 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 Bodie Hills LRU straddles the California-Nevada state boundary, just north of Mono Lake. The area is underlain by late Miocene age volcanic fields with upper Miocene and Pliocene sedimentary deposits over top. The youngest faults in the area are north and north-east striking. Extensive zones of hydrothermally altered rocks and large mineral deposits, including gold and silver rich veins, formed during hydrothermally active periods of the Miocene (John et al. 2015). A primary distinguishing factor between the Bodie Hills and other hills in MLRA 26 is the dominance of volcanic parent material. Elevations range from 2170 to 2650 meters and slopes typically range from 5 to 35 percent. Frost free days range from 75 to 105.

Ecological site concept

The Ashy Claypan 12-14 P.Z. site is found on 2 to 30 percent slopes on mountains. The Ashy Claypan 12-14 P.Z. site is found between 7200 and 9500 feet. The soils are very shallow to bedrock. The surface soil texture is very gravelly ashy sandy loam. The dominant vegetation is little (low) sagebrush (*Artemisia arbuscula*) and Thurber's needlegrass (*Achnatherum thurberianum*).

Associated sites

R026XF057CA	Ashy Shallow Loam 14-16 P.Z.
R026XF062CA	Ashy Mountain Basin
R026XY028NV	MOUNTAIN RIDGE
R026XY105NV	GRAVELLY LOAMY SLOPE 14-16 P.Z.
R026XY108NV	ASHY SLOPE 14-16 P.Z.
R026XY111NV	SHALLOW LOAM 12-14 P.Z.

Similar sites

R026XY028NV	MOUNTAIN RIDGE Mountain Ridge [Less productive site; ACPI2 dominant grass]
R026XY090NV	SCABLAND 10-14 P.Z. Scabland 10-14

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia arbuscula</i>
Herbaceous	(1) <i>Achnatherum thurberianum</i> (2) <i>Achnatherum webberi</i>

Physiographic features

This site occurs on hills and mountains, fan remnants and plateaus. Slopes range from 0 to 30 percent, but slope gradients of 4 to 15 percent are most typical. Elevations are 7200 to 9000 feet

Table 2. Representative physiographic features

Landforms	(1) Mountain
Elevation	2,195–2,743 m
Slope	4–15%

Climatic features

The climate on this site is subhumid-continental, characterized by cold, moist winters, and cool dry summers. Average annual precipitation is 12 to 14 inches. Mean annual air temperature is 41 to 45 degrees F. The average growing season is about 30 to 100 days.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	
Precipitation total (average)	356 mm

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils in this site are very shallow and well drained formed from colluvium and residuum derived from volcanic rocks. The soil profile typically has significant amounts of volcanic glass in the soil profile. A mollic epipedon occurs from 7 to 14 inches. Runoff is very high. Slow to very slow permeability.

Soils series correlated to this ecological site include Domehill, Fisherdig, Hardteph, Marmothill, and Mopana.

Table 4. Representative soil features

Parent material	(1) Volcanic ash–andesite (2) Colluvium–andesite (3) Residuum–andesite (4) Volcanic ash–tuff breccia (5) Colluvium–tuff breccia (6) Residuum–tuff breccia
Surface texture	(1) Very gravelly, ashy sandy loam
Family particle size	(1) Ashy-skeletal
Drainage class	Well drained
Depth to restrictive layer	18–36 cm
Surface fragment cover <=3"	35–41%
Surface fragment cover >3"	0–6%
Available water capacity (Depth not specified)	4.83–5.59 cm
Subsurface fragment volume <=3" (Depth not specified)	41–45%
Subsurface fragment volume >3" (Depth not specified)	3–6%

Ecological dynamics

This site responds differently to excessive use by different classes of livestock. Abusive sheep use will decrease abundance of Thurber's needlegrass, bluegrasses, and forbs. Early season cattle use decreases Thurber's needlegrass composition as low sagebrush, bottlebrush squirreltail, and bluegrass densities increase. Cheatgrass, Utah juniper and singleleaf pinyon are species most likely to invade this site.

Fire Ecology:

Communities:

Presettlement fire return intervals in mountain big sagebrush communities varied from 15 to 25 years. Plants are readily killed in all seasons, even light severity fires.

Mountain big sagebrush is highly susceptible to injury from fire. It is often top-killed by fire and will not resprout. Thurber's needlegrass is classified as moderately resistant, but depending on season of burn, phenology, and fire severity, this perennial bunchgrass is moderately to severely damaged by fire. Burning has been found to decrease the vegetation and reproductive vigor. Early season burning is more damaging to this needlegrass than late season burning. Prairie junegrass is reported as showing little or no damage to moderate damage from fire. The small stature of prairie Junegrass and coarse textured foliage aid in protection of these meristematic tissue areas. Possessing coarsely textured foliage and a small clump size also limits the potential for fire damage.

Livestock Interpretations: Rapid seasonal development of prairie Junegrass provides good, early-spring forage for livestock. It also provides suitable forage in the fall after curing.

Reference State 1.0: Community Phase Pathways: The Reference State 1.0 is a 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 Lahontan/low sagebrush, bluegrasses and Thurber's needlegrass. Forbs and other grasses make up smaller components. Pinyon and juniper may or may not be present.

Community Phase Pathway 1.1a, from Phase 1.1 to 1.2: Fire will decrease or eliminate the overstory of sagebrush and allow 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. Thurber's needlegrass, bluegrasses, 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 several 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. Mature and/or decadent sagebrush dominates the overstory and the deep-rooted perennial bunchgrasses in the understory become minor component either from competition with shrubs and/or from herbivory. Sandberg bluegrass may become co-dominant with deep rooted bunchgrasses. Pinyon and juniper may be present.

Community Phase Pathway 1.3a, from Phase 1.3 to 1.1: A low severity fire, herbivory or combinations will reduce the sagebrush overstory and create a sagebrush/grass mosaic.

Community Phase Pathway 1.3b, from Phase 1.3 to 1.2: Fire will decrease or eliminate the overstory of sagebrush and allow 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, medusahead, mustards, and bur buttercup.

Slow variables: Over time, the annual non-native plants will increase within the community. The change in dominance from perennial grasses to annual grasses reduces organic matter inputs from root turn-over, resulting in reductions in soil water availability.

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.

T1B: Transition from the Reference State 1.0 to Shrub State 3.0:

Trigger: To Community Phase 3.1: Long term lack of fire and/or 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, decrease perennial bunchgrasses and enhance Sandberg bluegrass.

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.

Current Potential State 2.0 Community Phase Pathways: 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 four 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. Lahontan/low sagebrush, bluegrasses, and Thurber's needlegrass 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 Lahontan/low 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.

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; 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 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 minor components, either from competition with shrubs or from inappropriate grazing, or from both. Rabbitbrush may be a significant component. Sandberg bluegrass may become co-dominant 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 grazing, drought, and fire.

Community Phase Pathway 2.3a, from Phase 2.3 to 2.1: A change in grazing management that reduces shrubs will allow the perennial bunchgrasses in the understory to dominate. Heavy late-fall or winter grazing may cause mechanical damage and subsequent death to sagebrush, facilitating an increase in the herbaceous understory. Brush treatments with minimal soil disturbance will also decrease sagebrush and release the perennial understory. A low severity fire would decrease the overstory of sagebrush or leave patches of shrubs and would allow the understory perennial grasses to dominate. Annual non-native species are present and may increase in the community.

Community Phase Pathway 2.3b, from Phase 2.3 to 2.2: Fire eliminates/reduces the overstory of sagebrush and allows the understory perennial grasses to dominate. 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, decrease perennial bunchgrasses and enhance Sandberg bluegrass. 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.

Shrub State 3.0 Community Phase Pathways: This state is a product of long-term lack of fire and/or 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 become the dominant grass. 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 bluegrass 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): Lahontan/low sagebrush dominates the overstory and may be decadent. Rabbitbrush may be a significant component. Deep-rooted perennial bunchgrasses may be present in trace amounts or absent from the community. Sandberg bluegrass and annual non-native species increase. Bare ground is significant. Pinyon and 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 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. Sprouting shrubs may increase. Trace amounts of sagebrush may be present with Thurber's needlegrass and other perennial grasses a minor component or missing altogether.

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 Lahontan/low sagebrush can take many years.

T3A: Transition from Shrub State 3.0 to Tree State 4.0: Trigger: Absence of disturbance over time allows for Utah juniper or western juniper dominance.

Feedbacks and ecological processes: Trees increasingly dominate use of soil water, contributing to reductions in soil water availability to grasses and shrubs. Overtime, grasses and shrubs are outcompeted. Reduced herbaceous and shrub production slows soil organic matter inputs and increases soil erodibility through loss of cover and root structure. Slow variables: Long-term increase in juniper and/or western juniper density.

Threshold: Trees overtop Lahontan/low sagebrush and out-compete shrubs for water and sunlight. Shrub skeletons exceed live shrubs in number. There is minimal recruitment of new shrub cohorts.

Tree State 4.0 Community Phase Pathways: This state is characterized by a dominance of pinyon and juniper in the overstory. Lahontan sagebrush and perennial bunchgrasses may still be present, but they are no longer controlling

site resources. Soil moisture, soil nutrients and soil organic matter distribution and cycling have been spatially and temporally altered.

Community Phase 4.1: Pinyon and juniper dominate the overstory and site resources. Trees are actively growing with noticeable leader growth. Trace amounts of bunchgrass may be found under tree canopies with trace amounts of Sandberg bluegrass and forbs in the interspaces. Sagebrush is stressed and dying. Annual non-native species are present under tree canopies. Bare ground interspaces are large and connected.

Community Phase Pathway 4.1a, from Phase 4.1 to 4.2: Time and lack of disturbance or management action allows for tree cover and density to further increase and trees to out-compete the herbaceous understory species for sunlight and water.

Community Phase 4.2: Pinyon and juniper dominate overstory. Lahontan/low sagebrush is decadent and dying with numerous skeletons present or sagebrush may be missing from the system. Bunchgrasses present in trace amounts and annual non-native species may dominate understory. Herbaceous species may be located primarily under the canopy or near the drip line of trees. Bare ground interspaces are large and connected. Soil movement may be apparent.

Community Phase Pathway 4.2a, from Phase 4.2 to 4.1: Tree Thinning treatment (typically for fuels management).

R4A Restoration Pathway from State 4 to State 2: Tree removal.

State and transition model

MLRA 26
Group 2
Claypan 10-12"
026XY023NV

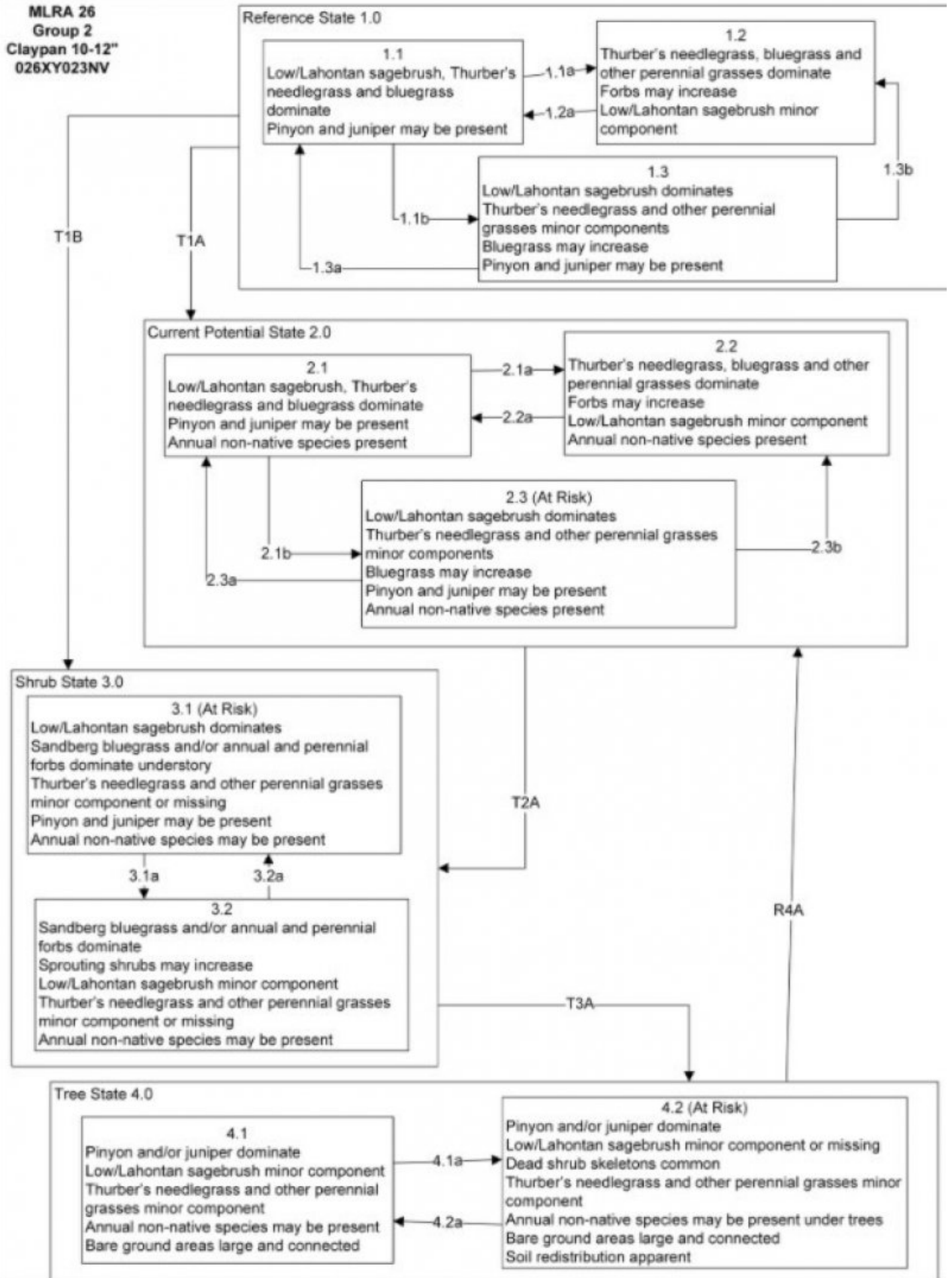


Figure 1. Similar STM

State 1 Reference Plant Community

Community 1.1 Reference Plant Community

The reference plant community is dominated by low sagebrush, Thurber's needlegrass and Webber's needlegrass. Potential vegetative composition is approximately 55% grasses, 10% forbs, and 35% shrubs. Approximate ground cover (basal and crown) is 25 to 35 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	123	247	308
Shrub/Vine	78	157	196
Forb	22	45	56
Total	223	449	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/Grasslikes			179–336	
	Webber needlegrass	ACWE3	<i>Achnatherum webberi</i>	22–67	–
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	34–56	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	22–45	–
2	Secondary Perennial Grasses/Grasslikes			9–359	
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	2–9	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	2–9	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	2–9	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	2–9	–
Forb					
3	Perennial Forbs			22–67	
	rockcress	ARABI2	<i>Arabis</i>	2–13	–
	aster	ASTER	<i>Aster</i>	2–13	–
	balsamroot	BALSA	<i>Balsamorhiza</i>	2–13	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	2–13	–
	matted buckwheat	ERCA8	<i>Eriogonum caespitosum</i>	2–13	–
	woollystar	ERIAS	<i>Eriastrum</i>	2–13	–
	haplopappus	HAPLO11	<i>Haplopappus</i>	2–13	–
	lupine	LUPIN	<i>Lupinus</i>	2–13	–
	phlox	PHLOX	<i>Phlox</i>	2–13	–
Shrub/Vine					
4	Primary Shrubs			112–135	
	little sagebrush	ARAR8	<i>Artemisia arbuscula</i>	112–135	–
5	Secondary Shrubs			22–45	
	yellow rabbitbrush	CHV18	<i>Chrysothamnus viscidiflorus</i>	2–13	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	2–13	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	2–13	–
	pricklyphlox	LEPTO2	<i>Leptodactylon</i>	2–13	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	2–13	–
Tree					
6	Trees			4–27	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	2–13	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	2–13	–

Animal community

Livestock Interpretations:

This site is suited for livestock grazing. Grazing management should focus on perennial grass production. Thurber's needlegrass species begin growth early in the year and remain green throughout a relatively long growing season. This pattern of development enables animals to use Thurber's needlegrass when many other grasses are unavailable. Cattle prefer Thurber's needlegrass in early spring before fruits have developed as it becomes less palatable when mature. Thurber's needlegrasses are grazed in the fall only if the fruits are softened by rain. Prairie Junegrass is also utilized by bighorn sheep, mountain goats, elk, and mule deer in the spring and in fall after curing. Although, due to scattered distribution, prairie Junegrass does not maintain a significant role in the diet of most

wildlife species The short stature and scattered distribution of prairie Junegrass provide minimum coverage for larger birds and mammals. Mountain big sagebrush is eaten by domestic livestock but has long been considered to be of low palatability, and a competitor to more desirable species.

Wildlife Interpretations:

Mountain big sagebrush is highly preferred and nutritious winter forage for mule deer and elk.

Sage-grouse: 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.

Thurber needlegrass is valuable forage for wildlife.

Other products

Native Americans used big sagebrush leaves and branches for medicinal teas, and the leaves as a fumigant. Bark was woven into mats, bags and clothing.

Other information

Prairie Junegrass can recolonize areas that have been subjected to severe water stress. Recolonization by prairie Junegrass provides protective cover to help subsequent post-drought, successional plant species growth.

Type locality

Location 1: Mono County, CA	
Latitude	38° 11' 24"
Longitude	119° 5' 12"
General legal description	Bodie Hills, Approximately 4 miles southwest of Bodie

Other references

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

USDA-NRCS Plants Database (Online; <http://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)	
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Contact for lead author	
Date	05/19/2024
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):**
-

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

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:**
-