

Ecological site R026XY052NV SHALLOW LOAM 16+ 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 than 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

This site occurs on high mountain slopes of mostly northerly aspect. Slopes range from 15 to 50 percent. Elevations are 7800 to over 10000 feet. The soils are very deep to bedrock and well drained. Some soils are modified by high volumes of rock fragments throughout the soil profile. These soils provide a cool, moist environment for plant growth because of the elevations and steep northerly exposures where they occur. The dominant plants are mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), slender buckwheat (*Eriogonum microthecum*), spike fescue (*Festuca kingii*), prairie Junegrass (*Koeleria macrantha*).

Associated sites

R026XY039NV	CLAYPAN 14+ P.Z.
R026XY056NV	SOUTH SLOPE 16+ P.Z.
R026XY028NV	MOUNTAIN RIDGE
R026XY038NV	LOAMY SLOPE 14+ P.Z.

Similar sites

R026XY053NV	LOAMY 16+ P.Z. BRMA4-ACHNA spp. codominant grasses: more productive site
R026XY008NV	GRANITIC FAN 10-12 P.Z. HECO26-ACHY codominant
R026XY005NV	LOAMY 12-14 P.Z. LEKI2 rarely present; more productive site
R026XY046NV	GRANITIC SLOPE 12-14 P.Z. LEKI2 minor spp. if present; granitic parent material
R026XY056NV	SOUTH SLOPE 16+ P.Z. ACLE9-ACOCO codominant grasses with LEKI2; PUTR2 important shrub
R026XY084NV	DEEP LOAMY 14+ P.Z. ACOCO-PONE3 codominant
R026XY038NV	LOAMY SLOPE 14+ P.Z. LEKI2 minor spp. if present
R026XY040NV	GRAVELLY LOAM 14+ P.Z. LEKI2 minor spp. if present
R026XY006NV	GRANITIC LOAM 14+ P.Z. Soils derived from granitic parent materials
R026XY082NV	MOUNTAIN LOAM 16+ P.Z. ACPI2-KOMA codominant grasses with ACLE9

R026XY018NV	GRANITIC SOUTH SLOPE 10-12 P.Z. ACTH7-ACOCO codominant
R026XY089NV	SOUTH SLOPE 12-14 P.Z. Less productive site
R026XY048NV	LOAMY SLOPE 12-14 P.Z. ACTH7-ACOCO codominant; PUTR2 codominant shrub
R026XY076NV	MOUNTAIN SHOULDERS 16+ P.Z. ACLE9 dominant grass; less productive site
R026XY079NV	GRANITIC SOUTH SLOPE 14+ P.Z. ACOCO-ACLE9 codominant

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. vaseyana</i> (2) <i>Eriogonum microthecum</i>
Herbaceous	(1) <i>Festuca kingii</i> (2) <i>Koeleria macrantha</i>

Physiographic features

This site occurs on high mountain slopes of mostly northerly aspect. Slopes range from 15 to 50 percent. Elevations are 7800 to over 10000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope
Elevation	7,800–10,000 ft
Slope	15–50%
Aspect	N

Climatic features

The climate is subhumid with cold, moist winters and cool, dry summers. Average annual precipitation is over 16 inches. Mean annual air temperature is 41 to 43 degrees F. The average growing season is about 70 days. There is no climate station available for this site.

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)	16-0 in
Frost-free period (average)	35 days
Freeze-free period (average)	
Precipitation total (average)	18 in

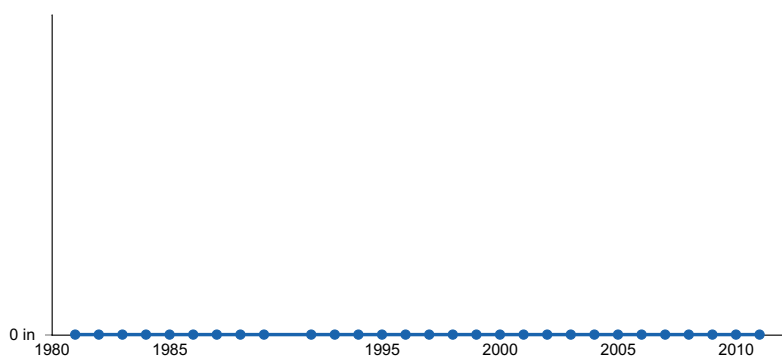


Figure 1. Annual precipitation pattern

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils are very deep to bedrock and well drained. Some soils are modified by high volumes of rock fragments throughout the soil profile. The available water capacity is low to moderate. These soils provide a cool, moist environment for plant growth because of the elevations and steep northerly exposures where they occur. Soil temperatures and evapotranspiration potentials are limited due to reduced insolation. Heavy snow accumulation on this site persists into summer and significantly reduces the potential plant growth period. Snow, slowly melting, adds to the soil moisture supply that is available to plants during the restricted growing season. The soils have mollic epipedons. Runoff is medium to high. The soil series associated with this site include Kiote, a loamy-skeletal, mixed, superactive Vitrandic Argicryolls and Snopoc, a loamy-skeletal, mixed, superactive Pachic Haplocryoll.

Table 4. Representative soil features

Parent material	(1) Colluvium–volcanic rock (2) Residuum–volcanic rock
Surface texture	(1) Gravelly, ashy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to rapid
Soil depth	72–84 in
Surface fragment cover <=3"	20%

Surface fragment cover >3"	0%
Available water capacity (0-40in)	5–5.7 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	52%
Subsurface fragment volume >3" (Depth not specified)	10%

Ecological dynamics

Where management results in abusive livestock use, spike fescue and other more palatable grasses and forbs decrease, as mountain big sagebrush, rabbitbrush and bottlebrush squirreltail increase. Cheatgrass and thistles are species likely to invade this plant community.

Fire Ecology:

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. The rhizomatous, dense growth of spike fescue may lessen the impact of fire on this species. Spike fescue persists following fire via on-site surviving rhizomes, and can colonize an area through off-site seed sources. 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. Sedge is top-killed by fire, with rhizomes protected by insulating soil. The rhizomes of Carex species may be killed by high-severity fires that remove most of the soil organic layer. Reestablishment after fire occurs by seed establishment and/or rhizomatous spread.

State and Transition Model Narrative Group 13

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 13. Sites included in this DRG are: R026XY038NV, R026XY108NV, R026XY075NV, R026XY056NV, R026XY052NV, R026XY112NV, R026XY110NV, R026XF059CA.

Reference State 1.0:

The Reference State 1.0 represents 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, 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:

Mountain big sagebrush and perennial bunchgrasses co-dominate. Western needlegrass is the dominant grass species, however there may be several grass species present. Grass, shrub, and forb diversity is high.

Community Phase Pathway 1.1a, from phase 1.1 to 1.2:

Fire would decrease or eliminate the overstory of sagebrush and allow perennial bunchgrasses and forbs to dominate the site. Fires are small, high-severity, stand replacement fires that typically occur from April through

October. Patchy fires create a sagebrush/grass mosaic. High severity fire significantly reduces sagebrush cover and leads to an early- to mid-seral community, dominated by grasses and forbs.

Community Phase Pathway 1.1b, from phase 1.1 to 1.3:

Time and lack of disturbance such as fire or drought allow for an increase in mountain big sagebrush. Excessive herbivory and/or long-term drought may also reduce perennial understory.

Community Phase 1.2:

This community phase is characteristic of a post-disturbance, early- to mid-seral community. Western needlegrass, bluegrass and other perennial grasses dominate. Sprouting shrubs such as green rabbitbrush (*Chrysothamnus viscidiflorus*), snowberry (*Symphoricarpos oreophilus*), green ephedra (*Ephedra viridis*), spineless horsebrush (*Tetradymia canescens*) may be a significant component. Mountain big sagebrush is a minor component. Forbs may be a significant component.

Community Phase Pathway 1.2a, from phase 1.2 to 1.1:

Time and lack of disturbance allows sagebrush to reestablish.

Community Phase 1.3:

Mountain big sagebrush becomes dominant in the absence of disturbance. Western needlegrass and other perennial grasses are reduced. Bluegrass may increase. Singleleaf pinyon and/or Utah juniper may be present.

Community Phase Pathway 1.3a, from phase 1.3 to 1.1:

Low severity fire kills some sagebrush and results in a patchwork of shrubs and grasses.

Community Phase Pathway 1.3b, from phase 1.3 to 1.2:

High severity fire significantly reduces sagebrush cover, leading to early- to mid-seral community.

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, mustard and Russian thistle (*Salsola* spp.).

Slow variables: Over time, the annual non-native plants will increase within the community decreasing organic matter inputs from deep-rooted perennial bunchgrasses resulting in reductions in soil water availability for perennial bunchgrasses.

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.

T2A: Transition from Reference State 1.0 to Shrub State 3.0:

Trigger: Inappropriately managed, long-term grazing of perennial bunchgrasses during the growing season would favor shrubs and initiate transition to Community Phase 3.1. Fire would cause a transition to Community Phase 3.2.

Slow variables: Long-term decrease in deep-rooted perennial grass density resulting in a decrease in organic matter inputs and subsequent soil water decline.

Threshold: Loss of deep-rooted perennial bunchgrasses changes spatial and temporal nutrient cycling and nutrient redistribution and reduces soil organic matter.

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. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, 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. Additionally, the presence of highly flammable, non-native species reduces State resilience because these species can promote fire where historically fire has been infrequent leading to positive feedbacks that further

the degradation of the system.

Community Phase 2.1:

Mountain big sagebrush and perennial bunchgrasses co-dominate. Western needlegrass is the dominant grass species; however, there may be several grass species present. Grass, shrub, and forb diversity is high. Annual non-native species present.

Community Phase Pathway 2.1a, from phase 2.1 to 2.2:

Fire would decrease or eliminate the overstory of sagebrush and allow perennial bunchgrasses and forbs to dominate the site. Fires would typically be small, high-severity, stand replacing, and patchy due to fine fuel loads. Patchy fires create a sagebrush/grass mosaic. High severity fire significantly reduces sagebrush cover and leads to an early- to mid-seral community, dominated by grasses and forbs.

Community Phase Pathway 2.1b, from phase 2.1 to 2.3:

Time, long-term drought, grazing management that favors shrubs or combinations of these allows the sagebrush overstory to increase and dominate the site, causing a reduction in perennial bunchgrasses.

Community Phase 2.2:

This community phase is characteristic of a post-disturbance, early- to mid-seral community. Western needlegrass, bluegrass and other perennial grasses dominate. Sprouting shrubs such as green rabbitbrush (*Chrysothamnus viscidiflorus*), snowberry (*Symphoricarpos oreophilus*), green ephedra (*Ephedra viridis*), spineless horsebrush (*Tetradymia canescens*) may be a significant component. Mountain big sagebrush is a minor component. Forbs may be a significant component. Annual non-native species are present.

Community Phase Pathway 2.2a, from phase 2.2 to 2.1:

Absence of disturbance over time allows the sagebrush to recover. This may be combined with grazing management that favors shrubs.

Community Phase 2.3:

Mountain big sagebrush increases and the perennial understory is reduced. Squirreltail and bluegrasses may increase. Annual non-native species are present.

Community Phase Pathway 2.3a, from phase 2.3 to 2.1:

Low severity fire kills some sagebrush and results in a patchwork of shrubs and grasses. Other disturbances/practices include brush management with minimal soil disturbance to reduce sagebrush cover.

Community Phase Pathway 2.3b, from phase 2.3 to 2.2

High severity fire significantly reduces sagebrush cover leading to early/mid-seral community.

T2A: Transition from Current Potential State 2.0 to Shrub State 3.0:

Trigger: Inappropriately managed, long-term grazing of perennial bunchgrasses during the growing season would favor shrubs and initiate transition to Community Phase 3.1. Fire would cause a transition to Community Phase 3.2.

Slow variables: Long-term decrease in deep-rooted perennial grass density resulting in a decrease in organic matter inputs and subsequent soil water decline.

Threshold: Loss of deep-rooted perennial bunchgrasses changes spatial and temporal nutrient cycling and nutrient redistribution, and reduces soil organic matter.

Shrub State 3.0:

This state has two community phases: a mountain big sagebrush dominated phase and a rabbitbrush dominated phase. This state is a product of many years of heavy grazing during time periods harmful to perennial bunchgrasses. Squirreltail and bluegrasses will 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 canopy cover is high and sagebrush may be decadent, reflecting stand maturity and lack of seedling establishment due to competition with mature plants. The shrub overstory and shallow-rooted 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:

Mountain big sagebrush dominates the overstory. Western needlegrass and other deep-rooted perennial grasses are reduced or missing. Bluegrasses may dominate the understory. Bare ground may be significant. Annual non-native species are present.

Community Phase Pathway 3.1a, from phase 3.1 to 3.2:

Fire reduces or eliminates the overstory of sagebrush.

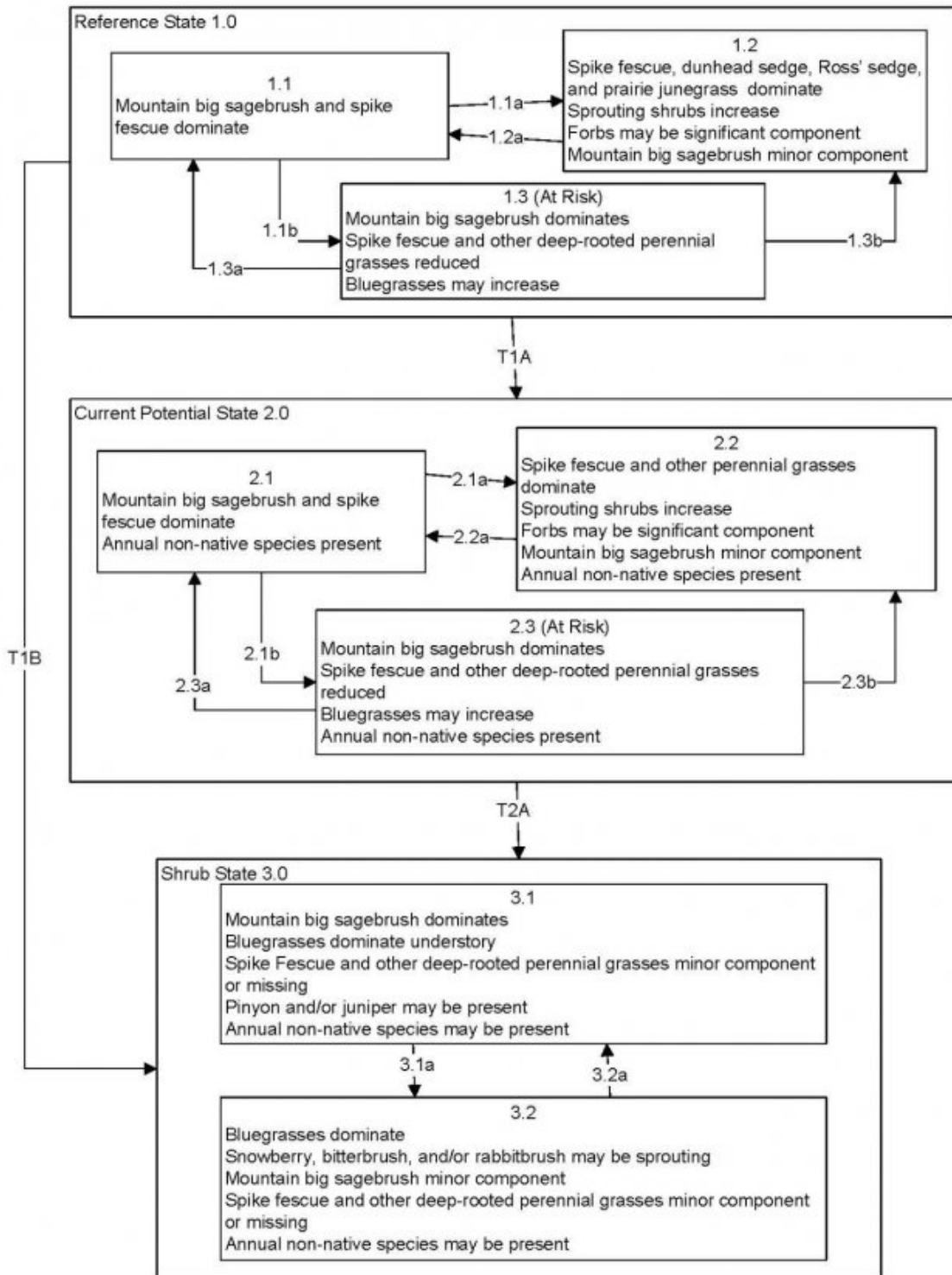
Community Phase 3.2:

Bluegrasses dominate the site. Rabbitbrush, bitterbrush, horsebrush, ephedra, and/or snowberry may be sprouting. Mountain big sagebrush is a minor component. Annual non-native species increasing and may be co-dominant in the understory.

Community Phase Pathway 3.2a, from phase 3.2 to 3.1:

Absence of disturbance over time allows sagebrush and other shrubs to recover.

State and transition model



MLRA 26
Group 13
Shallow Loam 16+”
026XY052NV
KEY

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 or drought. 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 creates 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.

Transition T2B: Inappropriate grazing management (from 1.3 to 3.1).

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.

2.3b: High severity fire significantly reduces sagebrush cover leading to early/mid-seral community.

Transition T2A: Inappropriate grazing management (to 3.1), or high severity fire (from 2.3 to 3.2).

Shrub State 3.0 Community Phase Pathways

3.1a: Fire.

3.2a: Time and lack of disturbance.

State 1
Reference Plant Community

Community 1.1

Reference Plant Community

The reference plant community is dominated by spike-fescue, dunhead and Ross' sedges, prairie junegrass, mountain big sagebrush and slenderbush eriogonum. Potential vegetative composition is about 55% grasses, 10% forbs and 35% shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	220	385	495
Shrub/Vine	140	245	315
Forb	40	70	90
Total	400	700	900

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses			199–553	
	spike fescue	LEK12	<i>Leucopoa kingii</i>	105–245	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	35–105	–
	dunhead sedge	CAPH2	<i>Carex phaeocephala</i>	18–53	–
	Ross' sedge	CARO5	<i>Carex rossii</i>	17–52	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	7–28	–
	western needlegrass	ACOCO	<i>Achnatherum occidentale</i> ssp. <i>occidentale</i>	7–28	–
	Cusick's bluegrass	POCUE2	<i>Poa cusickii</i> ssp. <i>epilis</i>	4–14	–
	muttongrass	POFE	<i>Poa fendleriana</i>	3–14	–
	Ewan's cinquefoil	POGLE	<i>Potentilla glandulosa</i> ssp. <i>ewanii</i>	4–14	–
2	Secondary Perennial Grasses			14–56	
	mountain brome	BRMA4	<i>Bromus marginatus</i>	4–21	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	4–21	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	4–21	–
Forb					
3	Perennial			35–105	
	dunhead sedge	CAPH2	<i>Carex phaeocephala</i>	18–28	–
	Ross' sedge	CARO5	<i>Carex rossii</i>	17–28	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	4–14	–
	lupine	LUPIN	<i>Lupinus</i>	4–14	–
	ragwort	SENEC	<i>Senecio</i>	4–14	–
Shrub/Vine					
4	Primary Shrubs			140–280	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	105–175	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	35–105	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	4–21	–
5	Secondary Shrubs			14–56	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	7–14	–
	snowberry	SYMPH	<i>Symphoricarpos</i>	7–14	–

Animal community

Livestock Interpretations:

This site is suited to livestock grazing. Grazing management should be keyed to spike fescue, sedge, and prairie junegrass. 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.

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:

Mountain big sagebrush is highly preferred and nutritious winter forage for mule deer and elk. Spike fescue, sedge, and prairie junegrass are important forage species for several wildlife species.

Hydrological functions

Run off is low to high. Permeability is moderate to moderately rapid.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition. This site offers rewarding opportunities to photographers and for nature study. This site is used for camping and hiking and has potential for upland and big game hunting.

Other products

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

Type locality

Location 1: Mineral County, NV	
Township/Range/Section	T7N R28E S12
General legal description	Section 12, T7N. R28E. MDBM. Hawthorne Army Depot near Mount Grant, Wassuk Range, Mineral County, Nevada. This site also occurs in Lyon County.

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)	P NOVAK-ECHENIQUE
Contact for lead author	State Rangeland Management Specialist
Date	07/12/2012
Approved by	Kendra Moseley
Approval date	

Indicators

1. **Number and extent of rills:** Rills are typically non-existent. A few may be expected on steeper slopes in areas recently subjected to summer convection storms.

2. **Presence of water flow patterns:** Waterflow patterns are none to rare. A few may be expected on steeper slopes in areas recently subjected to summer convection storms.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are none to rare. Occurrence is usually limited to areas of waterflow patterns. Small terracettes may occur on steeper slopes.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 10-25%.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) mostly stays in place. It may be expected to move 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.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is typically weak, fine and medium subangular blocky. Soil surface colors are grayish browns and soils are typified by a mollic epipedon. Organic matter of the surface 2 to 4 inches is typically 1 to 3 percent. Organic matter content can be more or less depending on micro-topography.

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. western needlegrass & basin wildrye]) slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

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. Subsoil argillic horizons are not to be interpreted as compaction.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: Tall shrubs (mountain big sagebrush) >> Deep-rooted, cool season, perennial bunchgrasses
- Sub-dominant: associated shrubs >cool season, perennial rhizomatous grass-like plants = deep-rooted, cool season, perennial forbs > shallow-rooted, cool season, perennial grasses > fibrous, shallow-rooted, cool season, perennial and annual forbs
- Other:
- Additional:
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs may be common with standing dead shrub canopy material as much as 20% of total woody canopy; some of the mature bunchgrasses (<10%) have dead centers.
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14. **Average percent litter cover (%) and depth (in):** Reference Plant Community: Under cover and between plant interspaces (35-50%) and litter depth is $\pm \frac{1}{4}$ inch.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (through mid-June) ± 700 lbs/ac; Favorable years ± 900 lbs/ac, Unfavorable years ± 700 lbs/ac
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Potential invaders include cheatgrass and annual mustards
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years
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