USDA Natural Resources
Conservation Service

Ecological site R025XY044ID
VERY SHALLOW STONY LOAM 10-14

Last updated: 4/25/2024
Accessed: 04/26/2024

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): 025X–Owyhee High Plateau

The Owyhee High Plateau, MLRA 25, lies within the Intermontane Plateaus physiographic province. The southern half is found in the Great Basin while the northern half is located in the Columbia Plateaus. The southern section of the Owyhee High Plateau is characterized by isolated, uplifted fault-block mountain ranges separated by narrow, aggraded desert plains. This geologically older terrain has been dissected by numerous streams draining to the Humboldt River. The northern section forms the southern boundary of the extensive Columbia Plateau basalt flows. Deep, narrow canyons drain to the Snake River across the broad volcanic plain.

This MLRA is characteristically cooler and wetter than the neighboring MLRAs of the Great Basin. Elevation ranges from 3,000 to 7,550 feet on rolling plateaus and in gently sloping basins. It is more than 9,840 feet on some steep mountains. The average annual precipitation in most of this area is typically 11 to 22 inches. It increases to as much as 49 inches at the higher elevations. Precipitation occurs mainly as snow in winter. The supply of water from precipitation and streamflow is small and unreliable, except along major rivers. Streamflow depends largely on accumulated snow in the mountains.

The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic or frigid temperature regime and an aridic, arid bordering on xeric, or xeric moisture regime. Most of the soils formed in mixed parent material. Volcanic ash and loess mantle the landscape. Surface soil textures are loam and silt loam, and have ashy texture modifiers in some cases. Argillic horizons occur on the more stable landforms.

Ecological site concept

This ecological site is on convex ridges of hills and mountains or plateau summits. Slopes are less than 25 percent. Elevations typically range from 4,500 to 6,000 feet (1,372 to 1,829 meters).
The soils at this site formed in residuum and colluvium derived from volcanic parent material. The soil profile is well drained and characterized by greater than 35 percent rock fragments by volume and very low available water holding capacity.
Important abiotic factors contributing to this site include shallow soils less than 7.9 inches (20cm) deep, less than 35 percent clay throughout the soil profile and 60 percent or greater surface cover of rock fragments.
The reference plant community is dominated by low sagebrush and shallow-rooted perennial bunchgrass.

Associated sites

R025XY010ID	**CLAYPAN 12-16**
R025XY011ID	**LOAMY 13-16**
R025XY039ID	**DRY MEADOW**
R025XY028ID	**LOAMY BOTTOM 12-16**

Similar sites

R025XY040ID	**VERY SHALLOW STONY 8-12**
R025XY016ID	**SHALLOW CALCAREOUS LOAM 10-16**
R025XY014ID	**CLAYEY 12-16**
R025XY048ID	**SHALLOW CLAYPAN 11-13**
R025XY042ID	**MOUNTAIN RIDGE 14-18**
R025XY051NV	**ERODED CLAYPAN 12-16 P.Z.**

Table 1. Dominant plant species

Tree	(1) *Juniperus grandis*
Shrub	(1) *Artemisia arbuscula*
Herbaceous	(1) *Poa secunda* (2) *Pseudoroegneria spicata subsp. spicata*

Physiographic features

This ecological site is on convex hills of mountains and plateaus. Slopes range from 3 to 30 percent but are typically less than 25 percent. Elevations range from 4,500 to 6,000 feet (1,372 to 1,829 meters) This site has high runoff potential.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Hillside or mountainside (2) Lava plateau > Plateau
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	4,500–6,000 ft
Slope	3–25%
Water table depth	100 in
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is defined by hot dry summers and cold snowy winters.

Mean annual precipitation is typically 13 inches per year. Effective precipitation is between 10 to 14 inches (25 to 36 cm). Averages snowfall is around 35 inches (89 cm) per year. Air temperatures average 26 degrees F in January (coldest) and 66 degrees F in July (warmest).

*The above and below data is averaged from the MTN CITY RS, JACKPOT, NASIS and the Western Regional Climate Center.

Table 3. Representative climatic features

Frost-free period (characteristic range)	50-90 days
Freeze-free period (characteristic range)	60-100 days
Precipitation total (characteristic range)	10-15 in
Frost-free period (actual range)	50-90 days

Freeze-free period (actual range)	60-100 days
Precipitation total (actual range)	7-17 in
Frost-free period (average)	60 days
Freeze-free period (average)	70 days
Precipitation total (average)	13 in

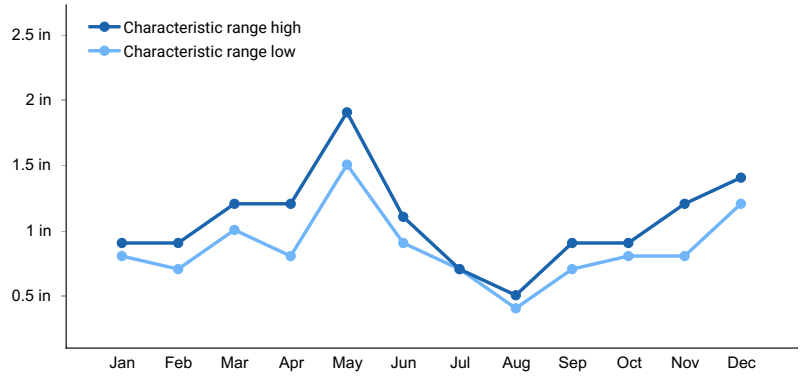


Figure 1. Monthly precipitation range

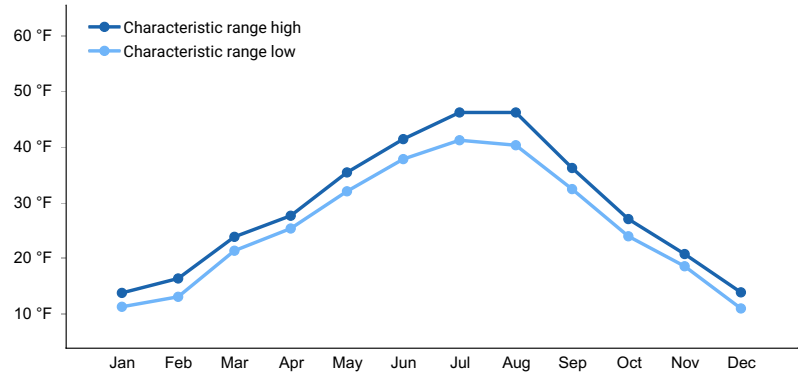


Figure 2. Monthly minimum temperature range

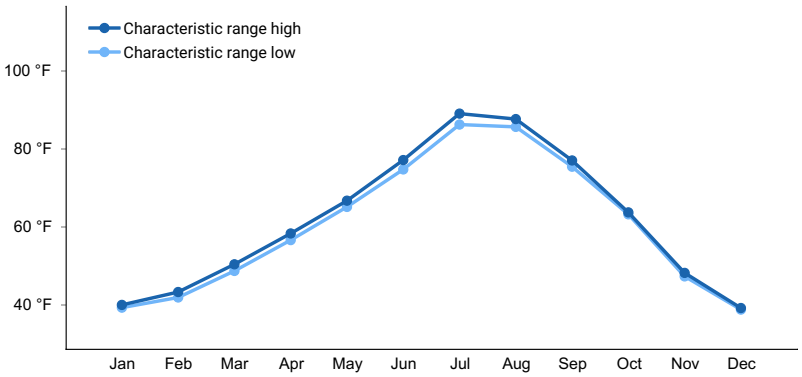


Figure 3. Monthly maximum temperature range

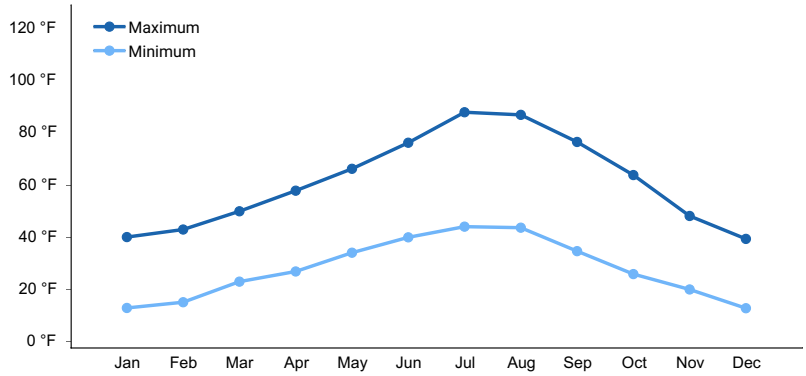


Figure 4. Monthly average minimum and maximum temperature

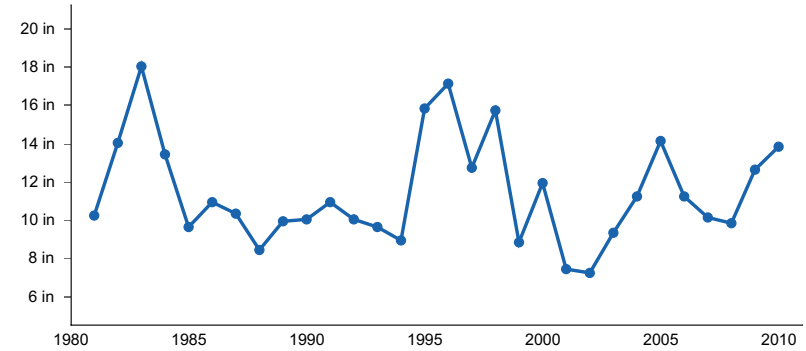


Figure 5. Annual precipitation pattern

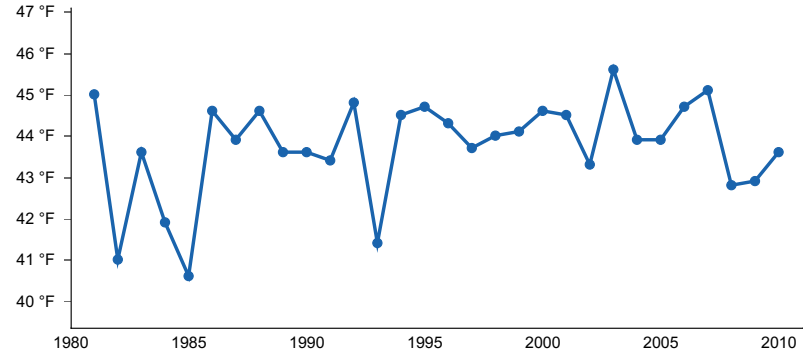


Figure 6. Annual average temperature pattern

Climate stations used

- (1) CONTACT [USC00261905], Jackpot, NV
- (2) MTN CITY RS [USC00265392], Mountain City, NV

Influencing water features

Influencing water features are not associated with this ecological site.

Wetland description

N/A

Soil features

The soils associated with this site are less than 20 inches (50 cm) deep to hard bedrock, well drained, and formed in residuum and colluvium from rhyolite, basalt, or tuff. Surface texture is a loam or coarse sandy loam along with the gravelly, stony or cobbly counterparts. The soil profile is characterized by a light-colored surface horizon (ochric epipedon), a horizon of clay accumulation (argillic), and greater than 35 percent rock fragments by volume. These

soils have low available water holding capacity.

Soil components associated with this ecological site include Nipntuck, Bregar and Loomis soil series.

Table 4. Representative soil features

Parent material	(1) Colluvium–rhyolite (2) Residuum–basalt (3) Residuum–basalt (4) Residuum–rhyolite
Surface texture	(1) Extremely cobbly, very cobbly, stony loam (2) Very gravelly coarse sandy loam
Drainage class	Well drained to somewhat excessively drained
Permeability class	Slow to moderate
Depth to restrictive layer	4–20 in
Soil depth	4–20 in
Surface fragment cover <=3"	23–50%
Surface fragment cover >3"	7–21%
Available water capacity (0-40in)	0.4–1.1 in
Soil reaction (1:1 water) (0-40in)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	30–45%
Subsurface fragment volume >3" (Depth not specified)	20–25%

Ecological dynamics

The Reference Plant Community is dominated by Sandberg bluegrass and little sagebrush. Subdominant species include bluebunch wheatgrass, Nevada bluegrass, bottlebrush squirreltail and hooker’s balsamroot. Total annual production is 200 lbs/acre in a normal year, 300 lbs/acre in a favorable year, and 125 lbs/acre in a unfavorable year. Structurally, cool season shallow rooted bunchgrasses are dominant, followed by medium height shrubs and perennial forbs. When bluebunch wheatgrass and Idaho fescue occur on the site, they typically grow in areas with deeper soils and more favorable moisture conditions. The dominant visual aspect of this site is mixed grasses and low sagebrush. Composition by weight is approximately 65-75% grasses, 10-15% forbs and 15-20% shrubs.

Herbivory has historically occurred on the site at low levels of utilization. Native herbivores include pronghorn antelope, mule deer, sage grouse, lagomorphs and rodents. Livestock grazing has become prevalent across this site. Overutilization of resources due to grazing (from livestock, wildlife, and feral horses) can degrade the site and decrease forage availability and quality. This will lead to a decrease in perennial bunch grasses and an increase of invasive species (Williamson, 2020). Annual and perennial invasive species compete with desirable plants for moisture and nutrients.

Wildfire frequency across this site has historically been low. Sagebrush evolved with low intensity wildfire that left a mosaic of burned and unburned patches (Baker, 2006). Annual species such as cheatgrass and medusahead can be troublesome invaders on this site after wildfire, preventing perennial grass and shrub re-establishment. Invasive, annual plant communities increase wildfire frequency and intensity (Haubensak, 2009). This could cause the dominate shrub population to shift away from little sagebrush to a shrub population with quicker establishment.

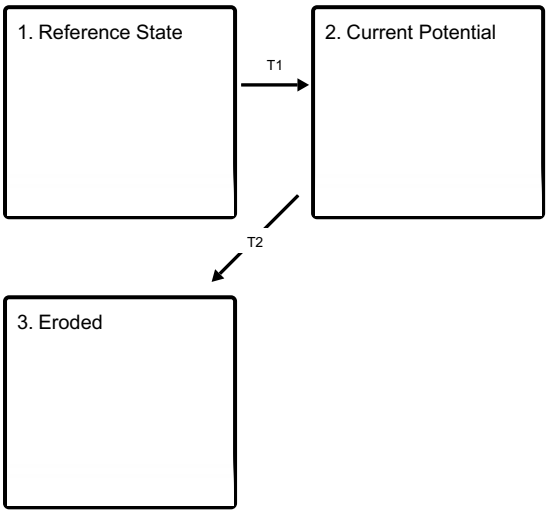
Periodic drought regularly influences sagebrush ecosystems and drought duration and severity has increased throughout the 20th century in much of the Intermountain West. Major shifts away from historical precipitation patterns have the greatest potential to alter ecosystem function and productivity. Species composition and productivity can be altered by the timing of precipitation and water availability with the soil profile (Bates, 2006). Low

sagebrush is fairly drought tolerant but also tolerates periodic wetness during a portion of the growing season. Low sagebrush is also susceptible to Aroga moth, which can partially or entirely kill individual plants or entire stands of big sagebrush (Furniss and Barr 1975), though the research is inconclusive of the damage sustained by low sagebrush populations.

High annual precipitation will increase the total plant production. Higher wildfire frequency following annual plant production can be expected due to a larger fuel load (Pilliod, 2017). Extended periods of drought significantly impact this site because of the low available water holding capacity and shallow soil. Extended drought reduces the vigor of perennial grasses and shrubs while extreme drought may cause plant mortality. Infiltration can be maintained with a mixed stand of bunchgrasses and shrubs. Runoff potential following large precipitation events is rapid with a moderate erosion risk. Decreased infiltration, increased runoff, and increased erosion occur when sagebrush is removed by frequent wildfires (Williams, 2018).

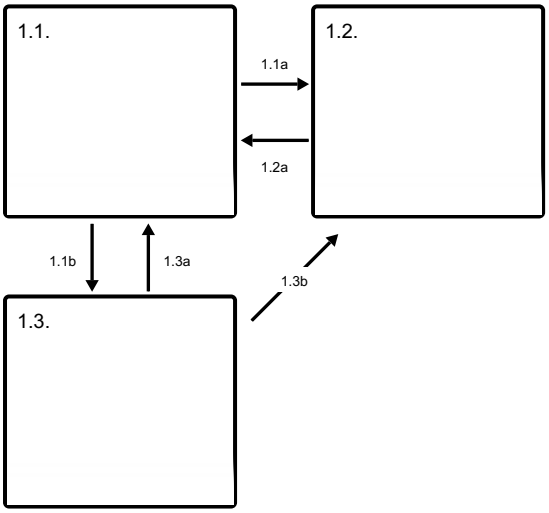
State and transition model

Ecosystem states

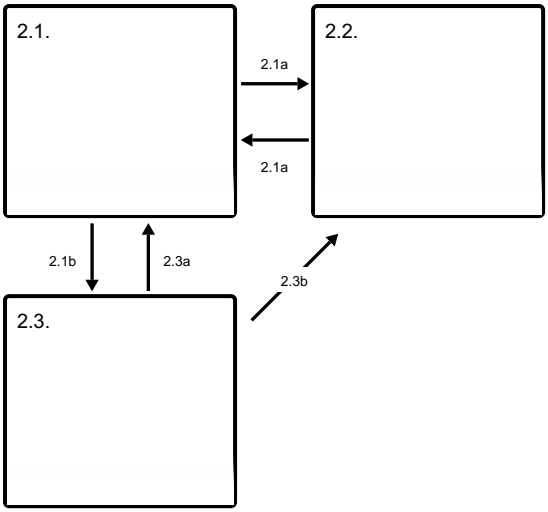


T1 - Introduction of annual non-native species.

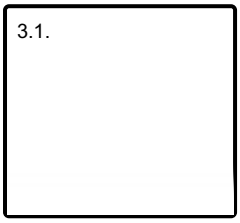
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Reference State

The Reference State is a representative of the natural range of variability under pristine conditions. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. 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.

Dominant plant species

- little sagebrush (*Artemisia arbuscula ssp. arbuscula*), shrub
- Sandberg bluegrass (*Poa secunda*), grass
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass
- Idaho fescue (*Festuca idahoensis*), grass

Community 1.1

The Reference State 1.0 is a representative of the natural range of variability under pristine conditions. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These include the presence of all structural and functional groups, low fine fuel loads, and retention of organic matter and nutrients. Plant community phase changes are primarily driven by fire, periodic drought and/or insect or disease attack. The dominant visual aspect of this site is mixed grass and low sagebrush. Composition by weight is approximately 65-75% grasses, 10-15% forbs and 15-20% shrubs.

Dominant plant species

- little sagebrush (*Artemisia arbuscula*), shrub
- Sandberg bluegrass (*Poa secunda*), grass
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	90	150	220
Shrub/Vine	25	30	50
Forb	10	20	30
Total	**125**	**200**	**300**

Community 1.2

This community phase is characterized by a post-disturbance, early seral, plant community. Sagebrush and other shrubs are reduced, or patchy. Perennial bunchgrasses and forbs dominate the visual aspect of the plant community. Non-natives are stable to increasing. Disturbance tolerant shrubs such as rabbitbrush and antelope bitterbrush will sprout from the root-crown following low and medium intensity wildfire and may begin to dominate the plant community 2 to 5 years post-disturbance.

Resilience management. 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. Sandberg bluegrass has been found to increase following fire, likely due to its low stature and productivity (Daubenmire 1975) and may retard reestablishment of deeper rooted bunchgrasses.

Community 1.3

Sagebrush increases or remains stable in the absence of disturbance. Decadent sagebrush dominates the overstory, perennial bunchgrasses and forbs are reduced. Perennial bunchgrasses and forbs are reduced in both vigor and productivity due to competition for light, moisture and nutrient resources.

Resilience management. Cover and vigor of native species is reduced and bare ground is increasing. This site is at significant risk of accelerated soil erosion and crossing an ecological threshold.

Pathway 1.1a
Community 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.

Context dependence. Prior to 1897, mean fire return intervals for low sagebrush communities have been estimated to be from 35 to over 100 years. Fire most often occurs during wet years with high forage production. Fire return intervals have recently been estimated at 100-200 years in black sagebrush-dominated sites (Kitchen and McArthur 2007) and likely is similar in the low sagebrush ecosystem. Historically, however, fires were probably patchy due to the low productivity of these sites.

Pathway 1.1b
Community 1.1 to 1.3

Time, absence of disturbance and natural regeneration over time allows sagebrush to dominate site resources. This community phase pathway may be coupled with drought and/or herbivory further reducing herbaceous understory.

Pathway 1.2a
Community 1.2 to 1.1

Time, absence of disturbance and natural regeneration over time allows sagebrush to recover. Recovery of sagebrush depends on the availability of a local seed source (patches of mature shrubs) as well as precipitation patterns favorable for germination and seedling recruitment. Sagebrush seedlings are susceptible to less than favorable conditions for several years. Completion of this community phase pathways may take decades.

Context dependence. Low sagebrush is killed by fire and does not sprout (Tisdale and Hironaka 1984). Establishment after fire is from seed, generally blown in and not from the seed bank (Bradley et al. 1992). Fire risk is greatest following a wet, productive year when there is greater production of fine fuels (Beardall and Sylvester 1976). Recovery time of low sagebrush following fire is variable (Young 1983). After fire, if regeneration conditions are favorable, low sagebrush recovers in 2 to 5 years; on harsh sites where cover is low to begin with and/or erosion occurs after fire, recovery may require more than 10 years (Young 1983). Slow regeneration may subsequently worsen erosion (Blaisdell et al. 1982).

Pathway 1.3a
Community 1.3 to 1.1

Low intensity, patchy wildfire or insect infestation would reduce sagebrush overstory creating a mosaic on the landscape. Perennial bunchgrasses and forbs dominate disturbed patches due to an increase in light, moisture and nutrient resources.

Context dependence. Prior to 1897, mean fire return intervals for low sagebrush communities have been estimated to be from 35 to over 100 years. Fire most often occurs during wet years with high forage production. Fire return intervals have recently been estimated at 100-200 years in black sagebrush-dominated sites (Kitchen and McArthur 2007) and likely is similar in the low sagebrush ecosystem.

Pathway 1.3b
Community 1.3 to 1.2

Wide spread wildfire removes sagebrush and allows perennial bunchgrasses and forbs to dominate.

State 2
Current Potential

This state may appear to be similar to the Reference State 1.0, however the resiliency of the state has been reduced by the presence of invasive weeds. These non-natives can be highly flammable, and can promote fire where historically fire had been infrequent. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These 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.

Resilience management. Management would be to maintain high diversity of desired species to promote organic matter inputs and prevent the dispersal and seed production of the non-native invasive species.

Dominant plant species

- little sagebrush (*Artemisia arbuscula*), shrub
- cheatgrass (*Bromus tectorum*), grass
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass
- Sandberg bluegrass (*Poa secunda*), grass

Community 2.1

This community phase is dominated by low sagebrush and Sandberg bluegrass. Bluebunch wheatgrass and other deep-rooted perennial bunchgrasses and forb are present Non-native species are present and stable within the plant community.

Resilience management. The presence of non-native annuals has reduced site resilience. Management actions should focus on maintaining the presence of all functional and structural groups and minimizing wildfire and soil disturbing practices.

Community 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 2.3

This community phase is characterized by decadent sagebrush, reduced herbaceous perennials and increasing bare ground. Annual non-natives species are stable or increasing Perennial bunchgrasses and forbs are reduced in both vigor and productivity due to competition for light, moisture and nutrient resources. This community phase is dominated by low sagebrush, Sandberg bluegrass, cheatgrass, and medusahead. Juniper may also be increasing in cover and number of individual trees. Additional field work is need to determine the extent of juniper on this ecological site and if correlation to a more appropriate site is warranted.

Resilience management. Cover and vigor of native species is reduced and bare ground is increasing. This site is at significant risk of accelerated soil erosion and crossing an ecological threshold.

Pathway 2.1a
Community 2.1 to 2.2

Fire reduces the shrub overstory and allows for perennial bunchgrasses to dominate the site. Fire may be patchy resulting in a mosaic pattern with patches of mature sagebrush remaining. Annual non-native species are likely to increase after fire.

Pathway 2.1b
Community 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 further reduces bunchgrass understory. Non-native annuals are stable to increasing.

Pathway 2.1a
Community 2.2 to 2.1

Time, lack of disturbance and natural regeneration of sagebrush. The establishment of little sagebrush depends on presence of seed source and favorable weather patterns. It may take decades for sagebrush to recover to pre-disturbance levels.

Context dependence. Low sagebrush is killed by fire and does not sprout (Tisdale and Hironaka 1984). Establishment after fire is from seed, generally blown in and not from the seed bank (Bradley et al. 1992). Fire risk is greatest following a wet, productive year when there is greater production of fine fuels (Beardall and Sylvester 1976). Recovery time of low sagebrush following fire is variable (Young 1983). After fire, if regeneration conditions are favorable, low sagebrush recovers in 2 to 5 years; on harsh sites where cover is low to begin with and/or erosion occurs after fire, recovery may require more than 10 years (Young 1983). Slow regeneration may subsequently worsen erosion (Blaisdell et al. 1982).

Pathway 2.3a
Community 2.3 to 2.1

Low intensity wildfire, insect infestation, or brush management with minimal soil disturbance reduces sagebrush overstory and releases herbaceous understory.

Pathway 2.3b
Community 2.3 to 2.2

Fire reduces or eliminates the overstory of sagebrush and allows for the understory perennial grasses and forbs to

increase. Annual non-native species respond well to fire and may increase post-burn.

Context dependence. Low sagebrush is killed by fire and does not sprout (Tisdale and Hironaka 1984). 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. Sandberg bluegrass has been found to increase following fire, likely due to its low stature and productivity (Daubenmire 1975) and may retard reestablishment of deeper rooted bunchgrasses.

State 3
Eroded

This is state is characterized by increased bare ground and active soil erosion. Patches of native shrubs and perennial grasses may be present, but bare ground is significant. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid

Community 3.1

This community phase is characterized by an increase in soil redistribution or loss of the A horizon. Low sagebrush and/or rabbitbrush dominate the overstory. Sandberg bluegrass, cheatgrass and medusahead are present in the understory. Infiltration is reduced and runoff is increasing. Juniper may be increasing, if seed source is present. Bare ground is significant, plants are pedestalled. Dead sagebrush skeletons may be prominent. Regeneration of sagebrush and herbaceous species is not evident.

Resilience management. It is economically impractical to return this plant community to previous ecological state. Best management practices includes maintaining appropriate cover and production of native shrubs and bunchgrasses.

Transition T1
State 1 to 2

Trigger: Introduction of annual non-native species Slow variable: Over time the annual non-native plants 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.

Transition T2
State 2 to 3

Trigger: Severe and repeated wildfire will remove sagebrush overstory and decrease herbaceous perennials Annual non-native species will increase. Inappropriate grazing management causing a removal of perennial bunchgrasses and a disruption of the soil surface would increase soil erosion. Soil disturbing treatments such as a chaining or other mechanical tree removal treatment. Slow variables: Long term decrease in shrub and perennial grass density. Bare ground interspaces are large and connected; water flow paths long and continuous, understory is sparse, pedestalling of plants significant. Threshold: Loss of shrubs and perennial bunchgrasses reduces soil stability and changes nutrient cycling, nutrient redistribution, and reduces soil organic matter. Soil redistribution and erosion is significant and linked to vegetation mortality evidenced by pedestalling and burying of herbaceous species and / or lack of recruitment in the interspaces.

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				90–220	
	Sandberg bluegrass	POSE	*Poa secunda*	75–190	–
	squirreltail	ELEL5	*Elymus elymoides*	5–10	–
	Idaho fescue	FEID	*Festuca idahoensis*	5–10	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	5–10	–
Forb					
2				10–30	
	wallflower phoenicaulis	PHCH	*Phoenicaulis cheiranthoides*	0–2	–
	Hooker's balsamroot	BAHO	*Balsamorhiza hookeri*	1–2	–
	Indian paintbrush	CASTI2	*Castilleja*	0–2	–
	spiny phlox	PHHO	*Phlox hoodii*	1–2	–
	stemless mock goldenweed	STAC	*Stenotus acaulis*	1–2	–
	milkvetch	ASTRA	*Astragalus*	0–2	–
	pussytoes	ANTEN	*Antennaria*	1–2	–
	tufted fleabane	ERCA2	*Erigeron caespitosus*	0–2	–
	agoseris	AGOSE	*Agoseris*	0–2	–
	lomatogonium	LOMAT2	*Lomatogonium*	1–2	–
	onion	ALLIU	*Allium*	1–2	–
	maiden blue eyed Mary	COPA3	*Collinsia parviflora*	1–2	–
	little larkspur	DEBI	*Delphinium bicolor*	1–2	–
	snow buckwheat	ERNI2	*Eriogonum niveum*	1–2	–
	rockcress	ARABI	*Arabidopsis*	0–1	–
	bitter root	LERE7	*Lewisia rediviva*	0–1	–
Shrub/Vine					
3				25–50	
	little sagebrush	ARAR8	*Artemisia arbuscula*	15–30	–
	Owyhee sage	ARPA16	*Artemisia papposa*	6–12	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	2–4	–
	yellow rabbitbrush	CHVIV4	*Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus*	2–4	–

Animal community

This site provides good habitat for various upland wildlife species. Mule deer, pronghorn antelope, feral horses and sage grouse are the most common large species.

Livestock grazing should occur in late spring and early fall. Natural water supplies are limited. Initial stocking rates should be determined with the landowner or decision-maker by utilizing forage analysis yearly in their specific allotment.

Hydrological functions

The soils on this site are in hydrologic group D and have high run-off potential.

Recreational uses

Hunting, horseback riding, recreational vehicle usage and hiking are all occur on this site.

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data.
Old SS Manuscripts, Range Site Descriptions, etc.
Also, field knowledge of range-trained personnel was used.

Those involved in developing this site description include:
Dave Franzen, co-owner, Intermountain Rangeland Consultants, LLC
Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC
Jim Cornwell, State Rangeland Management Specialist, NRCS, Idaho (retired)
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Type locality

Location 1: Humboldt County, NV

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Contributors

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Approval

Kendra Moseley, 4/25/2024

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.

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Date	08/07/2007
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills rarely occur on this site due to the gravelly and stony surface. If they do occur, it will normally be on slopes greater than 10%.

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2. **Presence of water flow patterns:** Water-flow patterns are normally not present on this site. When they do occur, they are short and disrupted by cool-season grasses, shrubs and surface stones. They are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or terracettes can occur on the site. They are most likely to occur where water flow patterns are present and surface stones are absent.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground ranges from 20-30 percent but more data is needed.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind-scoured, blowouts, and/or deposition areas do not occur.

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter moves by wind or water. Fine litter can move up to 2 feet after a strong summertime convection storm. Due to the flat slopes, large litter does not move.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Values should range from 4-6 but need to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface horizon is typically 2 to 4 inches thick. Structure typically includes moderate medium and thick platy, weak fine granular, and weak fine and medium subangular blocky. Soil organic matter (SOM) ranges from 1 to 2 percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses, especially deep-rooted perennials, slow runoff and increase infiltration. Shrubs accumulate some snow in the interspaces.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compaction layer is not present except under roads, livestock and ATV trails.

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: Cool season, shallow-rooted perennial bunchgrasses>> medium shrubs.

    Sub-dominant: Perennial forbs=deep-rooted bunchgrasses.

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little mortality or decadence is expected on this site. Mortality of shallow-rooted grasses may occur due to extended periods of drought.

14. **Average percent litter cover (%) and depth (in):** Additional data is needed but is expected to be low and at a shallow depth.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual Production is 200 pounds per acre (336 Kg/ha)in a year with normal precipitation and temperatures. Perennial grasses produce 65-75 percent of the total production, forbs 10-15 percent and shrubs 15-20 percent.

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:** Invasive Plants include cheatgrass, medusahead, Vulpia species, bulbous bluegrass and annual mustards.

17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in favorable years.