USDA Natural Resources Conservation Service

Ecological site R025XY010ID
CLAYPAN 12-16

Last updated: 4/24/2024
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): 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.

Classification relationships

Artemisia arbuscula/ Festuca idahoensis ht. in “ Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho". University of Idaho. Moscow, Idaho. Bulletin Number 35.

Ecological site concept

This ecological site is found on summits and side-slopes of lava plateaus on slopes less than 30 percent. Soils associated with this site are shallow, well drained, and formed in residuum and colluvium derived from volcanic rock. These soil have greater that 35 percent rock fragments by volume distributed throughout the profile, a horizon of clay accumulation (argillic horizon) within 4 inches (11cm) of the soil surface, and a hard volcanic bedrock at 27 inches (68 cm).
Important abiotic factors contributing to the presence of this ecological site include an abrupt boundary to argillic horizon in the upper soil profile that results in wet non-satiated conditions in the spring and early summer and shallow rooting depth. This ecological site is dominated by low sagebrush and bluebunch wheatgrass.

Associated sites

R025XY011ID	**LOAMY 13-16**
R025XY017ID	**SHALLOW BREAKS 14-18**
R025XY028ID	**LOAMY BOTTOM 12-16**
R025XY036ID	**SOUTH SLOPE LOAMY 12-16**
R025XY048ID	**SHALLOW CLAYPAN 11-13**
R025XY019ID	**LOAMY 10-13**
R025XY044ID	**VERY SHALLOW STONY LOAM 10-14**
R025XY048ID	**SHALLOW CLAYPAN 11-13**
R025XY043ID	**LOAMY 11-13**

Similar sites

R025XY014ID	**CLAYEY 12-16** early sage dominant shrub
R025XY017NV	**CLAYPAN 12-16 P.Z.** occurs on mountains and high elevation plateaus
R025XY048ID	**SHALLOW CLAYPAN 11-13** soils characterized by a horizon strongly cemented or indurated with silica and calcium carbonate (duripan)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia arbuscula*
Herbaceous	(1) *Festuca idahoensis* (2) *Pseudoroegneria spicata*

Physiographic features

This ecological site occurs on summits and side slopes of lava plateaus. Slopes are less than 30 percent and runoff ranges from low to medium.

Table 2. Representative physiographic features

Landforms	(1) Lava plateau > Hillslope (2) Lava plateau > Plateau
Runoff class	Low to medium
Elevation	1,524–2,134 m
Slope	2–30%
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. There are an average of 38 frost free-days and 81 day freeze-free days. Mean annual precipitation is 15 inches (38cm), with the highest rainfall occurring in May 2.2 inches (5.5cm) and the lowest in August 0.6 inches (1.5cm). Effective precipitation is lower, between 10 to12 inches (25 to 30cm). Averages snowfall is around 35 inches (88cm) per year. Air temperatures average degrees F 26 in January (coldest) and 66 in July (warmest).

Data was provided by the MTN CITY RS, JACKPOT, and Silver City 5 W climate stations.

Table 3. Representative climatic features

Frost-free period (characteristic range)	70-90 days
Freeze-free period (characteristic range)	95-130 days
Precipitation total (characteristic range)	279-457 mm
Frost-free period (actual range)	70-95 days
Freeze-free period (actual range)	90-135 days
Precipitation total (actual range)	279-508 mm
Frost-free period (average)	80 days
Freeze-free period (average)	110 days
Precipitation total (average)	381 mm

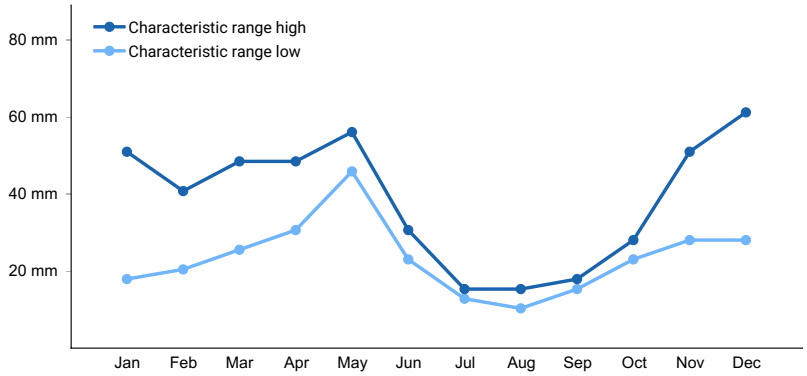


Figure 1. Monthly precipitation range

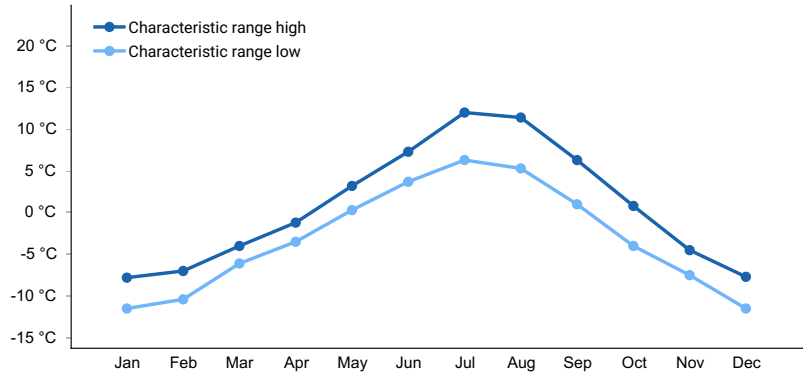


Figure 2. Monthly minimum temperature range

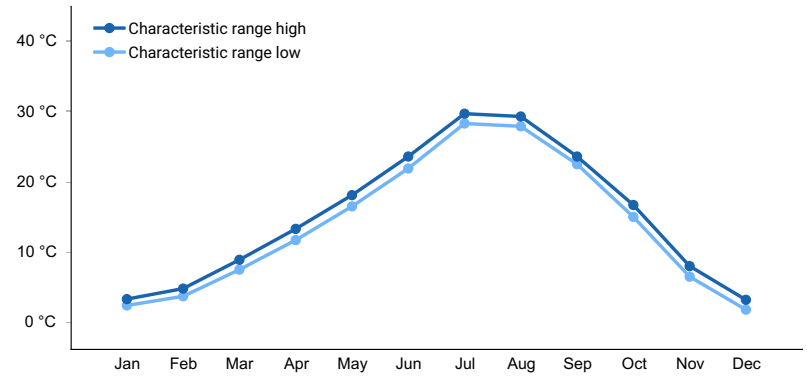


Figure 3. Monthly maximum temperature range

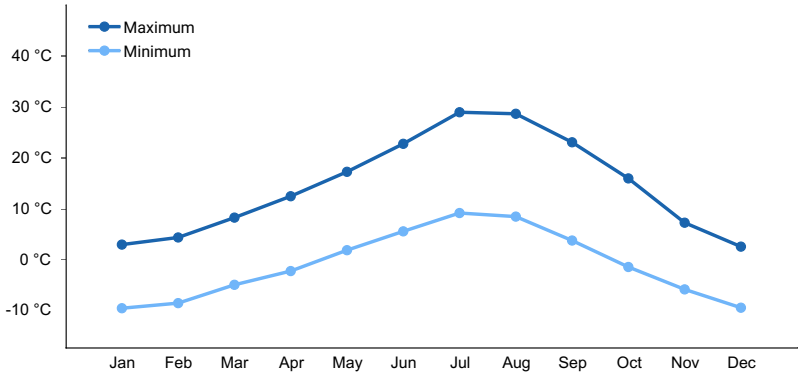


Figure 4. Monthly average minimum and maximum temperature

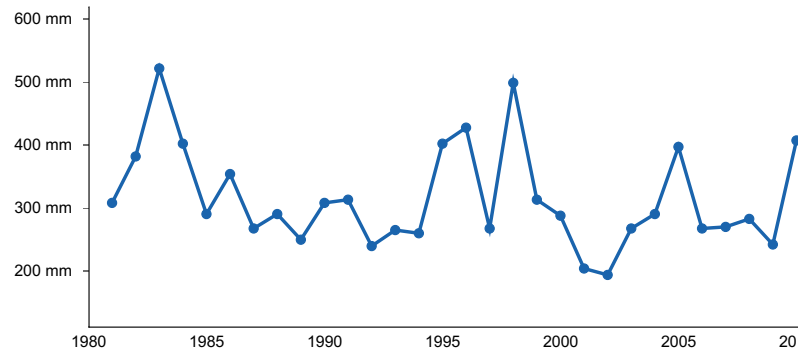


Figure 5. Annual precipitation pattern

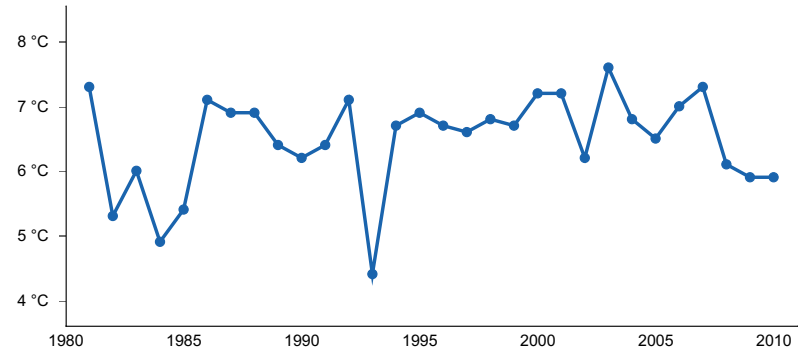


Figure 6. Annual average temperature pattern

Climate stations used

- (1) SILVER CITY 5 W [USC00108412], Murphy, ID
- (2) MTN CITY RS [USC00265392], Mountain City, NV
- (3) JACKPOT [USC00264016], Jackpot, NV

Influencing water features

This site is not influenced by adjacent water features and no water table is present.

Wetland description

N/A

Soil features

These soils are shallow, well drained, and formed in residuum and colluvium derived from volcanic rock. The soil profile is characterized by a gravely loam surface horizon, an abrupt boundary to accumulation of clay (argillic horizon) within 4 inches (11cm) of the soil surface, and a hard volcanic bedrock at 27 inches (68cm). These soils

are characterized by greater than 30 percent clay in the particle size control section.

Representative soil components associated with this ecological site include Wickahoney, Squawcreek, Dougal, Cleavage, Sharesnout, Thacker and Brose.

Table 4. Representative soil features

Parent material	(1) Volcanic ash (2) Colluvium–volcanic rock (3) Residuum–volcanic rock
Surface texture	(1) Very gravelly loam
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	25–51 cm
Surface fragment cover <=3"	25–40%
Surface fragment cover >3"	10–20%
Available water capacity (Depth not specified)	4.06–11.3 cm
Soil reaction (1:1 water) (Depth not specified)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	10–28%
Subsurface fragment volume >3" (Depth not specified)	3–22%

Ecological dynamics

The Claypan 12-16 ecological site is dominated by Bluebunch wheatgrass, Idaho fescue and little sagebrush. Subdominant species include Sandberg bluegrass, bottlebrush squirreltail, Nevada bluegrass, thickspike wheatgrass, Thurber’s needlegrass, arrowleaf balsamroot, Hooker’s balsamroot and longleaf phlox. Total annual production is 650 lbs/acre in a normal year, 950 lbs/acre in a favorable year, and 350 lbs/acre in a unfavorable year. Structurally, cool season deep-rooted perennial bunchgrasses are dominant, followed by medium height shrubs and perennial forbs. This site is visually dominated by bunch grasses and little sagebrush. Composition by weight is approximately 40-60% grasses, 15-25% forbs and 25-35% shrubs.

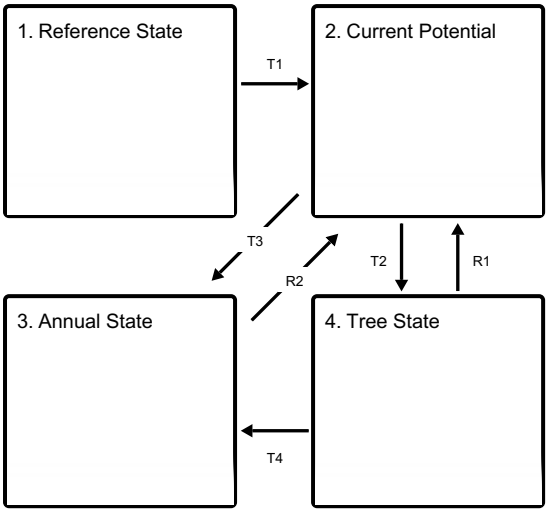
Herbivory has historically occurred on the site at low levels of utilization. Native herbivores include pronghorn antelope, mule deer, sage grouse, lagomorphs and rodents. Livestock grazing has become prevalent across this site. Overutilization of resources due to grazing (from livestock and wildlife) 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 invasive 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 (K. Haubensak, 2009). This could cause the dominate shrub population to shift away from little sagebrush to a shrub population with quicker establishment. A complete absence of wildfire could lead this site to become dominated by Utah Juniper.

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 drought reduces the vigor of perennial grasses and shrubs, while extreme drought may cause plant mortality. Runoff potential following large precipitation events is low if plant communities are present on the landscape. Decreased infiltration, increased runoff, and increased erosion often occur when little sagebrush is removed by frequent wildfires (C.J. Williams, 2018).

State and transition model

Ecosystem states



T1 - Introduction of annual non-native species.

T3 - Repeated, widespread and severe fire.

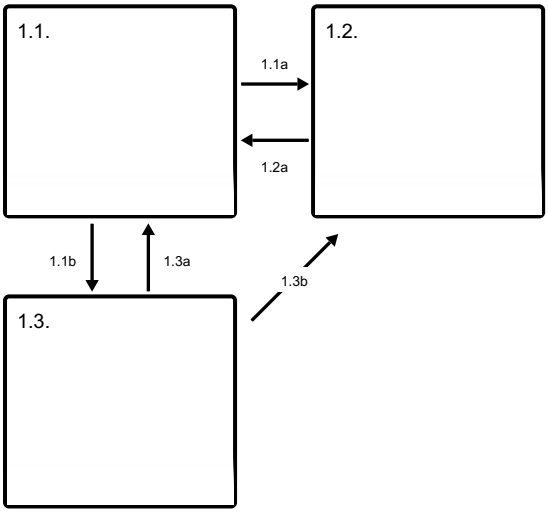
T2 - Wildfire Suppression

R2 - Seeding with native species/prescribed grazing

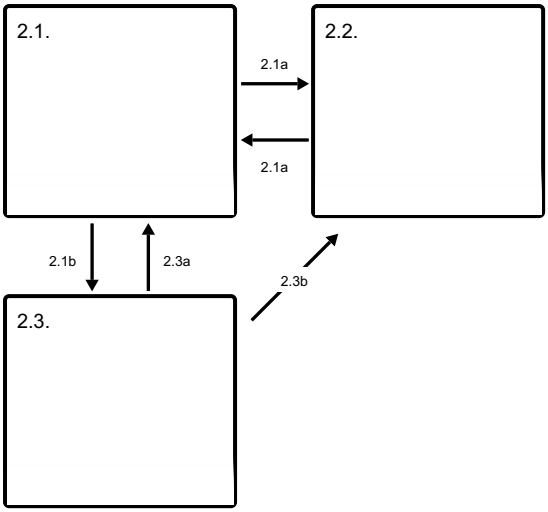
R1 - Tree Removal and seeding with native species

T4 - Catastrophic fire or a failed restoration attempt

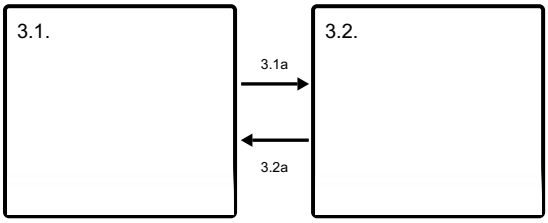
State 1 submodel, plant communities



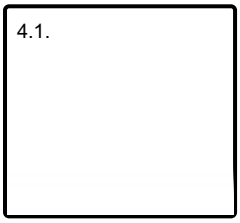
State 2 submodel, plant communities



State 3 submodel, plant communities



State 4 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*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass
- Idaho fescue (*Festuca idahoensis*), grass
- Sandberg bluegrass (*Poa secunda*), grass
- balsamroot (*Balsamorhiza*), other herbaceous

Community 1.1

This community phase is characteristic of a mid-seral plant community and is dominated by little sagebrush, bluebunch wheatgrass and Idaho fescue. Thurber's needlegrass, Nevada bluegrass, antelope bitterbrush and rabbitbrush are also common on this site. Potential vegetative composition by weight is about 50 percent grasses, 20 percent forbs and 30 percent shrubs. Total vegetative cover averages 40 to 70 percent and litter cover averages 20 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	196	364	532
Shrub/Vine	118	219	319
Forb	78	146	213
Total	**392**	**729**	**1064**

Community 1.2

This community phase is characterized by a post-disturbance, early seral, plant community. Little sagebrush and other shrubs are reduced, or patchy. Perennial bunchgrasses and forbs dominate the visual aspect of the plant community. 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.

Community 1.3

Absence of disturbance allows little sagebrush to mature and dominate the plant community. Perennial bunchgrasses and forbs are reduced in both vigor and productivity due to competition for light, moisture and nutrient resources. 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 determine if correlation to a more appropriate site is warranted.

Pathway 1.1a
Community 1.1 to 1.2

Wildfire. Low severity fire creates sagebrush/grass mosaic; higher intensity fires significantly reduce sagebrush cover and lead to early seral community dominated by grasses and forbs. Frequency and intensity of wildfire is primarily driven by cover and amount of herbaceous vegetation. Under pre-Eurosettlement conditions fire return interval is estimated to be between 20 and 50 years.

Pathway 1.1b
Community 1.1 to 1.3

Time, absence of disturbance and natural regeneration over time allows little 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 little 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.

Pathway 1.3a
Community 1.3 to 1.1

Low intensity, patchy wildfire or an aroga moth infestation would reduce little 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.

Pathway 1.3b

Community 1.3 to 1.2

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

State 2
Current Potential

This state is similar to the Reference State 1.0. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds. This state has the same three general community phases. These non-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. 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
- Idaho fescue (*Festuca idahoensis*), grass
- Sandberg bluegrass (*Poa secunda*), grass
- balsamroot (*Balsamorhiza*), other herbaceous

Community 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.

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 seral community where annual non-native species are present. Perennial bunchgrasses and forbs recover rapidly following wildfire. Annual non-native species are stable or increasing within the community. Disturbance tolerant shrubs typically recover 2 to 5 years post fire and may dominate the sites for many years.

Community 2.3

This community phase is characterized by decadent sagebrush, reduced perennial bunchgrass and increasing bare ground. Annual non-natives species are stable or increasing due to lack of competition from perennial bunchgrasses. Sandberg bluegrass may increase and become co-dominate with remaining deep-rooted bunchgrasses. 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 determine if correlation to a more appropriate site is warranted.

Resilience management. This community is at risk of crossing a threshold to another state. This site is susceptible to further degradation from poor grazing management, drought, and/or fire.

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. Mature sagebrush is controlling the spatial and temporal distribution of moisture, nutrient and light resources. Native perennial bunchgrasses are reduced due to competition for these resources. 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.

Pathway 2.3a
Community 2.3 to 2.1

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

Context dependence. Annual non-native species are present and may increase following disturbance.

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.

State 3
Annual State

Annual non-natives dominated site productivity and site resources. The dominance of non-native annuals control the spatial and temporal distribution of soil moisture, soil nutrients and energy resources. Remaining patches of sagebrush and/or perennial bunchgrass suffer from increased competition and narrowed fire return intervals.

Characteristics and indicators. This state experiences frequent fire due to increased cover and continuity of fine fuels. Fire is frequent enough to prevent the recovery of long-lived native perennials like mountain big sagebrush. Disturbance tolerant shrubs may be present or increasing depending on time since disturbance.

Dominant plant species

- cheatgrass (*Bromus tectorum*), grass
- medusahead (*Taeniatherum*), grass

Community 3.1

This community phase in dominated by annual non-native plants such as medusahead or cheatgrass and shallow-rooted perennial grasses like Sandberg bluegrass. Sprouting shrubs such as rabbitbrush may also common. Patches of mature sagebrush may or may not be present.

Community 3.2

This community phase is characteristic of a post-wildfire community where annual non-natives are controlling site resources. Depending on season and/or intensity of fire the visually aspect of the site in dominated annual non-natives and bare ground. Site may be experiencing soil loss.

Resilience management. This community phases is high susceptible to frequent and repeated wildfire. Best management practices prevent sites from reaching this community phase. Management options are extremely limited.

Pathway 3.1a
Community 3.1 to 3.2

Fire reduces or eliminates the overstory shrubs and shallow-rooted perennials and allows for annual non-natives to increase

Pathway 3.2a
Community 3.2 to 3.1

Time and lack of fire allows for sagebrush/rabbitbrush to establish. Probability of sagebrush establishment is very unlikely and dependent on a near-by seed source from unburned patches of sagebrush.

State 4
Tree State

This state is characterized by a dominance of Utah juniper. Little 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 nutrient cycling have been spatially and temporally altered. This state is relatively stable due to rapid growth rate and long life span of juniper.

Characteristics and indicators. Juniper is very drought tolerant and has the ability use moisture and nutrients from a wide variety of soil depths, due to its extensive root system. Native species experience reduced productivity and reproductive capacity due to shading and competition for soil moisture and nutrients.

Dominant plant species

- Utah juniper (*Juniperus osteosperma*), tree

Community 4.1

Juniper dominates overstory and site resources. Trees are actively growing and seedlings may be present. The shrub and grass understory is reduced. Sagebrush is stressed and dying. Trace amounts Sandberg bluegrass and forbs may be found in the interspaces. Annual non-native species are present under tree canopies. Bare ground areas are large and connected.

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 T3
State 2 to 3

Trigger: Repeated, widespread and severe fire. Slow variables: Increased production and cover of non-native annual species over time. Threshold: Loss of deep-rooted perennial bunchgrasses and shrubs truncates, spatially and temporally, nutrient capture and cycling within the community.

Constraints to recovery. Increased, continuous fine fuels from annual non-native plants modify the fire regime by changing intensity, size and spatial variability of fires. This increased disturbance prevents recovery of long-lived native perennials.

Transition T2
State 2 to 4

Trigger: Presence of juniper Slow variables: Encroachment of juniper is primarily driven by lack of fire. This may also be coupled with prolonged drought and poor grazing management. Threshold: Juniper is now controlling energy, moisture and nutrient resources Dominance of juniper results in decreased infiltration and increased runoff, reducing soil moisture and nutrient cycling. Sagebrush and perennial bunchgrass are reduced both vigor and reproductive capacity.

Restoration pathway R2
State 3 to 2

Seeding with native species followed by prescribed grazing Minimize soil disturbance and maximize non-native annual plant biomass removal during early spring. Combine prescribed grazing with seeding of native species. Continue to protect site from wildfire. Probability of success is extremely low.

Restoration pathway R1
State 4 to 2

Brush management/tree removal with minimal soil disturbance, coupled with seeding of native species. Probability of success very low.

Transition T4
State 4 to 3

Trigger: Catastrophic fire causing a stand replacing event. Or a failed restoration attempt including inappropriate tree removal or rangeland seeding using soil disturbing practices. Slow variables: Increased production and cover of non-native annual species under tree canopies. Threshold: Closed tree canopy with non-native annual species in the understory changes the intensity, size and spatial variability of wildfires. Changes in community composition are driven by temporal changes in energy capture, soil moisture and nutrient cycling and result in the loss of perennial bunchgrasses and sagebrush.

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				179–525	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	90–286	–
	Idaho fescue	FEID	*Festuca idahoensis*	90–286	–
	Sandberg bluegrass	POSE	*Poa secunda*	9–48	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	4–29	–
	sedge	CAREX	*Carex*	4–29	–
	basin wildrye	LECI4	*Leymus cinereus*	0–19	–
Forb					
2				90–286	
	balsamroot	BALSA	*Balsamorhiza*	13–67	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	4–29	–
	fleabane	ERIGE2	*Erigeron*	0–19	–
	bluebells	MERTE	*Mertensia*	0–19	–
	anemone	ANEMO	*Anemone*	0–19	–
	spiny phlox	PHHO	*Phlox hoodii*	0–19	–
	longleaf phlox	PHLO2	*Phlox longifolia*	0–19	–
	aster	ASTER	*Aster*	0–19	–
	lupine	LUPIN	*Lupinus*	0–19	–
	buckwheat	ERIOG	*Eriogonum*	0–19	–
	milkvetch	ASTRA	*Astragalus*	0–19	–
Shrub/Vine					
3				67–239	
	little sagebrush	ARAR8	*Artemisia arbuscula*	90–239	–
	green rabbitbrush	ERTE18	*Ericameria teretifolia*	4–29	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–10	–

Animal community

Large herbivore use on the reference plant community includes mule deer, elk and pronghorn antelope. Site (south facing slopes) can provide winter habitat for these large herbivores. The rangeland habitat provides important seasonal habitat for resident and migratory animals including western toad, common sagebrush lizard, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. Sage-grouse is an area sensitive species that may be present on this site. In isolated areas encroachment of noxious and invasive plant species (cheatgrass, medusahead and bulbous bluegrass) have replaced native plant species which provided critical feed, brood-rearing and nesting cover for a variety of native wildlife. Water is limited, being provided only by seasonal runoff, artificial water catchments and spring sites.

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.

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, Rangeland Management Specialist, IASCD
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Type locality

Location 1: Twin Falls County, ID	
Township/Range/Section	T15S R16E S20
General legal description	NE 1/4, NW 1/4
Location 2: Owyhee County, ID	
Township/Range/Section	T10S R2W S5
General legal description	NE 1/4, NE 1/4
Location 3: Owyhee County, ID	
Township/Range/Section	T6S R5W S23
General legal description	SE 1/4, SE 1/4
Location 4: Elko County, NV	
General legal description	Taylor Canyon Area
Location 5: Blaine County, ID	

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Contributors

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Trevor Crandall/ Erin Hourihan

Approval

Kendra Moseley, 4/24/2024

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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Date	07/03/2007
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills can occur on this site. If rills are present, they are likely to occur on slopes greater than 10 percent and immediately following a wildfire or high intensity storm. Rills are most likely to occur on soils with silt loam or clay loam surface texture.

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2. **Presence of water flow patterns:** Water-flow patterns occur on this site. They are not extensive except on slopes greater than 15 percent. When they do occur, they are short and disrupted by cool season grasses, shrubs and surface stones.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or terracettes are common on the site especially where flow patterns are present and the surface soils have a high clay content.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Ranges from 40-50 percent.

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 are usually not present in the HCPC.

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move up to 3 feet following a significant run-off event. Coarse litter generally 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 3 to 5.

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:** Bunchgrasses, especially deep-rooted perennial species, slow runoff and increase infiltration. Medium height 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. Do not mistake an increase in clay for a compaction layer. The site can develop a compaction layer due to the clay in the subsoil as a result of severe livestock use when the soils are wet.

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 deep-rooted perennial bunchgrasses>> medium shrubs

    Sub-dominant: Perennial forbs>shallow 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 650 pounds per acre (728 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 40-60 percent of the total production, forbs 15-25 percent and shrubs 25-35 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, annual mustards and rush skeletonweed.

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