USDA Natural Resources Conservation Service

Ecological site R025XY019ID
LOAMY 10-13

Last updated: 4/25/2024
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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): 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 wyomingensis/ Agropyron spicatum 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 on lava plateau landscapes. It is commonly found on tablelands, calderas and terraces. Slopes range from 0 to 30 percent. Elevations range from 3,000 to 5,200 feet (914 to 1,585 meters). Soils associated with this site are well drained and derived from volcanic rocks and volcanic ash. The soil profile is characterized by accumulation of clay (argillic horizon) 2.0 to 5.9 inches (5 to 15 cm) from the soil surface. Important abiotic factors contributing to this site include less than 35 percent clay in the particle size control section, shallow rooting depth and accumulation of silica and calcium carbonates in the lower soil profile. The reference plant community is dominated by Wyoming big sagebrush and bluebunch wheatgrass.

Associated sites

R025XY006ID	**SOUTH SLOPE STONY 10-13**

R025XY008ID	**NORTH SLOPE STONY 12-16**
R025XY010ID	**CLAYPAN 12-16**
R025XY043ID	**LOAMY 11-13**
R025XY048ID	**SHALLOW CLAYPAN 11-13**

Similar sites

R025XY020ID	**LOAMY 7-10**
R025XY007ID	**ASH 10-14** PSSPS-HECO26 dominant grasses; soil less than 50cm to weakly consolidated ash
R025XY011ID	**LOAMY 13-16**
R025XY010OR	**LOAMY 8-11 PZ**
R025XY050NV	**STONY BOTTOM**
R025XY043ID	**LOAMY 11-13**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata var. wyomingensis*
Herbaceous	(1) *Pseudoroegneria spicata*

Physiographic features

This ecological site is on lava plateau landscapes. It is commonly found on tablelands, calderas and terraces. Slopes range from 0 to 30 percent. Elevations range from 3,000 to 5,200 feet (914 to 1,585 meters).

Table 2. Representative physiographic features

Landforms	(1) Lava plateau > Terrace (2) Caldera (3) Tableland
Runoff class	Low to very high
Flooding frequency	None
Elevation	3,000–5,200 ft
Slope	0–30%
Water table depth	150 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. This is site is characterized by less than 126 freeze-free days annually. Mean annual precipitation is 12 inches (31cm), with effective precipitation between 10 to 13 inches (25 to 33cm). Averages snowfall is between 25 to 40 inches (63 to 102cm) per year.

* The above data is averaged from the Murphy 10 W, Murphy Desert Hot Springs, and Jackpot climate stations, NASIS and, the Western Regional Climate Center (wrcc.dri.edu).

Table 3. Representative climatic features

Frost-free period (characteristic range)	85-130 days

Freeze-free period (characteristic range)	100-130 days
Precipitation total (characteristic range)	11-16 in
Frost-free period (actual range)	85-130 days
Freeze-free period (actual range)	100-130 days
Precipitation total (actual range)	11-16 in
Frost-free period (average)	100 days
Freeze-free period (average)	126 days
Precipitation total (average)	12 in

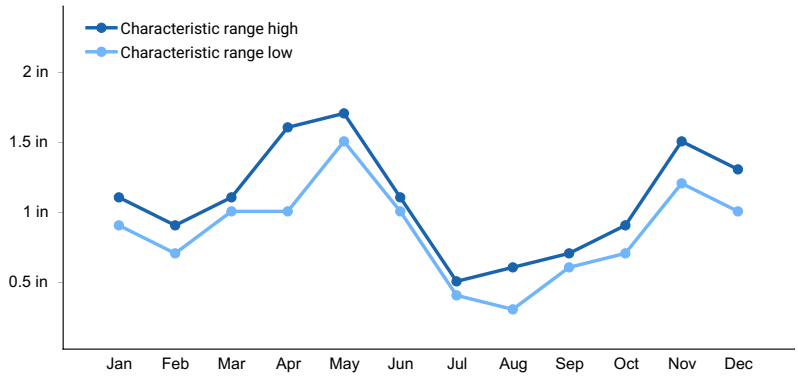


Figure 1. Monthly precipitation range

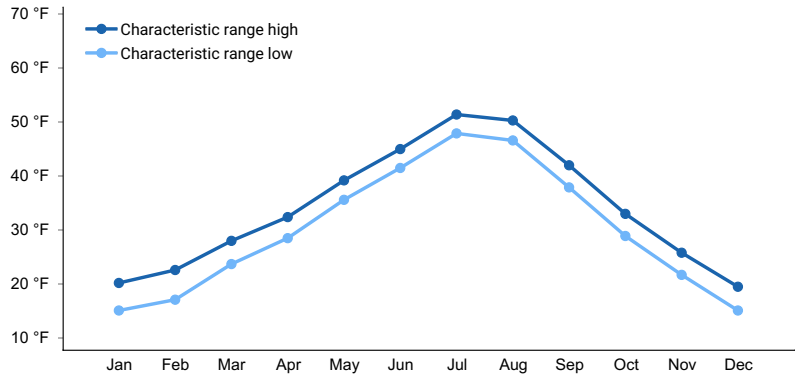


Figure 2. Monthly minimum temperature range

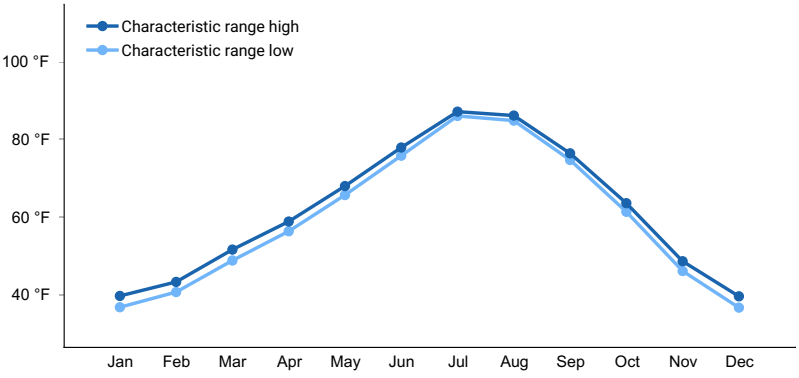


Figure 3. Monthly maximum temperature range

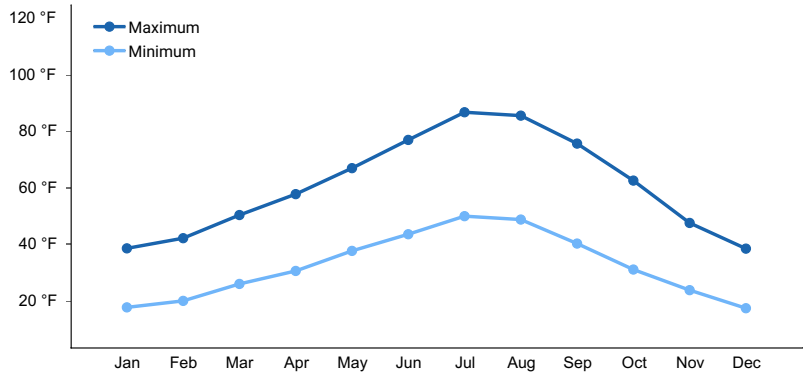


Figure 4. Monthly average minimum and maximum temperature

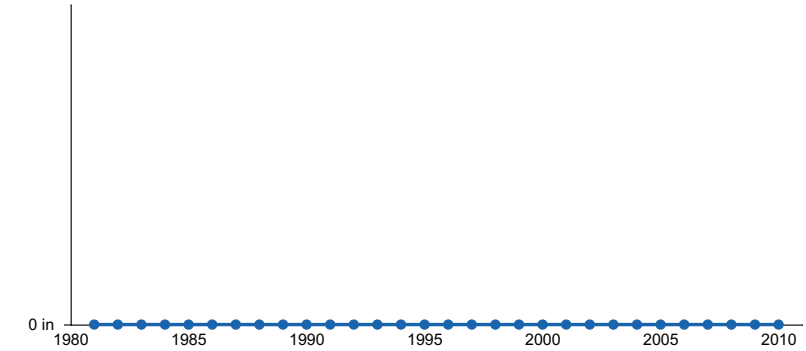


Figure 5. Annual precipitation pattern

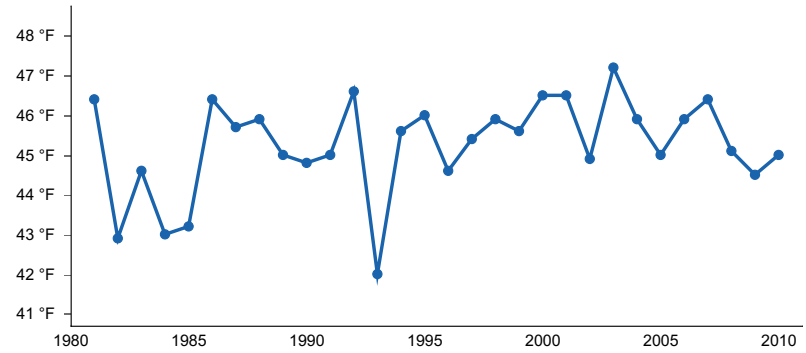


Figure 6. Annual average temperature pattern

Climate stations used

- (1) MURPHY 10 W [USW00004127], Murphy, ID
- (2) MURPHY DESERT HOT SPRG [USC00106250], Bruneau, ID
- (3) JACKPOT [USC00264016], Jackpot, NV

Influencing water features

This site is not influenced by adjacent wetlands, streams or run on.

Soil features

Soils associated with this site are well drained and derived from basalt, welded tuff, and volcanic ash. Surface texture is typically loamy. The soil profile is characterized by a light colored surface horizon (ochric epipedon), accumulation of clay (argillic horizon) 2.0 to 6.0 inches (5 to 15cm) from the soil surface and accumulation of silica (duripan) and calcium carbonates (calcic horizon) below 10 to 15 inches (25 to 38cm). Rooting depth of these soils is limited by agrillic horizon and a weakly cemented to indurated duripan. Soils are strongly to violently effervescent at depth.

Representative soil components associated with this ecological site include the Arbidge, Bigflat, Freshwater, and Willhill.

Table 4. Representative soil features

Parent material	(1) Loess–basalt (2) Volcanic rock (3) Welded tuff
Surface texture	(1) Loam (2) Silt loam
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderate
Depth to restrictive layer	20–60 in
Soil depth	20–60 in
Surface fragment cover <=3"	5–16%
Surface fragment cover >3"	2–7%
Available water capacity (0-40in)	0.2–6 in
Soil reaction (1:1 water) (0-40in)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	11–25%
Subsurface fragment volume >3" (Depth not specified)	3–18%

Ecological dynamics

The Reference Plant Community is dominated by bluebunch wheatgrass and Wyoming big sagebrush. Subdominant species include Thurber needlegrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot, tapertip hawksbeard and lupine. Total annual production is 750 lbs/acre in a normal year, 1100 lbs/acre in a favorable year, and 400 lbs/acre in a unfavorable year. Structurally, cool season shallow rooted bunchgrasses are dominant, followed by large shrubs and perennial forbs. The dominant visual aspect of this site is mixed perennial bunch grasses and Wyoming big sagebrush. Composition by weight is approximately 55% grasses, 10% forbs and 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, 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.

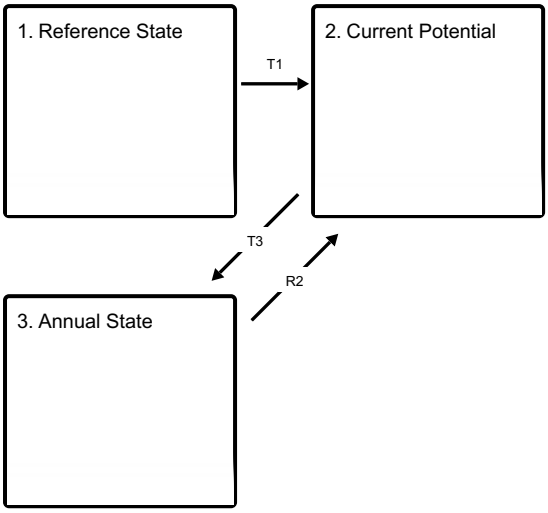
Wildfire frequency across this site has historically been low. Sagebrush evolved with low intensity wildfire that left a mosaic of burned and unburned patches (Baker, 2006). Annual species such as cheatgrass and medusahead can be troublesome invaders on this site after wildfire, preventing perennial grass and shrub re-establishment. Invasive, annual plant communities increase wildfire frequency and intensity (K. Haubensak, 2009). This could cause the dominate shrub population to shift away from Wyoming big sagebrush to a shrub population with quicker establishment. Aroga moth infestations have been known to occur in this area (Bentz, 2008). These insects are a defoliator and can decrease shrub abundance.

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 Wyoming big sagebrush is removed by frequent wildfires (C.J. Williams, 2018).

State and transition model

Ecosystem states

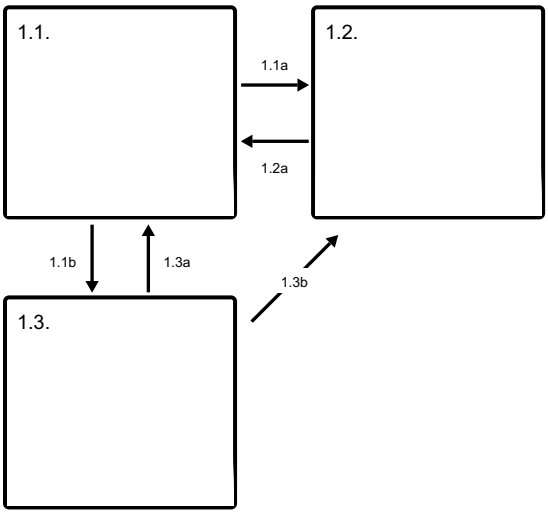


T1 - Introduction of annual non-native species.

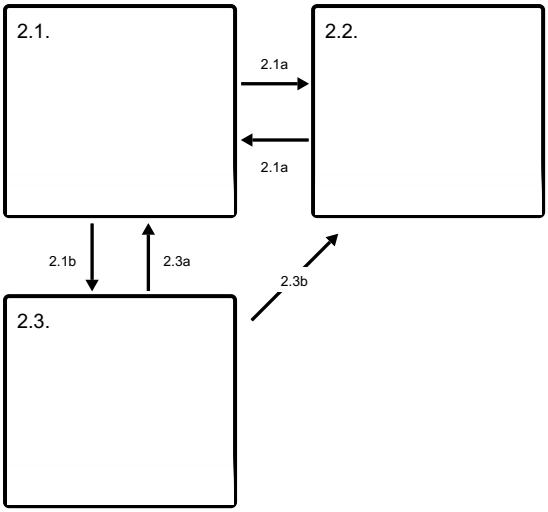
T3 - Repeated, widespread and severe fire.

R2 - Seeding with native species/prescribed grazing

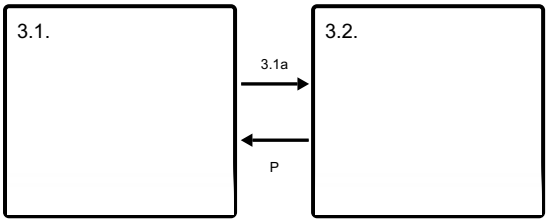
State 1 submodel, plant communities



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.

Resilience management. Wyoming big sagebrush communities historically had low fuel loads, and patchy fires that burned in a mosaic pattern were common at 10 to 70 year return intervals (Young et al. 1979, West and Hassan 1985, Bunting et al. 1987). Davies et al. (2006) suggest fire return intervals in Wyoming big sagebrush communities were around 50 to 100 years. More recently, Baker (2011) estimates fire rotation to be 200 to 350 years in Wyoming big sagebrush communities. Wyoming big sagebrush is killed by fire and only regenerates from seed. Recovery time for Wyoming big sagebrush may require 50 to 120 or more years (Baker 2006).

Dominant plant species

- Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass

Community 1.1

This community phase is characteristic of a mid-seral plant community and is dominated by wyoming big sagebrush and bluebunch wheatgrass. Thurber's needlegrass, indian ricegrass, and bottlebrush squirreltail are also common on this site. Potential vegetative composition by weight is about 50 percent grasses, 15 percent forbs and 35 percent shrubs. Total vegetative cover averages 20 to 50 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	220	425	600
Shrub/Vine	125	225	330
Forb	55	100	170
Total	**400**	**750**	**1100**

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. Disturbance tolerant shrubs such as rabbitbrush 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. The effect of fire on bunchgrasses relates to culm density, culm-leaf morphology, and the size of the plant. The initial condition of bunchgrasses within the site along with seasonality and intensity of the fire all factor into the individual species response. For most forbs and grasses the growing points are located at or below the soil surface providing relative protection from disturbances which decrease above ground biomass, such as grazing or fire. Thus, fire mortality is more correlated to duration and intensity of heat which is related to culm density, culm-leaf morphology, size of plant and abundance of old growth (Wright 1971, Young 1983).

Community 1.3

Absence of disturbance allows 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.

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 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.

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.

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 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

- Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*), shrub
- cheatgrass (*Bromus tectorum*), grass
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass

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.

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.

Resilience management. The effect of fire on bunchgrasses relates to culm density, culm-leaf morphology, and the size of the plant. Plant response will vary depending on season, fire severity, fire intensity and post-fire soil moisture availability. The initial condition of bunchgrasses within the site along with seasonality and intensity of the fire all factor into the individual species response. For most forbs and grasses the growing points are located at or below the soil surface providing relative protection from disturbances which decrease above ground biomass, such as grazing or fire. Thus, fire mortality is more correlated to duration and intensity of heat which is related to culm density, culm-leaf morphology, size of plant and abundance of old growth (Wright 1971, Young 1983). Cheatgrass has been found to be a highly successful competitor with seedlings of Thurber's needlegrass and may preclude reestablishment (Evans and Young 1978).

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.

Resilience management. Sandberg bluegrass has been found to increase following fire likely due to its low stature and productivity (Daubenmire 1975). Sandberg bluegrass may retard reestablishment of deeper rooted bunchgrass. Reduced bunchgrass vigor or density provides an opportunity for Sandberg bluegrass expansion and/or cheatgrass and other invasive species to occupy interspaces, leading to increased fire frequency and potentially an annual plant community.

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. Recovery time for Wyoming big sagebrush may require 50 to 120 or more years (Baker 2006). However, the introduction and expansion of cheatgrass has dramatically altered the fire regime (Balch et al. 2013) and restoration potential of Wyoming big sagebrush communities.

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.

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. Reduced bunchgrass vigor or density provides an opportunity for Sandberg bluegrass expansion and/or cheatgrass and other invasive species to occupy interspaces, leading to increased fire frequency and potentially an annual plant community.

Resilience management. The introduction and expansion of cheatgrass has dramatically altered the fire regime (Balch et al. 2013) and restoration potential of Wyoming big sagebrush communities.

Dominant plant species

- cheatgrass (*Bromus tectorum*), grass

Community 3.1

This community phase in dominated by annual non-native plants such as 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.

Resilience management. Yellow rabbitbrush is top-killed by fire, but sprouts vigorously after fire (Kuntz 1982, Akinsoji 1988). As cheatgrass increases, fire frequencies also increase to frequencies between 0.23 and 0.43 times a year; then even sprouting shrubs such as rabbitbrush will not survive (Whisenant 1990).

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.

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 P
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.

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.

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.

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				220–600	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	170–450	–
	Sandberg bluegrass	POSE	*Poa secunda*	10–30	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	10–30	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	10–30	–
	squirreltail	ELEL5	*Elymus elymoides*	10–30	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	10–30	–
Forb					
2				55–170	
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	12–27	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	10–22	–
	longleaf phlox	PHLO2	*Phlox longifolia*	10–22	–
	lupine	LUPIN	*Lupinus*	8–18	–
	fleabane	ERIGE2	*Erigeron*	8–18	–
	aster	ASTER	*Aster*	8–18	–
	larkspur	DELPH	*Delphinium*	0–12	–
	Hooker's balsamroot	BAHO	*Balsamorhiza hookeri*	0–12	–
	milkvetch	ASTRA	*Astragalus*	0–10	–
	pussytoes	ANTEN	*Antennaria*	0–10	–
Shrub/Vine					
3				125–330	
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	100–280	–
	green rabbitbrush	ERTE18	*Ericameria teretifolia*	10–20	–
	yellow rabbitbrush	CHVIP4	*Chrysothamnus viscidiflorus ssp. puberulus*	10–20	–
	buckwheat	ERIOG	*Eriogonum*	5–10	–

Animal community

Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. Large herbivore use of this ecological site is dominated by mule deer. Important seasonal habitat is provided for resident and migratory animals including western toad, common sagebrush lizard, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. Encroachment of noxious and invasive plant species (cheatgrass, bulbous bluegrass, rush skeleton weed, and knapweed) can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Area sensitive species include pygmy rabbit, burrowing owl, Great Basin ground squirrel, Greater sage-grouse, and Merriam’s shrew. Water features are sparse provided by seasonal streams, artificial water catchments, and springs.

State 1 Phase 1.1 - Wyoming Big Sagebrush/ Bluebunch Wheatgrass/ Thurber’s Needlegrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail Reference Plant Community (RPC): This plant community provides a diversity of grasses, forbs, and shrubs used by native insect communities that assist in pollination. The reptile and amphibian

community is represented by common sagebrush lizard, western rattlesnake, and western toad. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Spring developments that capture all available water would preclude the use of these sites by amphibians. Native shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Habitat (brood-rearing and winter cover) for sage-grouse is provided by this diverse plant community. The plant community supports seasonal needs of large mammals (mule deer and antelope) providing food and cover. Wyoming big sagebrush is preferred browse for wild ungulates. A diverse small mammal population including golden-mantled ground squirrels, Merriam's shrew, pygmy rabbit, Columbia Plateau ground squirrel, bushy-tailed woodrat, jackrabbit, and yellow-bellied marmots would utilize this plant community.

State 1 Phase 1.2 - Wyoming Big Sagebrush/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of improper grazing management. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. Grasses, forbs, and shrubs are used by native insects that assist in pollination but the reduced herbaceous understory results in lower diversity and numbers of insects. The reduced populations of insects may reduce reptile diversity and populations. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Habitat (brood-rearing and winter cover) quality for sage grouse would decline due to a depleted herbaceous plant community. The plant community supports seasonal needs of mule deer, providing food and cover. Wyoming big sagebrush is desirable forage for mule deer. A small mammal population including golden-mantled ground squirrels, Merriam's shrew, pygmy rabbit, Columbia Plateau ground squirrel, bushy-tailed woodrat, jackrabbit, and yellow-bellied marmots may utilize this plant community.

State 1 Phase 1.3 - Bluebunch Wheatgrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of wildfire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure and limits use by shrub obligate animals. Insect diversity would be reduced but a native forb plant community would still support select pollinators. The quality of habitat for the common sagebrush lizard and western rattlesnakes would decline due to the absence of sagebrush. The dominance of herbaceous vegetation with little sagebrush canopy cover would prevent use of these areas for nesting by Brewer's sparrow, sage sparrow, sage thrasher, and sage- grouse. This plant community provides brood-rearing habitat for sage-grouse if sagebrush cover is nearby. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Forage for mule deer would be seasonal (spring, summer, and fall). Habitat quality for pronghorn may increase due to the open landscape. Small mammal diversity may be reduced due to an increase in hunting success by predators. Large blocks of this plant community would fragment the reference plant community and reduce the quality of the habitat for shrub-steppe obligate animal species.

State 2 - Sandberg Bluegrass/ Cheatgrass and Annual Plant Community: This plant community is the result of continued improper grazing management and frequent fire. The loss of the native shrub and herbaceous plant community would not support a diverse insect community. If rabbitbrush has a chance to sprout, late season pollinator habitat would be provided. Most native reptilian species are not supported with food or cover. This plant community does not support the habitat requirements for sage-grouse, sage thrasher, Brewer's sparrow, or sage sparrow. Diversity of grassland avian species is reduced due to poor cover and food. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Large mammals may utilize the herbaceous vegetation in the early part of the year when the invasive annuals (cheatgrass) are more palatable. At other times of the year large mammals would not regularly utilize these areas due to poor food and cover conditions. Habitat quality (food and cover) for native small mammals would decline due to loss of the native plant community. Large blocks of this plant community would fragment the reference plant community and reduce the quality of the habitat for shrub-steppe obligate animal species.

Grazing Interpretations.

There are few limitations to grazing. The distance to water may be a problem in some areas. Usually this site is a key area in a management program.
Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use and seasonal preference.

Hydrological functions

The soils in this site are in hydrologic group B. They have moderately low runoff potential.

Recreational uses

Some opportunities exist for hunting of big game and upland birds. This site provides excellent sight seeing opportunities due to spring blooming flowers. During late spring and early summer smaller birds, such as larks and bluebirds, frequent the site and provide opportunities for bird watching.

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. 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)
Joe May, State Rangeland Management Specialist, NRCS, Idaho
Leah Juarros, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Assistant State Conservationist, NRCS, Idaho (Retired)

Type locality

Location 1: Owyhee County, ID	
Township/Range/Section	T2S R3W S11
General legal description	NE1/4, NE1/4
Location 2: Owyhee County, ID	
Township/Range/Section	T1N R5W S11
General legal description	NE1/4, SW1/4

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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.

Author(s)/participant(s)	Old SS Manuscripts, Range Site Descriptions, etc.
Contact for lead author	USDA/NRCS 9173 W. Barnes Drive, Suite C Boise, ID 83709 208-378-5722
Date	06/12/2007
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. If they do occur, they are most likely to be on slopes greater than 30% and immediately following wildfire. Gravel and stones on the surface reduces erosion.

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2. **Presence of water flow patterns:** Water-Flow Patterns rarely occur on this site except on slopes greater than 25%. When they do occur, they are short, disrupted by cool season perennial grasses and tall shrubs and are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or Terracettes are rare on this site. In areas of greater than 25% slopes where flow patterns and/or rills are present, a few pedestals and terracettes may be expected.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground ranges from 30-40 percent.

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move up to 3 feet or further following a significant run-off event. Terracettes and rocks can trap fine litter. Coarse litter generally does not move.

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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

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface horizon is typically 4 to 9 inches thick. Structure typically includes weak thin and moderate thick platy, weak fine and moderate fine granular, and weak fine to medium subangular blocky. Soil organic matter (SOM) ranges from 1 to 3 percent.

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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 run-off and increase infiltration. Shrubs accumulate snow in the interspaces. Terracettes provide a favorable micro-site for vegetation establishment, which further increases infiltration.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compaction Layer is not present.

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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: Cool season deep-rooted perennial bunchgrasses

    Sub-dominant: Tall shrubs> perennial forbs> shallow rooted grasses

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Wyoming big sagebrush will become decadent in the absence of fire and ungulate grazing. Grass and forb

mortality will occur as tall shrubs increase.

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14. **Average percent litter cover (%) and depth (in):** Annual litter cover in the interspaces will be 5-10 percent to a depth of

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 750 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 45-55 percent of the total, forbs 10-15 percent and shrubs 25-35 percent.

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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:** Invasive Plants include cheatgrass, medusahead rye, bulbous bluegrass, rush skeletonweed, scotch thistle, spotted and diffuse knapweed.

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