

## Ecological site R012XY032ID Loamy 8-12 PZ ARTRW8/PSSPS

Last updated: 9/22/2020  
Accessed: 04/25/2024

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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): 012X–Lost River Valleys and Mountains

Land Resource Region: B (Northwestern Wheat and Range)  
MLRA: 12 (Lost River Valleys and Mountains)

EPA EcoRegion: Level III (Middle Rockies)

### LRU notes

012X-Lost River Valleys and Mountains

Precipitation or Climate Zone: 8-12" P.Z.  
<https://soils.usda.gov/survey/geography/mlra/index.html>

### 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

Site does not receive additional water.

Soils are:

Not saline or saline-sodic.

Moderately deep to very deep, with <35% (by volume) coarse fragments, Not skeletal within 20" of the soil surface.

Not strongly or violently effervescent in the to 20" of the soil profile.

textures usually range from loam to silt loam in surface mineral 4".

Slope is < 30%.

Clay content is = <35% in surface mineral 4".

Site does not have an argillic horizon with > 35% clay.

### Associated sites

R012XY004ID	Gravelly Loam 8-12 PZ ARTRW8/PSSPS
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### Similar sites

R012XY017ID	Shallow Fractured South 8-12 PZ ARTRW8/PSSPS-LESAS2
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> var. <i>wyomingensis</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>

## Physiographic features

This site occurs on nearly level flats and benchlands to rolling and somewhat broken foothills. Small rock outcrops may be scattered throughout the site. Slopes predominately range from 0-30 percent. Elevation ranges from 5000-7500 feet (1524-2286m).

**Table 2. Representative physiographic features**

Landforms	(1) Plain (2) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	5,000–7,500 ft
Slope	0–30%
Aspect	N, S, W

## Climatic features

MLRA 12 is dominated by dramatic changes in elevation which, in turn, influence local weather patterns. The intermontane valleys have elevations as low as 3800 feet, while the adjacent mountains may reach more than 12,600 feet. The average annual precipitation for the entire MLRA, based on 10 long term climate stations located throughout the MLRA, is approximately 9.38 inches. However, the dry valleys may have averages as low as 6 inches, while the upper peaks may have averages that exceed 46 inches per year.

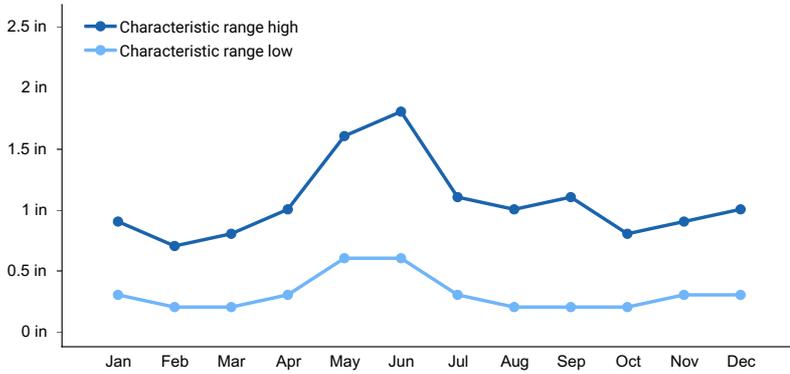
Temperatures vary considerably over the year. The average annual temperature is 42.25 degrees F. The average low is 27.4 degrees while the average high temperature is 57 degrees.

In the summer the sun shines 78% of the time, but drops to 40% in the winter. The prevailing wind is location-dependent, and generally flows parallel to the orientation of the dominant valleys. In the summer localized afternoon upslope winds and evening downslope winds are common. The average windspeed is greatest in the spring and early summer.

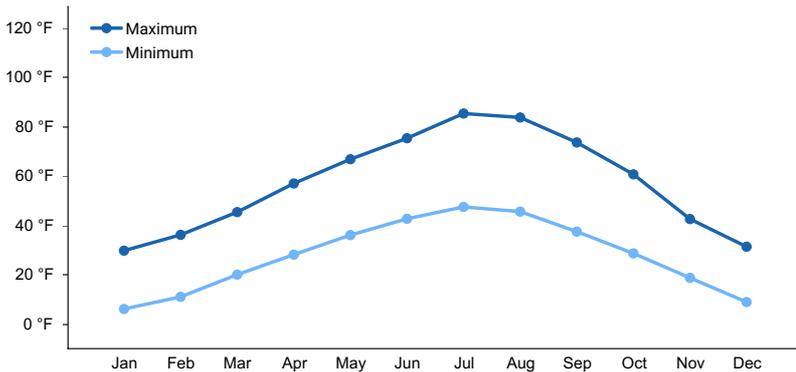
The frost free period ranges from 102 to 107 days while the freeze free period ranges from 134 to 139 days across the MLRA.

**Table 3. Representative climatic features**

Frost-free period (average)	107 days
Freeze-free period (average)	139 days
Precipitation total (average)	11 in



**Figure 1. Monthly precipitation range**



**Figure 2. Monthly average minimum and maximum temperature**

## Influencing water features

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

## Soil features

The soils on this site are moderately deep to deep loams, silt loams, gravelly silt loams, and clay loams. Subsoils are medium textured and usually have a lime accumulation at depths from 8-12 inches. Organic matter is low, permeability is moderate, and available water holding capacity (AWC) is medium to high.

Note: Move loamy and sandy-skeletal SMU's within this combination of sites to 12X-4. Do not use sodic SMU's to describe this site.

## Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is Wyoming big sagebrush in the overstory and bluebunch wheatgrass in the understory. Composition by weight is approximately 55-65 percent grasses, 5-15 percent forbs and 25-35 percent shrubs.

During the last few thousand years, this site has evolved in an arid climate characterized by warm, dry summers and cold, wet winters. Herbivory has historically occurred on the site at low levels of utilization. Herbivores include pronghorn antelope, mule deer, sage grouse, lagomorphs, and small rodents. Fire has historically occurred on this site every 50-70 years.

The Historic Climax Plant Community (HCPC) moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The HCPC is Phase A. This plant community is dominated by bluebunch wheatgrass and Wyoming big sagebrush. Subdominant species include Sandberg bluegrass, Indian ricegrass, needle and thread, and tapertip hawksbeard. The plant species composition of Phase A is listed later under "HCPC Plant Species Composition".

Total annual production is 700 pounds per acre (778 Kg/ha) in a normal year. Production in a favorable year is 1000 pounds per acre (1111 Kg/ha). Production in an unfavorable year is 350 pounds per acre (389 Kg/ha). Structurally, cool season deep-rooted perennial bunchgrasses are very dominant, followed by medium height shrubs with perennial forbs and shallow rooted perennial bunchgrasses being sub-dominant.

#### FUNCTION:

This site is suited for grazing by domestic livestock in late spring, early summer, and fall. This site provides fair to good habitat for various upland wildlife including mule deer, pronghorn antelope, sage grouse, and songbirds. The site is hunted by raptors.

This site has slight recreation or aesthetic value. Some hunting of big game and upland game does occur. Spring blooming forbs add color to the landscape.

Due to the lack of surface stones and relatively flat slopes, this site is easily degraded by improper grazing management or frequent fires.

#### Impacts on the Plant Community.

##### Influence of fire:

In the absence of normal fire frequency, Wyoming big sagebrush can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, Wyoming big sagebrush can displace most of the primary understory species.

When fires become more frequent than historic levels (50-70 years), Wyoming big sagebrush is reduced significantly. Rabbitbrush and horsebrush can increase slightly. With continued short fire frequency, Wyoming big sagebrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass, needle and thread, and Indian ricegrass. These species may be replaced by Sandberg bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site at lower elevations. These fine fuels will increase the fire frequency.

##### Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be very detrimental to this site. This type of management leads to reduced vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to increase in Wyoming big sagebrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by reducing fine fuels that carry fires. As cheatgrass increases and becomes co-dominant with Sandberg bluegrass and other annuals, fires become more frequent.

Proper grazing management that addresses frequency, duration, and intensity of grazing can also keep fine fuels from developing, thereby reducing fire frequency. This can lead to gradual increases in Wyoming big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management should be carefully planned, as a reduction in shrubs without a suitable understory of perennial grasses can cause an increase in cheatgrass which will lead to more frequent fire intervals.

##### Weather influences:

Above normal precipitation in April, May, and June can dramatically increase total annual production of the plant

community. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Likewise, below normal precipitation during these spring months can significantly reduce total annual production and be detrimental to viable seed production. Overall plant composition is normally not affected when perennials have good vigor.

Below normal temperatures in the spring can have an adverse impact on total production regardless of the precipitation. An early, hard freeze can occasionally kill some plants.

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment, and production are usually reduced. Mortality can occur. Prolonged drought can lead to a reduction in fire frequency.

Influence of insects and disease:

The sagebrush defoliator moth (*Aroga websterii*) causes mortality in relatively small patches. It affects Wyoming big sagebrush primarily. It seldom kills the entire stand. Mormon cricket and grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency. Perennial and annual invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory.

Influence of wildlife:

Big game animals use this site in the spring, fall, and winter. Their numbers are seldom high enough to adversely affect the plant community.

Watershed:

Decreased infiltration and increased runoff occur with an increase in Wyoming big sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same results, but to a lesser degree. The long-term effect is a transition to a different state.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with improper grazing management.

Phase A to C. Develops with fire.

Phase B to A. Develops with prescribed grazing.

Phase C to A. Develops with prescribed grazing and no fire.

State 1 Phase C to State 2. Develops through frequent fire or continued improper grazing management. The site has crossed the threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

State 2 to State 3: Is a result of rangeland seeding.

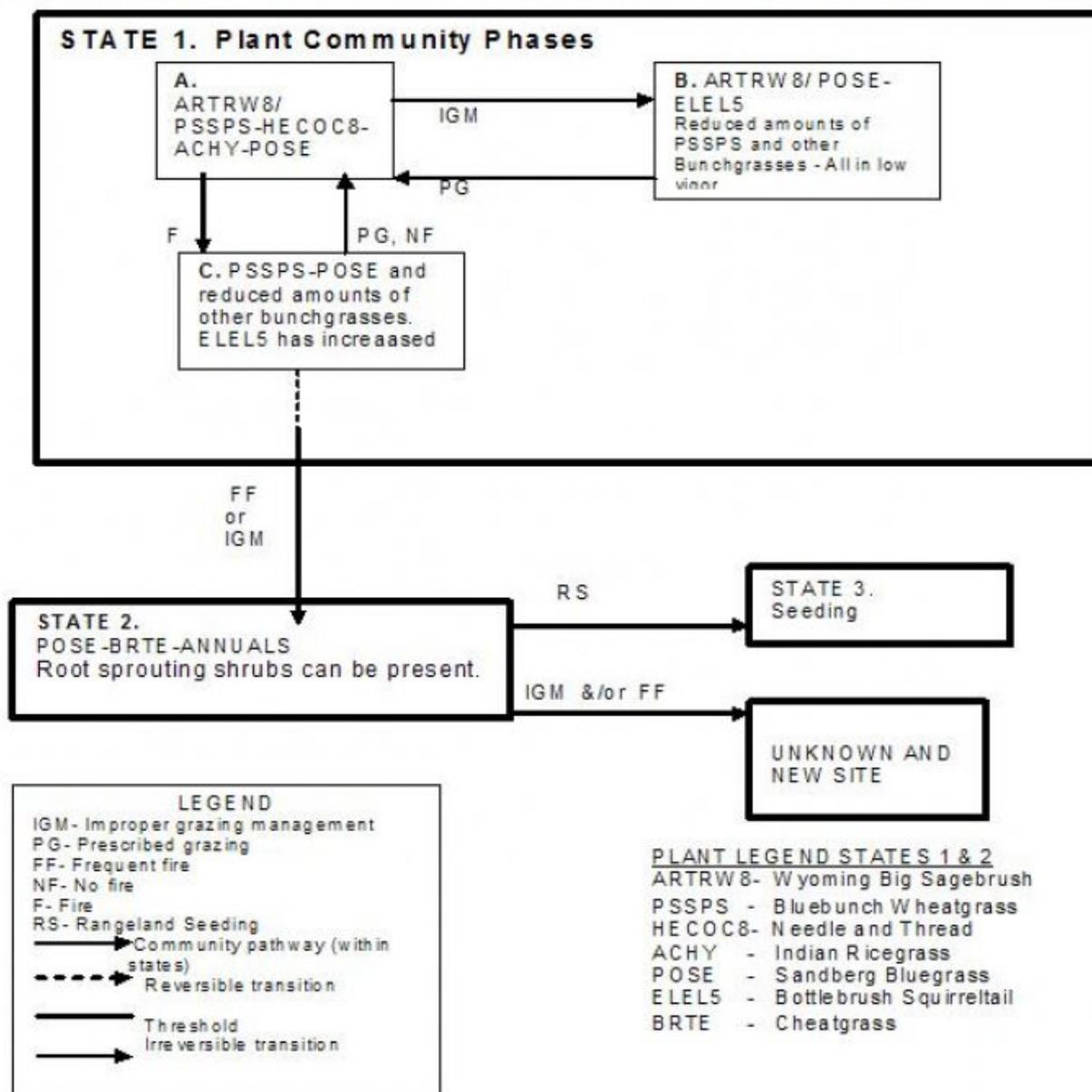
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and regress to a new site with reduced potential. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

Practice Limitations.

Only slight limitations exist on this site for implementation of vegetative management and facilitating practices. Moderate to severe limitations exist for range seeding due to low annual precipitation and the possibility of strong winds in the spring and early summer.

## State and transition model

The Reference State (State 1), The Historic Climax Plant Community (HCPC) moves through many phases depending on the natural and man-made forces that impact the community over time. The Reference Plant Community Phase is Phase A, State 1. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".



### State 1

#### State 1, Plant community A. Historic Climax Plant Community (HCPC)

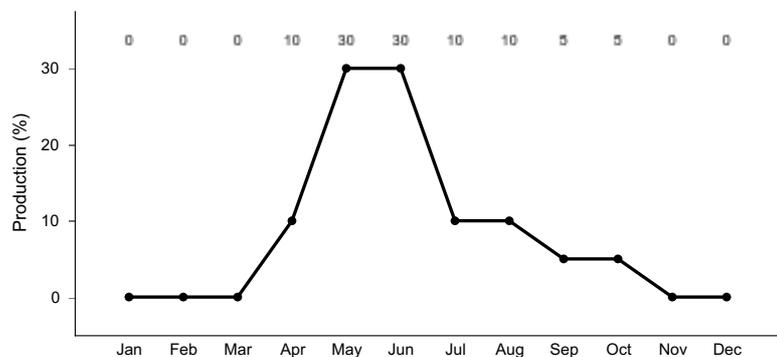
#### Community 1.1

#### State 1, Plant community A. Historic Climax Plant Community (HCPC)

The HCPC has Wyoming big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Needle and thread, Indian ricegrass, Sandberg bluegrass, and tapertip hawksbeard are sub-dominant. Natural fire frequency is 50-70 years.

**Table 4. Annual production by plant type**

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	210	420	600
Shrub/Vine	105	210	300
Forb	35	70	100
<b>Total</b>	<b>350</b>	<b>700</b>	<b>1000</b>

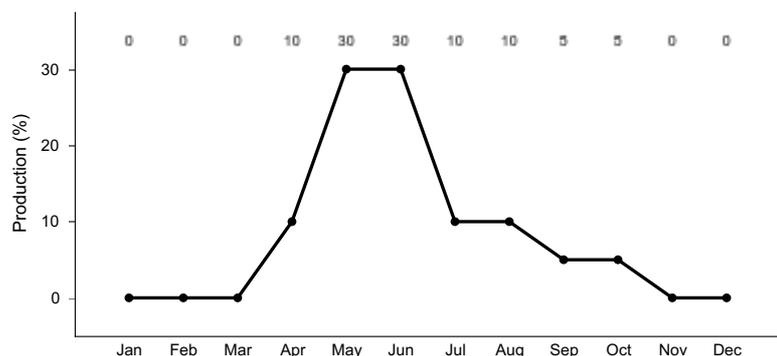


**Figure 4. Plant community growth curve (percent production by month). ID0701, ARTRW8/ PSSPS. State 1.**

**State 2  
State 1, Plant community B**

**Community 2.1  
State 1, Plant community B**

This plant community is dominated by Wyoming big sagebrush with reduced amounts of bluebunch wheatgrass. Sandberg bluegrass and bottlebrush squirreltail has increased in the understory. Needle and thread is gradually decreasing. There is a reduced amount of Indian ricegrass and perennial grasses. All deep-rooted perennial bunchgrasses are typically in low vigor. Wyoming big sagebrush has increased. This state has developed due to improper grazing management. Some cheatgrass may have invaded the site at lower elevations.



**Figure 5. Plant community growth curve (percent production by month). ID0701, ARTRW8/ PSSPS. State 1.**

**State 3  
State 1, Plant community C**

**Community 3.1  
State 1, Plant community C**

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Some Indian ricegrass may be present. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Plant Community

A. Very little Wyoming big sagebrush is present due to wildfire, but some rabbitbrush and horsebrush are present due to sprouting. Some cheatgrass has invaded the site at lower elevations. This plant community is the result of wildfire.

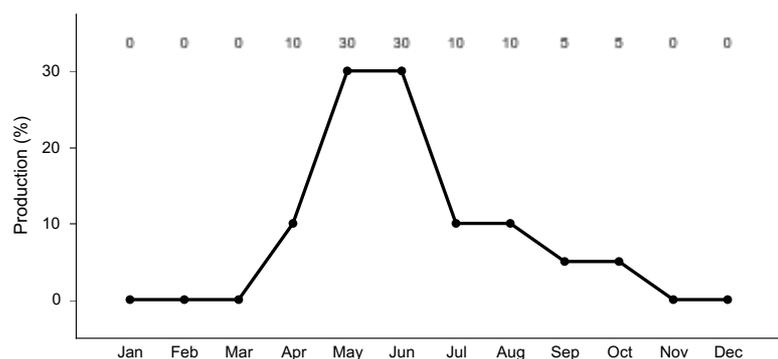


Figure 6. Plant community growth curve (percent production by month). ID0701, ARTRW8/ PSSPS. State 1.

**State 4**  
**State 2**

**Community 4.1**  
**State 2**

This plant community is dominated by Sandberg bluegrass, cheatgrass, and other annuals. Root sprouting shrubs such as rabbitbrush and horsebrush can be present, dependent upon, how frequent, fire has occurred. Some soil loss has occurred. This state has developed due to frequent fires or improper grazing management. The site has crossed the threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

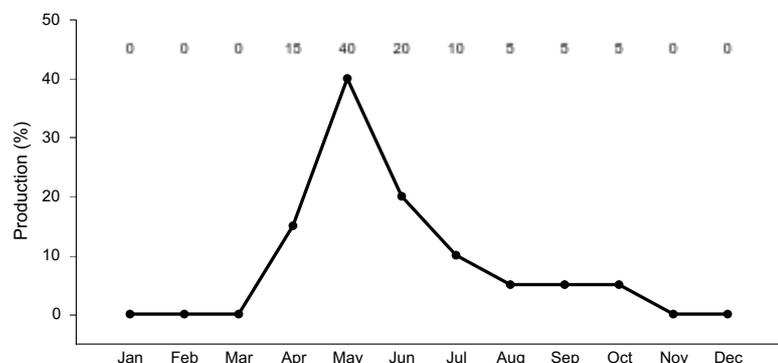


Figure 7. Plant community growth curve (percent production by month). ID0702, POSE/ BRTE- ANNUALS. State 2.

**State 5**  
**State 3**

**Community 5.1**  
**State 3**

This plant community is dominated by seeded species. The seeding may be introduced species or natives to mimic the HCPC.

**State 6**  
**Unknown new site**

**Community 6.1**  
**Unknown new site**

This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This state has developed due to continued improper grazing management and/or frequent fires. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

## **Additional community tables**

### **Animal community**

Wildlife Interpretations.

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, pronghorn antelope, and elk. Important seasonal habitat is provided for resident and migratory animals including western toad, 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. Area sensitive species may include northern leopard frog, burrowing owl, pygmy rabbit, Great Basin ground squirrel, Idaho pocket gopher, and Merriam's shrew. Changes in the plant community composition can reduce the number and diversity of wildlife species in the area. With reduced shrub cover, shrub obligate avian and mammal species become rare including sage-grouse, brewer's sparrow, sage sparrow, sage thrasher, and pygmy rabbits. Encroachment of noxious and invasive plant species (cheatgrass, Russian thistle, and knapweed) can replace native plant species which provide feed, brood-rearing, and nesting cover for a variety of native wildlife. Water features are sparse provided by seasonal streams, artificial water catchments, and springs.

State 1 Phase 1.1 - Wyoming Big Sagebrush/ Bluebunch Wheatgrass/ Needle and Thread/ Indian Ricegrass/ Sandberg Bluegrass 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 leopard lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, western toad, and northern leopard frog. 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. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Critical habitat (brood-rearing, nesting areas, winter cover and food) for sage grouse is provided by this diverse plant community. The plant community supports seasonal needs of large mammals (mule deer and antelope), providing forage and young of year cover. Wyoming big sagebrush is a preferred browse for large mammals. A diverse small mammal population including jackrabbit, deer mouse, Great Basin kangaroo rat, and golden-mantled ground squirrels may 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 of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, and western rattlesnake. The reduced diversity and populations of insects will reduce reptile diversity and populations. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Key shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Critical habitat (brood-rearing and nesting cover) for sage-grouse is limited due to a less diverse herbaceous plant community. The increase in shrub cover may reduce the quality of the habitat for burrowing owls. The reduced vigor of understory vegetation provides a shorter forage season for mule deer. Wyoming big sagebrush is a preferred browse for wild ungulates. Young of year cover would be provided for deer and antelope. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots, and pygmy rabbits 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 fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure and limits use by shrub obligate animals. Large areas of Phase 1.3 would fragment the reference plant community and would severely reduce the quality of habitat for shrub obligate animal species. Over time rabbitbrush and horsebrush may re-sprout and provide limited vertical structure for wildlife. Insect diversity would be reduced due to the loss of brush, but a native forb plant community would still support

select pollinators. Rabbitbrush would provide fall pollinator habitat. Reptile use, including short horned lizard, sagebrush lizard, and western rattlesnakes would be limited or excluded due to the absence of sagebrush. The dominance of herbaceous vegetation with little sagebrush canopy cover would reduce or 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 when sagebrush cover is nearby. The site does not provide suitable winter habitat or nesting cover for sage grouse. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer, antelope) use for foraging would be seasonal but the site would offer little thermal or young of year cover. Small mammal diversity would be reduced and the plant community would not provide suitable habitat for pygmy rabbits.

**State 2 - Sandberg Bluegrass/ Cheatgrass and Annual Plant Community:** This plant community is the result of continued improper grazing management and/or frequent fire. Large areas of State 2 would fragment the reference plant community and would severely reduce the quality of habitat for shrub obligate animal species. The loss of the native shrub and herbaceous plant community would not support a diverse insect community. Ants and grasshoppers may dominate the insect community. Most native reptilian species are not supported with food, water, or cover. This plant community does not support the habitat requirements for sage-grouse, sage thrasher, Brewer's sparrow, or sage sparrow. Diversity of bird species will be 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. Small mammal populations and diversity would be dominated by open grassland species like the Columbian ground squirrel. Hunting success by predators for small mammals would increase with the loss of suitable cover.

**State 3 - Range Seeding Plant Community:** The seeding mixture (native or non-native) determines the animal species that utilize this site. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in State 1 phase 1.3. A diverse seed mixture of grasses, forbs, and shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.2. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, avians, mammals, or sagebrush obligate animal species. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat, mule deer, and elk would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout this community looking for prey species. Large areas of State 3 with no shrubs in the plant community would fragment the reference plant community and would severely reduce the quality of the habitat for shrub obligate animal species.

#### Grazing Interpretations:

This site is suited for grazing by domestic livestock in late spring, early summer and fall.

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. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

### **Hydrological functions**

Soils on this site are in hydrologic group B. When the hydrologic conditions of the vegetation is good, the erosion hazard is slight.

### **Recreational uses**

This site has slight recreation or aesthetic value. Some hunting of big game and upland game does occur. Some spring blooming forbs add color to the landscape.

### **Wood products**

None

## Other products

None

## 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, Range Management Specialist, IASCD

Joe May, State Rangeland Management Specialist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

## Type locality

Location 1: Butte County, ID	
Township/Range/Section	T4 R29 S6
General legal description	Township: 4N Range: 29E Section: NE ¼, SE ¼, SEC. 6
Location 2: Butte County, ID	
Township/Range/Section	T6 R24 S5
General legal description	Township: 6N Range: 24E Section: SW ¼, NE ¼, SEC. 5 Field Offices Arco, ID Challis, ID Rexburg, ID Rigby, ID Salmon, ID

## Other references

Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush- Grass Habitat Types of Southern Idaho. University of Idaho. Moscow, Idaho. Bulletin Number 35

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USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; version 4-2005.

## Contributors

DLF

## Approval

Kendra Moseley, 9/22/2020

## 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	03/27/2007
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 rills are present they are likely to occur on slopes over 15 percent and immediately following wildfire. They are most likely to occur on silt loam surface textures.

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- 2. Presence of water flow patterns:** Water-Flow Patterns: rarely occur on this site except on slopes greater than 15 percent. If they occur, they are short and disrupted. They are disrupted by cool season grasses and medium 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. Where flow patterns and/or rills are present, few pedestals 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: data is not available. On sites in mid-seral status bare ground may range from 50-65 percent.

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- 5. Number of gullies and erosion associated with gullies:** Gullies: do not occur on this site.

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- 6. Extent of wind scoured, blowouts and/or depositional areas:** Wind-Scoured, Blowouts, and/or Deposition Areas: usually not present. Immediately following wildfire some soil movement may occur on lighter textured soils. Where sagebrush has repopulated the site after a fire, remnants of past wind scour may be present.

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- 7. Amount of litter movement (describe size and distance expected to travel):** Litter Movement: fine litter in the interspaces may move up to 2 feet following a significant run-off event. 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):** Soil Surface Resistance to Erosion: values should range from 4 to 6 but needs to be tested.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil Surface Loss or Degradation: the A or A1 horizon is typically 2 to 11 inches thick. Structure ranges from weak very thin, thin or moderately thick platy, to weak fine or moderate fine, medium granular to moderate fine or medium subangular blocky. Soil organic matter (SOM) ranges from 1 to 4 percent.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant Community Composition and Distribution Relative to Infiltration: bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Tall shrubs can catch snow in the interspaces.
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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: 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: Functional/ Structural Groups: cool season deep -rooted perennial bunchgrasses > tall shrubs > perennial forbs > shallow rooted bunchgrasses.
- Sub-dominant:
- Other:
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Plant Mortality/ Decadence: Wyoming big sagebrush will become decadent in the absence of normal fire frequency. Grass and forb mortality will occur as medium shrubs increase.
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14. **Average percent litter cover (%) and depth ( in):** Litter Amount: additional litter cover data is needed but is expected to be 5-20 percent to a depth of 0.1 inches. Under mature shrubs litter is
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual Production: is 700 pounds per acre (778 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 55-65 percent of the total production, forbs 5-15 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: includes cheatgrass, *Vulpia* sp., annual mustards, halogeton, Russian thistle, yellow salsify and spotted and diffuse knapweeds.

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17. **Perennial plant reproductive capability:** Reproductive Capability of Perennial Plants: all functional groups have the potential to reproduce in most years.
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