

## Ecological site R011XY021ID South Slope Stony 8-12 PZ ARTRW8/PSSPS

Last updated: 4/06/2020  
Accessed: 05/03/2024

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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): 011X–Snake River Plains

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Precipitation or Climate Zone: 8-12" P.Z.

### 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."

Land Resource Region: B (Northwest Wheat and Range)  
MLRA: 11 (Snake River Plains)  
EPA Eco Region: Level III (Snake River Plain)

### Ecological site concept

Site does receive additional moisture

Soils are:

Not saline or saline sodic

Moderately deep to deep, with >35% coarse fragments (by volume) in subsurface soil. Skeletal below soil surface 4"

May be strongly or violently effervescent in the surface mineral 10"

Textures range from silt loam to loam in the 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

R011XY001ID	<b>Loamy 8-12 PZ</b>
R011XY004ID	<b>Shallow Loamy 8-12 PZ</b>
R011XY005ID	<b>Stony 10-12 PZ</b>
R011XY007ID	<b>Gravelly 10-12 PZ</b>
R011XY008ID	<b>South Slope 10-12 PZ</b>

### Similar sites

R011XY005ID	<b>Stony 10-12 PZ</b>
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

### Physiographic features

This site occurs on convex slopes on canyonsides. The elevations range from 3200 to 5400 feet (975-1650 meters). Slopes range from 30-65 percent and occur on south and west aspects.

**Table 2. Representative physiographic features**

Landforms	(1) Canyon
Elevation	975–1,646 m
Slope	30–65%
Aspect	S, W

### Climatic features

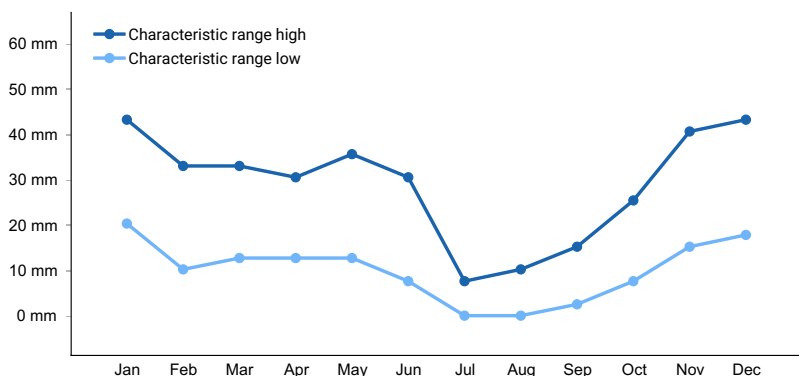
MLRA 11 is part of Idaho’s Snake River Plain. The elevation ranges from 2,077 to 7,549 feet, with a mean of 3,992 feet. Most of the precipitation falls as rain in the fall, winter and spring. Very little precipitation occurs during the summer months. In general this MLRA receives more sun than the U.S. average during the summer, but less than average during the winter.

The average annual precipitation is 10.01 inches (based on 10 long term climate stations located throughout the MLRA), with minimum and maximum values of 8.38 and 11.62 inches, respectively.

The average annual temperature ranges from 38° to 65° Fahrenheit. With a maximum average temperature of 65 degrees F. and a minimum average of 38 degrees F. The frost free interval ranges from 139 to 165 days and the freeze free interval ranges from 168 to 196 days.

**Table 3. Representative climatic features**

Frost-free period (average)	165 days
Freeze-free period (average)	196 days
Precipitation total (average)	305 mm



**Figure 1. Monthly precipitation range**

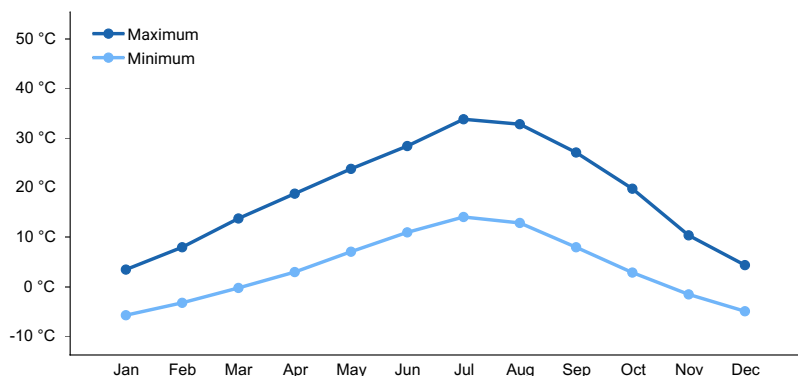


Figure 2. Monthly average minimum and maximum temperature

## Influencing water features

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

## Soil features

The soils supporting this site are moderately deep to very deep and are well drained, with moderately slow to moderate permeability above unconsolidated or hard lacustrine sediments. Runoff is high to very high. The erosion hazard is severe to very severe by water. The available water holding capacity (AWC) is low. Soil moisture regime is xeric or aridic.

Soil Series Correlated to this Ecological Site

Aridic argixerolls

Xeric Torriorthents

Table 4. Representative soil features

Surface texture	(1) Stony loam (2) Very stony
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover ≤3"	0–30%
Surface fragment cover >3"	0–30%
Available water capacity (0-101.6cm)	8.38–13.97 cm
Calcium carbonate equivalent (0-101.6cm)	0–25%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume ≤3" (Depth not specified)	5–15%
Subsurface fragment volume >3" (Depth not specified)	5–40%

## Ecological dynamics

The dominant visual aspect is bluebunch wheatgrass and Wyoming big sagebrush. Some antelope bitterbrush is present on the site. Composition by weight is approximately 50-60 percent grass, 10-20 percent forbs, and 25-35 percent shrubs.

The Historic Climax Plant Community (HCPC), the Reference State (State 1), 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 Reference Plant Community Phase is Phase A. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

During the last few thousand years, this site has evolved in a semi-arid climate characterized by dry summers and cold, moist winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include pronghorn antelope, mule deer, and lagomorphs. Fire has historically occurred on the site at intervals of 50-70 years. This site is dominated by bluebunch wheatgrass and Wyoming big sagebrush. Subdominant species include Sandberg bluegrass, arrowleaf balsamroot, lupine, antelope bitterbrush, and tall green rabbitbrush.

Total annual production is 600 pounds per acre (666 kilograms per hectare) in a normal year. Production in a favorable year is 750 pounds per acre (833 kilograms per hectare). Production in an unfavorable year is 500 pounds per acre (555 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted bunchgrasses are subdominant.

### FUNCTION:

This site is suited for big game and livestock as late spring and fall range. The site can be early spring and winter range for big game in moderate winters. It is also suited for recreation use in the summer and fall.

Due to the rainfall, elevation and steep topography on this site, it is susceptible to degradation from erosion. This is caused by improper grazing management or frequent fire. Infiltration is good where the community is in mid to late seral status. Runoff, when it does occur can be erosive on steeper slopes particularly during high intensity convection storms.

### Impacts on the Plant Community:

#### Influence of fire:

In the absence of normal fire frequency, Wyoming big sagebrush and antelope bitterbrush 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 and bitterbrush are reduced significantly. Rabbitbrush can increase slightly. With continued short fire frequency, Wyoming big sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Thurber's needlegrass. These species may be replaced by Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site. 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 an increase in Wyoming big sagebrush and/or an invasion of noxious and invasive species.

Continued improper grazing management influences fire frequency by increasing fine fuels. If cheatgrass increases

due to improper grazing management 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 reduction can lead to gradual increases in Wyoming big sagebrush. A planned grazing system can also 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 can increase cheatgrass which will lead to more frequent fire intervals.

#### Weather influences:

Above normal precipitation in March, April, and May 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 reduction in fire frequency.

#### Influence of Insects and disease:

Outbreaks can affect vegetation health. Bitterbrush can be severely affected by the western tent caterpillar (*Malacosoma fragilis*). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. The sagebrush defoliator moth (*Aroga websterii*) causes mortality in relatively small patches. It seldom kills the entire stand.

#### 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 and fall and in moderate winters. Their numbers are seldom high enough to adversely affect the plant community. Herbivory can be detrimental to bitterbrush when livestock grazing and browsing by big game occurs at the same time and season. This will occur when both kinds of animal are using the plant in the late summer or fall. The adverse impact is excessive use of the current year's leader growth. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

#### 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 and in the absence of fire.

Phase A to C. Develops with fire.

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

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

State 1 Phase B or C to State 2. Develops through frequent fire and/or improper grazing management. This site has crossed the threshold. It is economically impractical to move this site back to State 1 with accelerated practices.

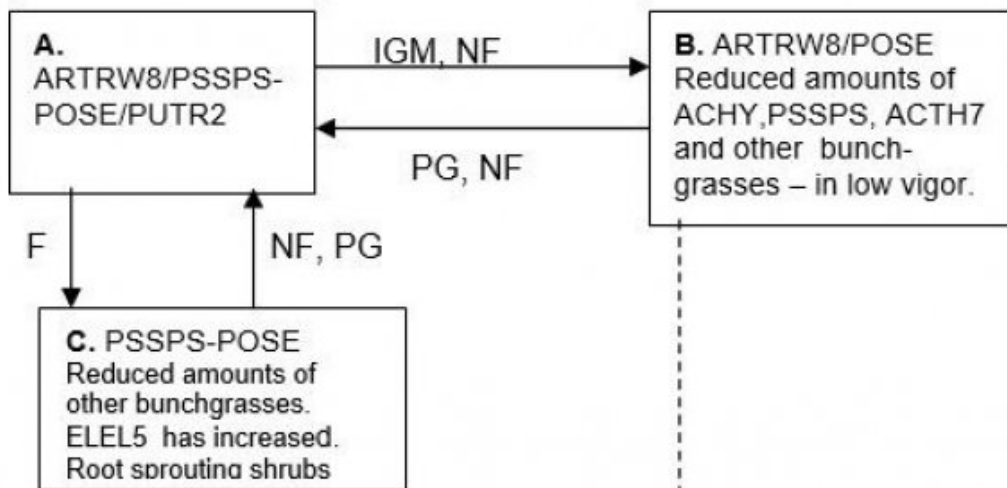
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is economically impractical to move this site back to State 1 with accelerated practices.

#### Practice Limitations

Only slight limitations exist on this site for implementing vegetative management practices. Usually this site will not be a key area for livestock management due to slope and stoniness. Moderate to severe limitations exist on this site for facilitating practices for livestock management. The steep slopes, stoniness, and limited soil depths will make construction of fences, pipelines, trough pads, and trails difficult. Stony soils and steep slopes present severe limitations for the use of ground travel equipment for seeding. The sparse vegetation will severely limit the use of fire to improve this site.

#### **State and transition model**

## STATE 1. Plant Community Phases



**STATE 2.**  
POSE-BRTE-ANNUALS  
Some root sprouting shrubs may be present

IGM and/or FF

UNKNOWN AND  
NEW SITE

### PLANT LEGEND STATES 1 & 2

ARTRW8- Wyoming Big Sagebrush  
 PSSPS - Bluebunch Wheatgrass  
 POSE - Sanberg Bluegrass  
 ACTH7 - Thurber's Needlegrass  
 BRTE - Cheatgrass  
 ELEL5 - Bottlebrush Squirreltail  
 PUTR2 - Antelope Bitterbrush

### LEGEND

IGM- Improper grazing management  
 PG- Prescribed grazing  
 FF- Frequent fire  
 NF- No fire  
 F- Fire

→ Community pathway (within states)

- - - - -> Reversible transition

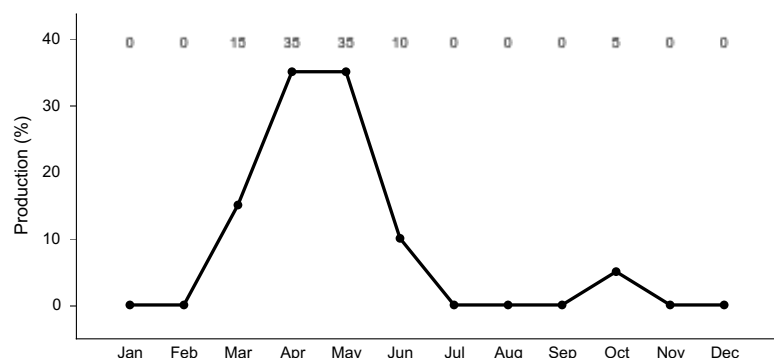
— Threshold

→ Irreversible transition

State 1  
State 1 Phase A

Community 1.1  
State 1 Phase A

Reference Plant Community Phase. This plant community has Wyoming big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Sandberg bluegrass, basin wildrye, antelope bitterbrush, and lupine are sub-dominant species. Other significant species in the plant community can include Thurber's needlegrass, bottlebrush squirreltail, Indian ricegrass, needle and thread, phlox, arrowleaf balsamroot, and tall green rabbitbrush. Natural fire frequency is 50-70 years.

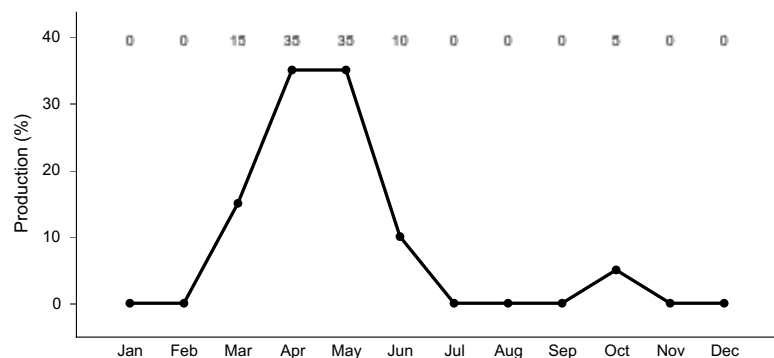


**Figure 3. Plant community growth curve (percent production by month). ID0407, ARTRW8/PSSPS LOW PRECIP.. State 1.**

## State 2 State 1 Phase B

### Community 2.1 State 1 Phase B

This plant community is dominated by Wyoming big sagebrush with reduced amounts of bluebunch wheatgrass. Sandberg bluegrass and bottlebrush squirreltail have increased in the understory. There is a reduced amount of Indian ricegrass and Thurber's needlegrass. All deep-rooted perennial bunchgrasses are typically in low vigor. Wyoming big sagebrush has increased. This state has developed due to improper grazing management and lack of fire. Some cheatgrass may have invaded the site.



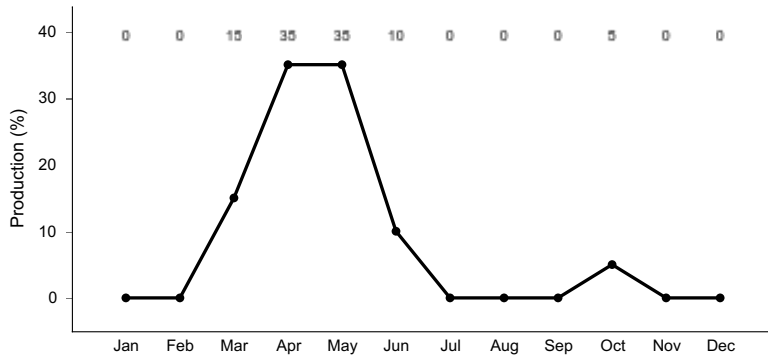
**Figure 4. Plant community growth curve (percent production by month). ID0407, ARTRW8/PSSPS LOW PRECIP.. State 1.**

## State 3 State 1 Phase C

### Community 3.1 State 1 Phase C

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Fine-leaved grasses such as Thurber's needlegrass can be lost due to fire. Some needle and thread may be present. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Phase A. Very little Wyoming big sagebrush is present due to wildfire, but some rabbitbrush and horsebrush are present due to sprouting. Some cheatgrass may have invaded the site. This plant community is the result of wildfire.



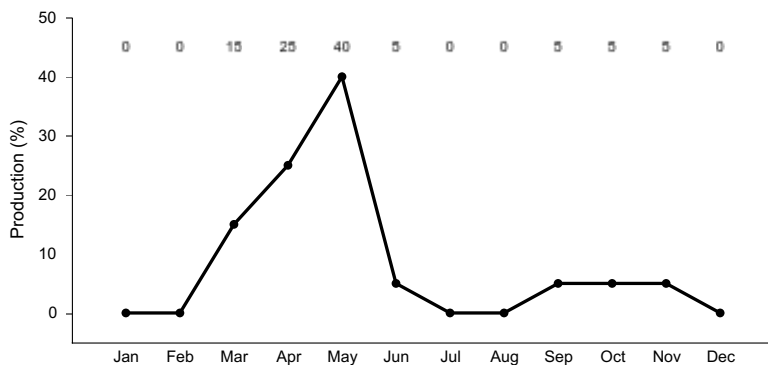


**Figure 5. Plant community growth curve (percent production by month). ID0407, ARTRW8/PSSPS LOW PRECIP.. State 1.**

**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 frequently, fire has occurred. Some soil loss has occurred. This state has developed due to frequent fires and/or improper grazing management from Phase B or C State 1. This site has crossed the threshold. It is uneconomical to return it to State 1 with accelerated practices.



**Figure 6. Plant community growth curve (percent production by month). ID0411, BRTE/ ANNUALS . State 2.**

**State 5  
Unknown New Site**

**Community 5.1  
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. This site has crossed the threshold. It is uneconomical to return it 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 and to a lesser extent antelope depending on topography and height of brush. 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. 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 species become rare including sage-grouse, brewer's sparrow, sage sparrow, and sage thrasher. Encroachment of noxious and invasive plant species (cheatgrass) can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water is limited only being provided by seasonal runoff, artificial water catchments, and isolated springs.

State 1 Phase 1.1 - Wyoming Big Sagebrush/ Bluebunch Wheatgrass/ Sandberg Bluegrass/ Antelope Bitterbrush 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, and western toad. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Critical habitat (brood-rearing, winter cover and food) for sage-grouse is provided by this diverse plant community. The plant community supports the needs of mule deer providing food and cover on a seasonal basis. Winter habitat is provided for mule deer. Antelope bitterbrush and Wyoming big sagebrush are preferred browse for ungulates. The degree of slope and height of brush would limit use by antelope on the site. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize this plant community. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.2 - Wyoming Big Sagebrush/ Sandberg Bluegrass/ Plant Community: This plant community is the result of improper grazing management and no fire. 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 reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, and western toad. Diversity and populations of reptiles and amphibians may be reduced due to reduced prey species and cover. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Development of spring sites that collect all available water would exclude the use of amphibians on these sites. Shrub-steppe obligate animals still supported on the site include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Brood-rearing habitat for sage-grouse is limited due to a less diverse herbaceous plant community. The plant community supports seasonal needs of mule deer providing food, thermal cover and young of year cover. Quality of winter habitat for mule deer is reduced due to a reduction of antelope bitterbrush within the stand. A small mammal population including golden-mantled ground squirrels, chipmunks, kangaroo rats, and yellow-bellied marmots would utilize this plant community. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.3 - Bluebunch Wheatgrass/ Sandberg Bluegrass 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. Insect diversity would be reduced but a native forb plant community similar to State 1 Phase 1.1 would still support select pollinators. 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 eliminate use of these areas for nesting by Brewer's sparrow, sage sparrow, and sage thrasher. This plant community provides brood-rearing habitat for sage-grouse when sagebrush cover is nearby. Winter habitat for sage-grouse is eliminated. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer and antelope) use for food would be seasonal but the site would offer little thermal and young of year cover. Antelope use may increase with the reduction of brush cover. Predator hunting success may increase. Small mammal diversity would be reduced but use by kangaroo rats may increase.

State 2 - Sandberg Bluegrass/ Cheatgrass/ Annual Plant Community: This plant community is the result of continued improper grazing management and/or frequent fire. The loss of the native shrub and herbaceous plant community would not support a diverse insect community. The reduced forb component in the plant community would support a very limited population of pollinators. 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 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 (mule deer and antelope) 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. Predator hunting success may increase. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

Grazing Interpretations.

This site is best suited for livestock as late spring and fall range.

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**

When hydrologic conditions of the vegetative cover are good, natural erosion hazard is severe to very severe.

## **Recreational uses**

It is suited for recreation use in the summer and fall. Some opportunities exist for hunting of big game and upland birds. This site provides excellent sight seeing opportunities due to spring blooming flowers and antelope bitterbrush. During late spring and early summer, smaller birds, such as larks and mountain bluebirds, frequent the site and provide opportunities for bird watching.

## **Wood products**

None.

## **Other products**

None.

## **Other information**

Field Offices

Meridian, ID

Caldwell, ID

Mountain Home, ID

Gooding, ID

Shoshone, ID

Rupert, ID

## **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

Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho

Leah Juarros, Resource Soil Scientist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

## 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.

## Approval

Kendra Moseley, 4/06/2020

## 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.

Author(s)/participant(s)	Dave Franzen and Jacy Gibbs Intermountain Range Consultants 17700 Fargo Rd. Wilder, ID 83676
Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	06/18/2009
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 due to steep slopes, low water-holding capacity and percent bare ground. Gravel and stones on the surface reduces erosion.

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- 2. Presence of water flow patterns:** water-flow patterns are common on this site. When they occur they may be long, continuous, and extensive.

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- 3. Number and height of erosional pedestals or terracettes:** both can occur on this site but are not extensive. Terracettes develop uphill from the large bunchgrasses and shrubs.

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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 5-10 percent.

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5. **Number of gullies and erosion associated with gullies:** does not occur on this site.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** usually does 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 5 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 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):** No data.
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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. Tall 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):** 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
- Other: perennial forbs
- Additional: shallow rooted grasses
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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 and antelope bitterbrush 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 <0.1". Under the mature shrubs litter is greater than 0.5 inches. Fine litter can accumulate on the terracettes and behind surface stones.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 600 lbs. per acre in a year with normal precipitation and temperatures. Production is normally low due to low infiltration, steep south aspect and low to moderate water capacity. Perennial grasses produce 50-60 percent of the total, forbs 10-20 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:** includes cheatgrass, medusahead rye, bulbous bluegrass, rush skeletonweed, scotch thistle, andspotted and diffuse knapweed.

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

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