

## Ecological site R011XB016ID Sand 8-12 PZ ARTRT-PUTR2/HECOC8

Last updated: 4/06/2020  
Accessed: 05/07/2024

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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

Major Land Resource Area (MLRA): 011X – Snake River Plains  
Precipitation or Climate Zone: 8-12” P.Z.

### Classification relationships

Similar to *Artemisia tridentate/Stipa comata* 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 not receive additional moisture

Soils are:

Not saline or saline sodic

Deep to very deep, with <35% coarse fragments (by volume), not skeletal  
not strongly or violently effervescent in the surface mineral 10”

Surface textures range from loam sand to fine sand 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

R011XA003ID	<b>Shallow Loam 8-12 PZ ARTRT/PSSPS</b>
R011XB003ID	<b>Stony Loam 8-12 PZ ARTRW8/PSSPS</b>
R011XB006ID	<b>Loamy 8-12 PZ ARTRT/LECI4</b>
R011XB009ID	<b>Shallow Stony 8-12 PZ ARTRW8/PSSPS</b>
R011XY007ID	<b>Gravelly 10-12 PZ</b>
R011XY008ID	<b>South Slope 10-12 PZ</b>
R011XY015ID	<b>Loamy Bottom 8-14 PZ ARTRT/LECI4</b>

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

This site occurs in areas of partially stabilized eolian dunes. Some parts of the area are being re-worked by the wind. The dunes are in an upland position and are long and narrow; oriented in the direction of the prevailing winds. Slopes typically range from 1 to 30 percent while the more stabilized areas slopes are generally from 1 to 10 percent. Elevations range from 4000 to 6000 feet (1200-1800 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Lava plain
Flooding frequency	None
Elevation	1,219–1,829 m
Slope	1–30%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

## Climatic features

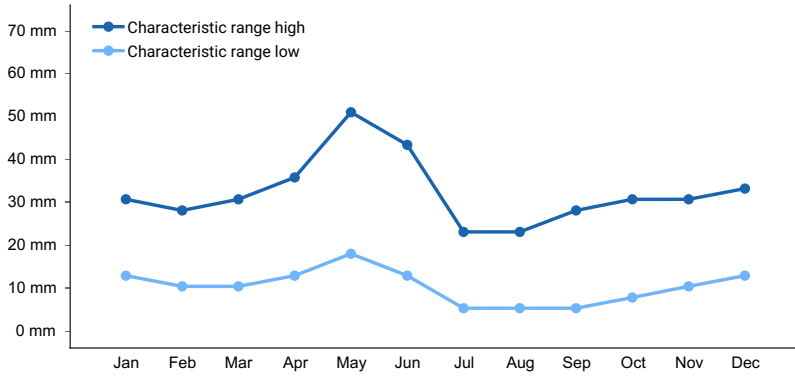
The Upper Snake River Plain, MLRA 11B, is part of the Northwestern Wheat and range Region. It has a mean elevation of 4841 feet above sea level, and varies from 4177 to 4841 feet. In general, it is a geologically young, level to gently sloping lava plateau. In places larger streams have cut deep, steep-walled canyons. The average annual precipitation, based on 10 long term climate stations located throughout the MLRA, is 10.88 inches. The averaged low is 8.74 inches and the maximum average is 12.69. Monthly precipitation usually peaks in May, then drop off rapidly to reach its low in July and August. The climate station at Aberdeen Experiment Station (1000010) has records of zero precipitation in 11 months of the year, and as low as 0.03 inches in December, the lone non-zero month.

Temperatures can be extremely variable across the year. Highs of up to 104° and lows down to -42° Fahrenheit have been recorded. The average annual temperature from ten climate stations is 44.75° F. The frost-free period ranges from 91 to 115 days. The freeze-free period can last from 123 to 146 days.

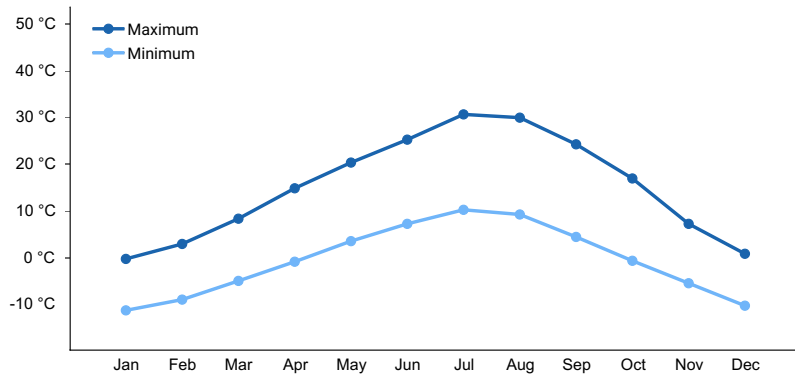
Both morning and afternoon average relative humidity values reach their low in August, and are far below the national average. Wind speed peaks in the Spring, and is generally somewhat above the national average. The average number of sunny, cloud-free days is above average for the summer months, but below average for the period from November through February. The average total snowfall is approximately 29 inches.

**Table 3. Representative climatic features**

Frost-free period (average)	115 days
Freeze-free period (average)	146 days
Precipitation total (average)	330 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 deep to very deep, excessively drained, and have very rapid permeability. Runoff is low to very low. The erosion hazard is slight to moderate by water, and moderate to high by wind. The available water holding capacity (AWC) is very low to low. These soils are usually greater than 60 inches deep to bedrock. The surface texture is generally sand, loamy sand, or fine sand with no surface stones. The subsoil is usually slightly developed with clay ranging from approximately 2 to 10 percent. These soils are characterized by limited AWC, an aridic or xeric soil moisture regime and the lack of shallow restrictive layers. Soil temperature regime is frigid.

Soil Series Correlated to this Ecological Site

Wolverine  
Grassy Butte  
Grassyridge

**Table 4. Representative soil features**

Surface texture	(1) Sand (2) Loamy sand (3) Fine sand
Drainage class	Excessively drained
Permeability class	Very rapid
Soil depth	102–152 cm

Surface fragment cover <=3"	4%
Available water capacity (0-101.6cm)	5.08–7.87 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–3%

## Ecological dynamics

The dominant visual aspect of this site is basin big sagebrush and antelope bitterbrush in the overstory with needle and thread in the understory. Composition by weight is approximately 45 to 55 percent shrubs, 5 to 15 percent forbs, and 35 to 45 percent shrubs.

During the last few thousand years, this site has evolved in a semi-arid climate characterized by dry summers and cold winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, Rocky Mountain elk, lagomorphs, and small rodents.

Fire has historically occurred on the site at intervals of 50 to 70 years.

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. This plant community is dominated by needle and thread, basin big sagebrush, and antelope bitterbrush. Other species that can be significant in the community include Indian ricegrass, sand dropseed, thickspike wheatgrass, western wheatgrass, and arrowleaf balsamroot. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 400 pounds per acre (48 kilograms per hectare) in a normal year. Production in a favorable year is 700 pounds per acre (784 kilograms per hectare). Production in an unfavorable year is 300 pounds per acre (336 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

### FUNCTION:

This site is suited for livestock grazing in the spring, fall, and winter. The site can be winter range for big game in the winter. This site has limited value for recreational uses, but some hiking and photographic opportunities exist. Off road vehicle use can easily degrade the site.

This site is susceptible to degradation due to the gentle slopes, ease of access, and instability of sandy surface textures. Infiltration is good where the community is in mid to late seral status. The site has slow runoff potential but wind erosion hazard is high. The plant community needs a mix of deep rooted grasses and shrubs to be stable.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, basin big sagebrush and antelope bitterbrush can gradually increase on the

site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, basin big sagebrush can displace most of the primary understory species.

When fires become more frequent than historic levels (50-70 years), basin big sagebrush and antelope bitterbrush are reduced significantly. Rabbitbrush and horsebrush can increase slightly. With continued short fire frequency, basin big sagebrush and antelope bitterbrush can be completely eliminated along with many of the desirable understory species such as needle and thread and Indian ricegrass. These species may be replaced by bottlebrush squirreltail and sand dropseed 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. Root sprouting shrubs such as rabbitbrush and horsebrush may increase. After each fire, the sandy surface soils are susceptible to severe wind erosion.

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 and possibly antelope bitterbrush. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in basin big sagebrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by reducing fine fuels. As cheatgrass increases and becomes co-dominant with 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 basin big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management needs to be carefully planned because of the Antelope Bitterbrush present. Loss of brush species on this site can have very negative impacts on wildlife.

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:

Outbreaks can affect health of vegetation, particularly bitterbrush with western tent caterpillars (*Malacosoma fragilis*). Two consecutive years of defoliation by the tent caterpillars can cause mortality in bitterbrush. An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available. 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. Many of the annual and perennial 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 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 years' leader growth.

Watershed:

Decreased infiltration and increased runoff occur with an increase in basin 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 C to State 2. Develops through frequent fires and/or improper grazing management. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

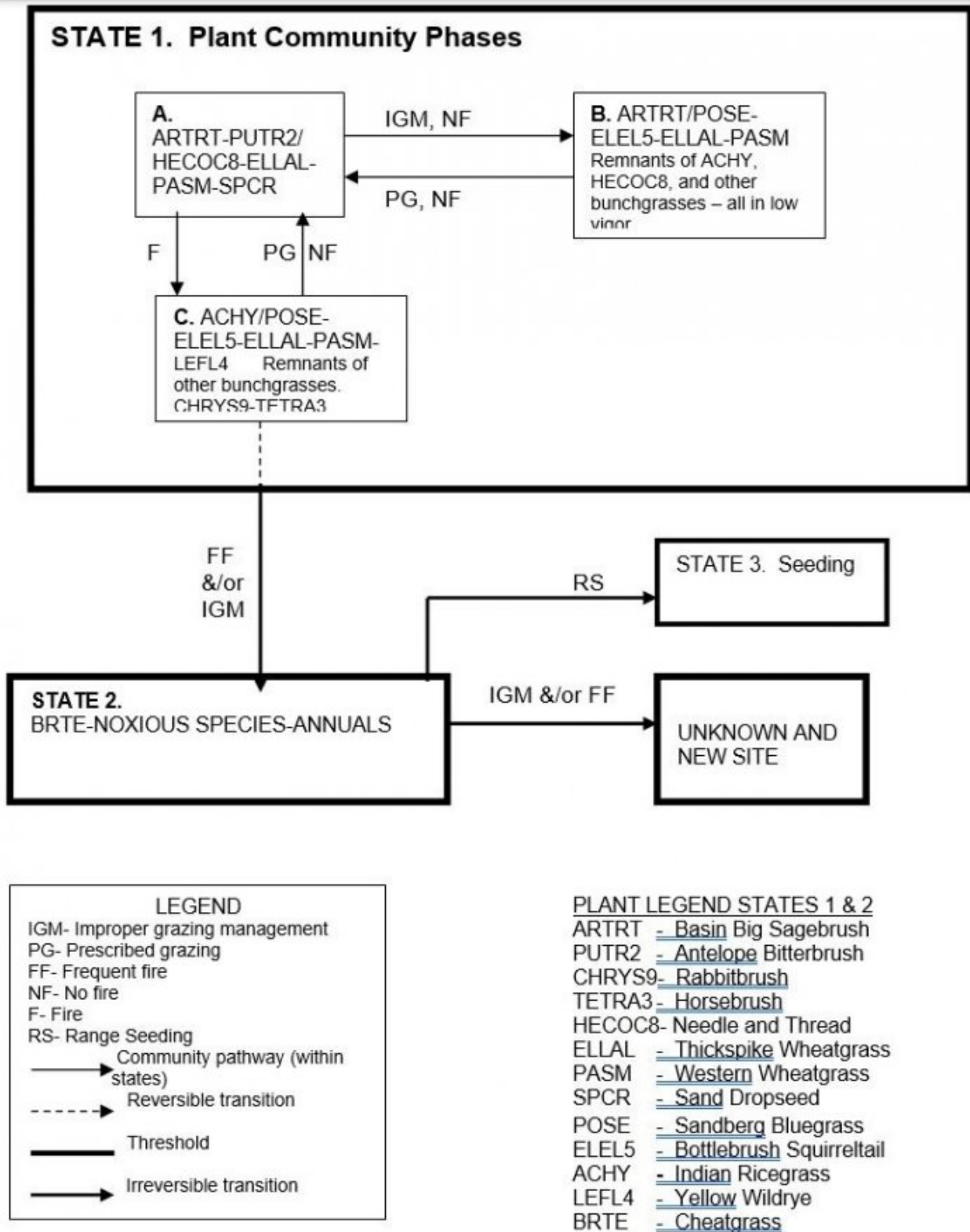
State 2 to State 3. Develops through range seeding.

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 the threshold and retrogress to a new site with reduced potential. It is economically impractical to return this state to State 1 with accelerated practices.

Practice Limitations:

No physical limitations exist for seeding on this site. There is a high risk of failure due to the low moisture holding capacity of the soil, low precipitation, and hazard of wind erosion. There are no physical limitations that exist for brush management on this site. Planning should carefully analyze the stand of perennial grasses and forbs, because removal of basin big sagebrush can result in significant wind erosion.

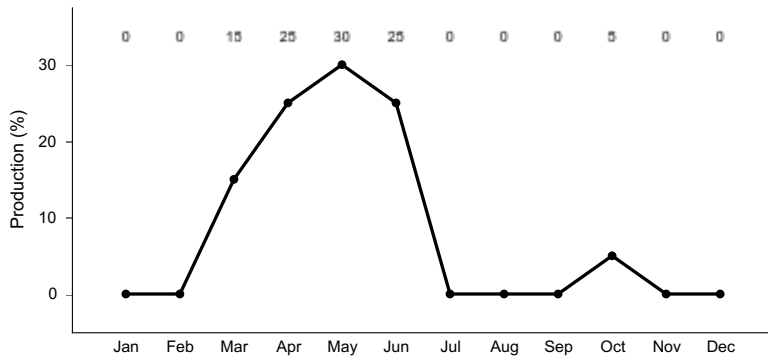
**State and transition model**



**State 1**  
**State 1 Phase A**

**Community 1.1**  
**State 1 Phase A**

This plant community is dominated by basin big sagebrush, antelope bitterbrush, and needle and thread. Other species that can be significant in the community include thickspike wheatgrass, western wheatgrass, sand dropseed, Indian ricegrass, and arrowleaf balsamroot. A variety of other grasses, forbs, and shrubs can occur in the plant community in minor amounts. Natural fire frequency is 50-70 years.

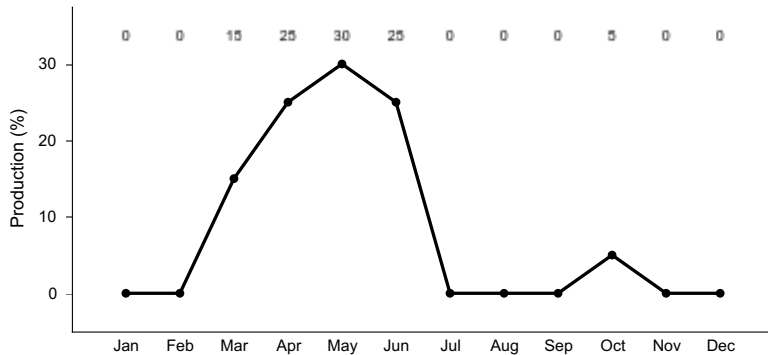


**Figure 3. Plant community growth curve (percent production by month). ID0605, ARTRW8 -PSSPS . State 1.**

**State 2  
State 1 Phase B**

**Community 2.1  
State 1 Phase B**

This plant community is dominated by basin big sagebrush with Sandberg bluegrass and bottlebrush squirreltail in the understory. Significant amounts of thickspike wheatgrass and western wheatgrass may also be present. There are reduced amounts of Indian ricegrass and needle and thread. Other bunchgrasses have been significantly reduced. All deep-rooted bunchgrasses are in reduced vigor. Basin big sagebrush has increased. Antelope bitterbrush may be present but in reduced vigor and hedged. This state has developed due to improper grazing management and lack of fire. Rabbitbrush and horsebrush may have increased.



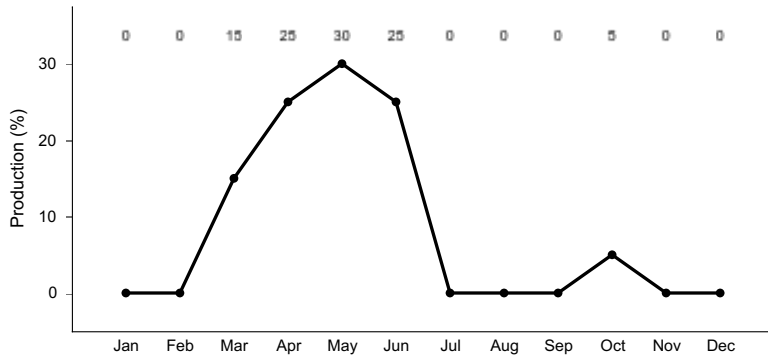
**Figure 4. Plant community growth curve (percent production by month). ID0605, ARTRW8 -PSSPS . State 1.**

**State 3  
State 1 Phase C**

**Community 3.1  
State 1 Phase C**

This plant community is dominated by Indian ricegrass with some Sandberg bluegrass. Bottlebrush squirreltail has increased. Thickspike wheatgrass, western wheatgrass, yellow wildrye, and basin wildrye are about the same as Phase A. Other bunchgrasses have been significantly reduced. Forbs remain about in the same proportion as Phase A. Only small amounts of basin big sagebrush and antelope bitterbrush are present due to wildfire, but some rabbitbrush and horsebrush are present due to sprouting and may have increased. Cheatgrass may have invaded the site. This plant community is the result of wildfire.



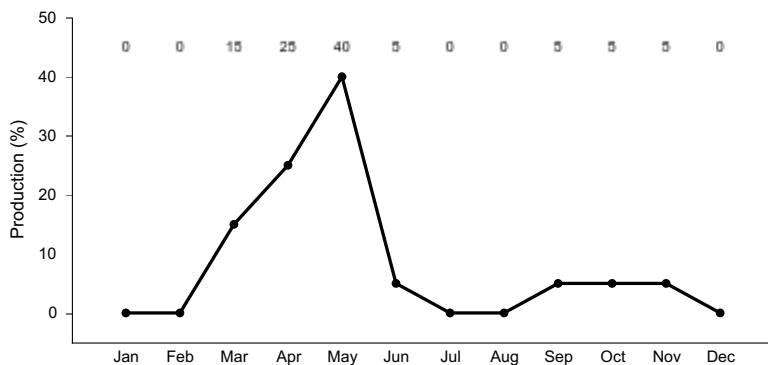


**Figure 5. Plant community growth curve (percent production by month). ID0605, ARTRW8 -PSSPS . State 1.**

**State 4  
State 2**

**Community 4.1  
State 2**

This plant community is dominated by cheatgrass, invasive plant species, and other annuals. Root sprouting shrubs such as rabbitbrush and horsebrush can be present, dependent upon, how frequent, fire has occurred. This state has developed due to frequent fires and/or improper grazing management. Some soil loss has occurred. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.



**Figure 6. Plant community growth curve (percent production by month). ID0611, POSE/ BRTE/ ANNUALS . State 2.**

**State 5  
State 3**

**Community 5.1  
State 3**

State 3. This plant community is dominated by the seeded species. The seeding can be introduced species or native species that mimic State 1. This community is the result of range seeding.

**State 6  
State 4**

**Community 6.1  
State 4**

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. The site may resemble an active dune. It is economically impractical to return this state 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 include Great Basin ground squirrel, Townsend pocket gopher, and St. Anthony sand dune tiger beetle. 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) 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 and artificial water catchments. This rangeland ecological site can be associated with pre-historic lava flows which provide unique cave habitats for several sensitive animal species, including the Blind Cave Leiodid Beetle, Cave Obligate Mite, Bats, and the Cave Obligate Harvestman.

State 1 Phase 1.1 - Basin Big Sagebrush/ Antelope Bitterbrush/ Needle and Thread/ Thickspike Wheatgrass/ Western Wheatgrass/ Sand Dropseed Reference Plant Community (RPC): The RPC provides a diversity of grasses, forbs, and shrubs, used by native insect communities who assist in the pollination process for the plant community. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, western toad, boreal chorus frog, and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Shrub-steppe obligate avian species of concern include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Critical habitat (lek sites, brood-rearing, nesting areas, winter cover and food) for the sage-grouse is provided by this diverse plant community. The plant community supports seasonal (winter and spring) needs of large mammals (mule deer, antelope, and elk) providing food and cover. Basin big sagebrush, antelope bitterbrush, and thickspike wheatgrass are desired browse for wild ungulates. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots, and pygmy rabbits may utilize the site.

State 1 Phase 1.2- Basin Big Sagebrush/ Sandberg Bluegrass/ Bottlebrush Squirreltail/ Thickspike Wheatgrass/ Western Wheatgrass Plant Community: This state has developed due to improper grazing management and lack of fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. The reduced herbaceous understory results in a lower diversity of insects. The reptile and amphibian community is represented by leopard lizard, desert horned lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, western toad, boreal chorus frog, and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. A decrease in populations and diversity of reptiles and amphibians may occur due to the reduced diversity and canopy cover of herbaceous vegetation. Shrub-steppe avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Critical habitat (nesting areas and brood rearing) for sage-grouse is limited due to the reduced diversity and canopy cover of herbaceous vegetation. The plant community provides escape cover and thermal cover for deer, elk, and antelope. Winter food habitat for large mammals is limited due to a reduction of antelope bitterbrush and the understory. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots, and pygmy rabbits may utilize the site.

State 1 Phase 1.3 – Indian Ricegrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail/ Thickspike Wheatgrass/ Western Wheatgrass/ Yellow Wildrye Plant Community: This plant community is the result of frequent fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure, limiting use by shrub obligate animals. Insect diversity would be reduced but a diverse native forb plant community 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, sage

thrasher, and sage-grouse. This plant community provides limited brood-rearing habitat for sage-grouse if adjacent to sagebrush cover. 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, antelope, and elk) use for food would be seasonal (spring, early summer, and fall) but the site would offer little thermal and young of year cover. Small mammal diversity would be reduced and the plant community would not provide suitable habitat for pygmy rabbits.

**State 2 – Cheatgrass/ Noxious Species/ Annuals Plant Community:** This 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 reptilian species would not be supported with food, water, or cover. The plant community would not support sage-grouse, sage thrasher, Brewer's sparrow, or sage sparrow. 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) would be more palatable. At other times of the year large mammals would not regularly utilize these areas due to poor food and cover conditions. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

**State 3 - Range Seeding Plant Community:** The proposed seeding mixture (native or non-native) would determine the animal species that would utilize the area. 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, birds, or mammals. Sagebrush obligate animal species would not be supported by a monoculture of grass species. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat, and elk would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout these areas looking for prey species.

#### Grazing Interpretations.

This site is best suited for grazing by livestock in late spring to early summer and again in the fall. Extreme care must be exercised in grazing management due to vulnerability to erosion by wind once the cover is disturbed. 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**

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

### **Recreational uses**

The gently rolling dune-like topography offers some aesthetic values. The site can be used for hiking, hunting and photography. ATV use can cause degradation of the site and cause severe wind erosion.

### **Wood products**

None

### **Other products**

None

### **Other information**

Field Offices

Burley, ID  
Shoshone

American Falls, ID  
Pocatello, ID  
Blackfoot, ID  
Arco, ID  
Rexburg, ID  
St. Anthony, ID  
Rigby, ID  
Fort Hall, ID  
Idaho Falls, 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

## Type locality

Location 1: Fremont County, ID	
Township/Range/Section	T7N R39E S18

## 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".  
USDA Forest Service, Rocky Mountain Research Station. 2004. Restoring Western Ranges and Wildlands. General Technical Report RMRS-GTR-136-vols. 1-3.  
USDA, NRCS.2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.  
USDA, Forest Service, Fire Effects Information Database. 2004. [www.fs.fed.us/database/feis](http://www.fs.fed.us/database/feis)  
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.

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Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	04/02/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** rills are rare on this site. If they are present they are likely to occur immediately following wildfire and a high intensity convection storm and on slopes in excess of 10 percent. Sandy surface texture will limit rill development.

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2. **Presence of water flow patterns:** flow patterns are rare on this site. They may occur immediately following a high intensity convection storm and on slopes greater than 10 percent. If they occur, they are short and disrupted by cool season grasses and tall shrubs and are not extensive. Water infiltration is generally rapid for the site.

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3. **Number and height of erosional pedestals or terracettes:** both pedestals and terracettes are rare on this site.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** data is not available for this site. On sites in mid-seral status, bare ground is expected to be about 50-60%. This site is naturally unstable due to sandy surface textures particularly following a wildfire.

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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 scour and depositional areas can occur on this site, particularly following a wildfire. Deposition will be noticeable in the crowns of bunchgrasses and at the base of shrubs.

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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 2 feet following a significant run-off event or further with wind. 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 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):** structure typically includes weak single grain or weak granular. Soil organic matter (SOM) ranges from 0 to 2 percent. The surface horizon is typically 2 to 5 inches thick.

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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 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):** 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 bunchgrasses
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** basin 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):** additional litter cover data is needed but is expected to be 5-10 percent to a depth of <0.1 inches. Under mature shrubs litter is >0.5 inches deep and is 90-100 percent ground cover.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 400 pounds per acre (448 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 45-55 percent of the total production, forbs 5-15 percent, and shrubs 30-40 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, clasping pepperweed, beggars ticks, tansymustard, Jim Hill tumbledustard, yellow salsify, burr buttercup, medusahead, Russian thistle, annual kochia, and halogeton.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years.
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