USDA Natural Resources
Conservation Service

Ecological site R011XY008ID
South Slope 10-12 PZ

Last updated: 4/06/2020
Accessed: 05/12/2025

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: 10-12” 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 not receive additional moisture
Soils are:
Not saline or saline sodic
moderately deep to very deep, with <35% coarse fragments (by volume), not skeletal
not strongly or violently effervescent in the surface mineral 10”
Textures range from coarse sandy 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	**Loamy 8-12 PZ**
R011XY004ID	**Shallow Loamy 8-12 PZ**
R011XY005ID	**Stony 10-12 PZ**
R011XY007ID	**Gravelly 10-12 PZ**
R011XY008ID	**South Slope 10-12 PZ**
R011XY009ID	**Silty 7-10 PZ KRLA2/ACHY**
R011XY010ID	**Calcareous Loam 7-10 PZ ATCO-PIDE4/ACHY-ACTH7**
R011XY011ID	**Sand 8-12 PZ ARTRT/ACHY**

R011XY014ID	**Sandy Loam 8-12 PZ ARTRW8/ACHY-HECOC8**
R011XY015ID	**Loamy Bottom 8-14 PZ ARTRT/LECI4**

Table 1. Dominant plant species

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

Physiographic features

This site occurs on south facing strongly sloping to steep foothills with slopes greater than 30 percent. This site is primarily south facing with some western aspects. Elevations range from 2300 to 3500 feet (700-1100 meters). This site is associated with river canyons.

Table 2. Representative physiographic features

Landforms	(1) Terrace
Flooding frequency	None
Elevation	701–1,067 m
Slope	30–70%
Water table depth	152 cm
Aspect	S, SW

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

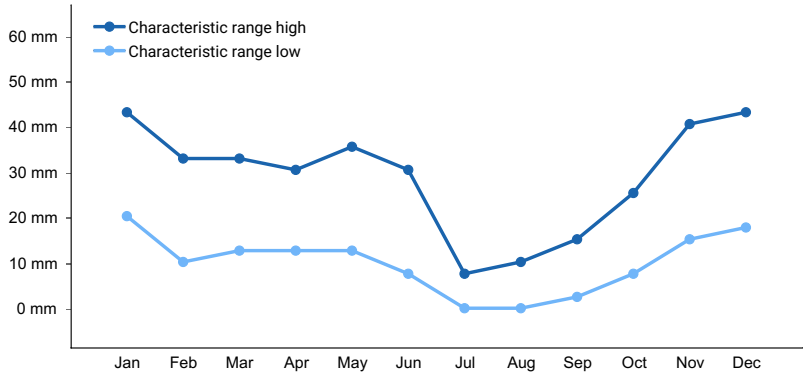


Figure 1. Monthly precipitation range

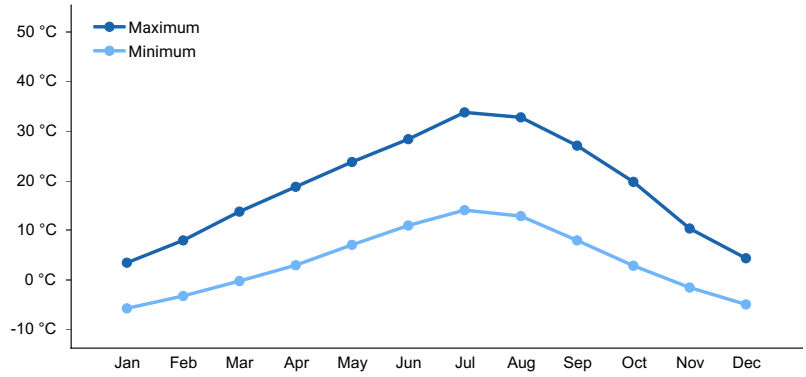


Figure 2. Monthly average minimum and maximum temperature

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, well drained, with slow to moderately rapid permeability. Runoff is medium to very high. The erosion hazard is severe or very severe by water. The available water holding capacity (AWC) is low to moderate. The surface texture is generally sandy loam. Mackey has many stones on the surface. Gravels and stones may be present throughout the profile but generally do not affect kind and amount of vegetation on the site. Soils generally have rapid warm-up in spring and remain warm throughout the summer due to slope position and aspect. These soils are characterized by a xeric or aridic soil moisture regime that borders on xeric. Soil temperature regime is mesic.

Soil Series Correlated to this Ecological Site

Brent
Glasgow
Haw
Lankbush
Lanktree
Lolalita
Mackey
Payette
Saralegui

Table 4. Representative soil features

Surface texture	(1) Extremely stony sandy loam (2) Loam (3) Coarse sandy loam
Drainage class	Well drained
Permeability class	Slow to moderately rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	0–12%
Surface fragment cover >3"	0–30%
Available water capacity (0-101.6cm)	9.14–20.07 cm
Soil reaction (1:1 water) (0-101.6cm)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–23%
Subsurface fragment volume >3" (Depth not specified)	0–26%

Ecological dynamics

The dominant visual aspect of the site is Wyoming big sagebrush and bluebunch wheatgrass. Composition by weight is approximately 60 to 70 percent grass, 10 to 15 percent forbs, and 15 to 20 percent shrubs.

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

Fire has historically occurred on the site at intervals of 60-80 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 bluebunch wheatgrass and Thurber’s needlegrass in the understory and Wyoming big sagebrush in the overstory. Subdominant species include Indian ricegrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot, and tapertip hawksbeard. There is a large variety of other forbs and some other shrubs that can occur in minor amounts. 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 (448 kilograms per hectare) in a normal year. Production in a favorable year is 600 pounds per acre (672 kilograms per hectare). Production in an unfavorable year is 250 pounds per acre (280 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 perennial bunchgrasses are subdominant.

FUNCTION:

This site is suited for livestock grazing in the spring, early summer, and fall. There are few limitations to grazing except for slope.

The site provides winter and spring range for mule deer.

The site has limited value for recreation but does provide some hunting, hiking, and photographic opportunities.

Due to relatively low production, this site can easily be degraded from improper livestock management. A mixed

stand of shrubs and perennial grasses is necessary to reach the potential of the site.

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 (60-80 years), Wyoming big sagebrush is reduced significantly. Rabbitbrush 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, Indian ricegrass, 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. Establishment of 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 increasing 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. Brush management should be carefully planned, as a reduction in shrubs without a suitable understory of perennial grasses can increase cheatgrass which will lead to more frequent fire intervals. If bitterbrush is present, precautions need to be taken to protect it from any brush management practices applied. Loss of bitterbrush from this site will have negative impacts on wildlife and livestock.

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 a reduction in fire frequency.

Influence of Insects and disease:

Outbreaks can affect vegetation health, particularly bitterbrush from western tent caterpillars (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. 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. 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 in moderate winters. 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.

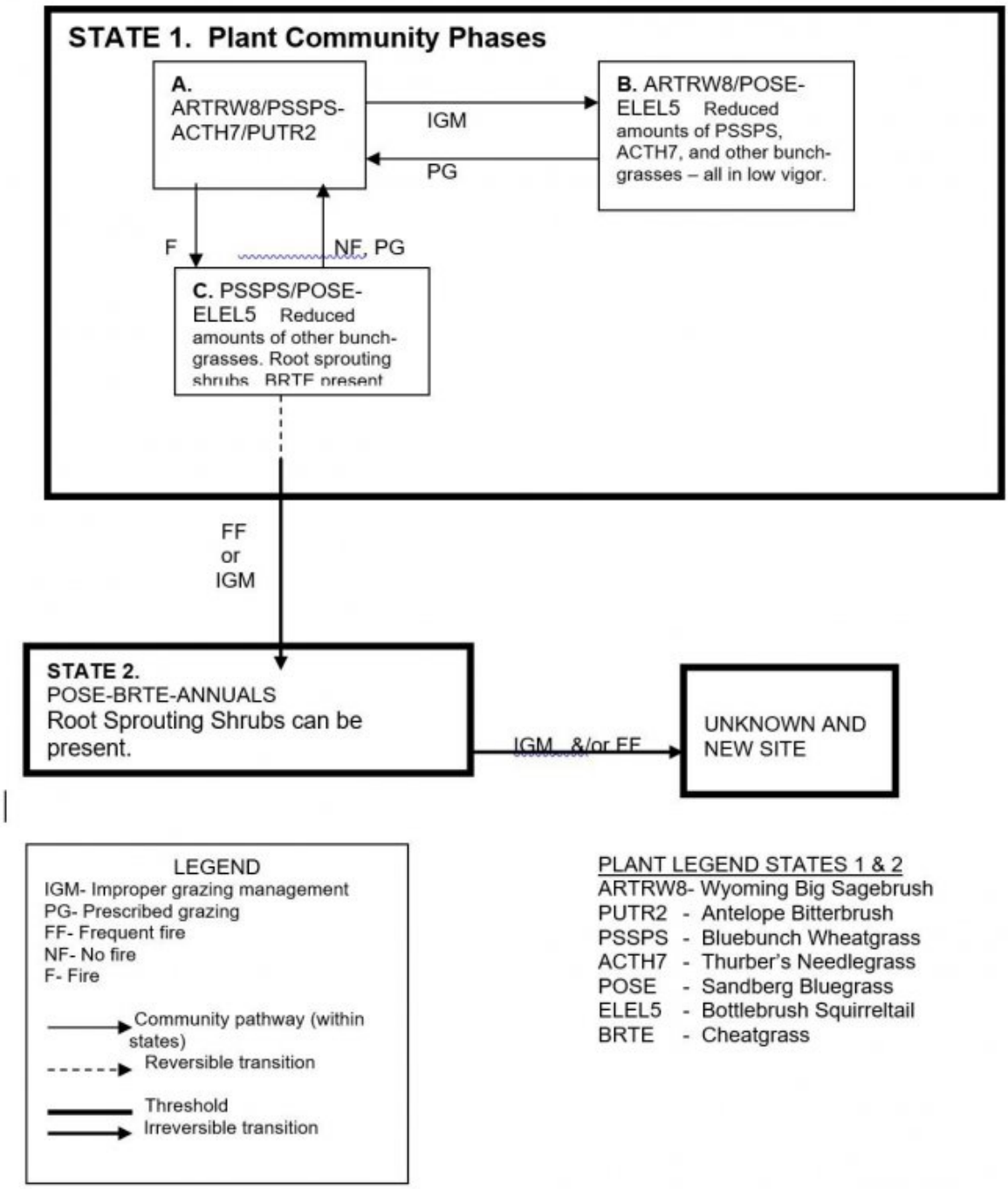
State 1 Phase C to State 2. Develops through frequent fire and continued improper grazing management. The site has crossed the threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

State 2 to 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 generally not economically feasible to move this state back to State 1 with accelerated practices.

Practice Limitations:

Severe limitations occur for seeding by mechanical methods due to steep slopes. Steepness of slopes somewhat limits movement of livestock. Severe limitations exist for brush management by surface methods due to slope. Careful planning is necessary for any application of brush management. Removal of Wyoming big sagebrush can result in a significant invasion of cheatgrass.

State and transition model



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. Antelope bitterbrush can occur in the plant community. Thurber's needlegrass is the subdominant grass. Other significant species include Indian ricegrass, Sandberg bluegrass, bottlebrush squirreltail, tapertip hawksbeard, and arrowleaf balsamroot. There can be a variety of other grasses, forbs, and shrubs in minor amounts. Natural fire frequency is 60-80 years.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	185	291	437
Shrub/Vine	56	90	135
Forb	39	67	101
Total	**280**	**448**	**673**

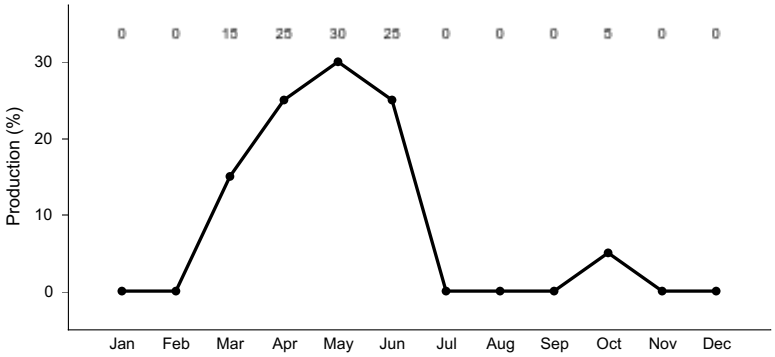


Figure 4. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

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. Thurber's needlegrass initially increases but with continued improper grazing management it is reduced. There is a reduced amount of Indian ricegrass. All deep-rooted bunchgrasses are typically in low vigor. Wyoming big sagebrush has increased. Antelope bitterbrush is in low vigor and may be hedged. This state has developed due to improper grazing management. Some cheatgrass may have invaded the site.

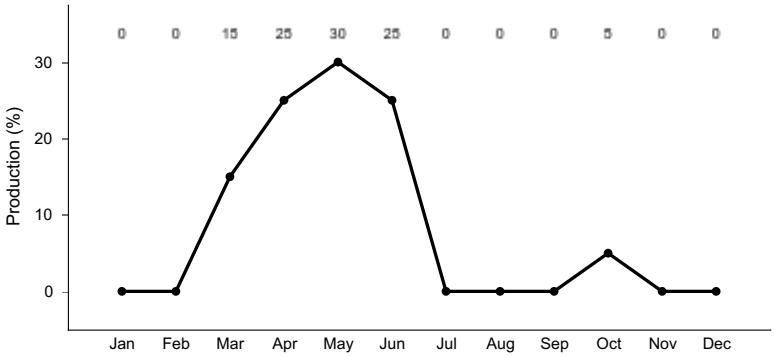


Figure 5. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Some Thurber's needlegrass may be lost due to fire. Some Indian ricegrass may still remain in the plant community. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Phase A. Little Wyoming sagebrush and

antelope bitterbrush are present due to wildfire, but some rabbitbrush is present due to sprouting. Some cheatgrass has invaded the site. This plant community is the result of wildfire.

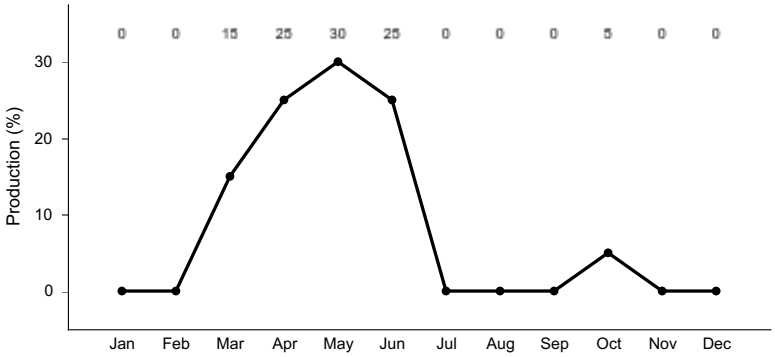


Figure 6. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

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 can be present. Some soil loss has occurred. This state has developed due to frequent fires and 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.

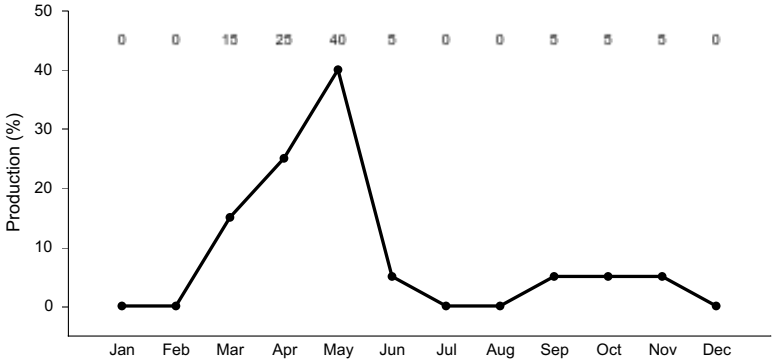


Figure 7. Plant community growth curve (percent production by month). ID0511, BRTE-ANNUALS. State 2.

State 5
State 3

Community 5.1
State 3

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

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**grass**			1–560	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	0–22	–

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. 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/ Thurber Needlegrass/ 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 steepness 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 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/ Bottlebrush Squirreltail 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. Critical habitat (brood-rearing, winter cover and food) for sage-grouse is limited due to a less diverse herbaceous plant community. The plant community supports the seasonal needs of mule deer providing food, thermal cover, and young of year cover. Available winter habitat for mule deer is reduced due to a reduction of antelope bitterbrush within the stand. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, kangaroo rats, and yellow-bellied marmots 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/ 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. Insect diversity would be reduced but a native forbs plant community similar to 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 cover provided by sagebrush 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 most suited to spring and fall grazing by domestic livestock. Early turnout with improper grazing management is most damaging to this site.
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 C. When the hydrologic conditions of the vegetative cover are good, natural erosion hazard is slight to moderate.

Recreational uses

This site has very little recreational value or natural beauty. There are limited opportunities for hunting. Steep slopes and unstable soils create hazards for use by off-road vehicles.

Wood products

None

Other products

None

Other information

Field Offices

Caldwell, ID
Meridian, ID
Mountain Home, ID
Payette, ID
Marsing, ID
Weiser, ID
Emmett, 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
Dan Ogle, Acting State Rangeland Management Specialist, NRCS, Idaho
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”.
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
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

Dave Franzen And Jacy Gibbs

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	04/03/2008
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. They are most likely to occur immediately following a wildfire.

Gravels and stones on the surface reduce erosion.

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2. **Presence of water flow patterns:** water-flow patterns can occur on this site. When they do occur, they are short, disrupted by cool season perennial grasses, tall shrubs, and stones and are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** both can occur on the site. They are not extensive.

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

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** usually not present. Immediately following wildfire some soil movement may occur on lighter textured soils.

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7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 3-5 feet or further 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):** 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):** structure ranges from weak or moderate, very fine, fine or moderate granular to moderate or weak very thin or thin platy. Soil organic matter (SOM) ranges from 0.5 to 4 percent. The A or A1 horizon is typically 3 to 12 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. Shrubs catch 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 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.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 400 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 60-70 percent of the total, forbs 10-15 percent, and shrubs 15-20 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, bulbous bluegrass, rush skeletonweed, scotch thistle, spotted and diffuse knapweed, Russian thistle, halogeton, and kochia.

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