

Ecological site R011XB003ID Stony Loam 8-12 PZ ARTRW8/PSSPS

Last updated: 4/06/2020
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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 not receive additional moisture

Soils are:

Not saline or saline sodic

Shallow to deep to either basalt bedrock or duripan, with >35% coarse fragments (by volume) in the soil subsurface, skeletal

not strongly or violently effervescent in the surface mineral 10"

Textures range from loam to silt loam in the surface mineral 4", with gravelly or stony modifier

Slope is <30%

Clay content is =<35% in surface mineral 4”
Site does not have an argillic horizon with >35% clay

Associated sites

R011XA003ID	Shallow Loam 8-12 PZ ARTRT/PSSPS
R011XB003ID	Stony Loam 8-12 PZ ARTRW8/PSSPS
R011XB005ID	Fractured Loamy 8-16 PZ ARTRW8/PSSPS
R011XB009ID	Shallow Stony 8-12 PZ ARTRW8/PSSPS
R011XB012ID	South Slope Loamy 11-13 PZ ARTRW8/PSSPS
R011XB013ID	Shallow Loamy 8-12 PZ ARAR8/PSSPS
R011XB016ID	Sand 8-12 PZ ARTRT-PUTR2/HECOC8
R011XB019ID	Loamy 7-10 PZ ARTRW8/HECOC8-ACHY
R011XY001ID	Loamy 8-12 PZ
R011XY015ID	Loamy Bottom 8-14 PZ ARTRT/LECI4

Similar sites

R011XB009ID	Shallow Stony 8-12 PZ ARTRW8/PSSPS
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on sloping and rolling uplands, lava plains, fans, and terraces on the Snake River plains. The elevations range from 4000 to 5500 feet (1200-1700 meters). Slopes range from 2 to 30 percent. It occurs on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Lava plain (2) Terrace (3) Butte
Flooding frequency	None
Elevation	4,000–5,500 ft
Slope	2–30%

Water table depth	60 in
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)	13 in

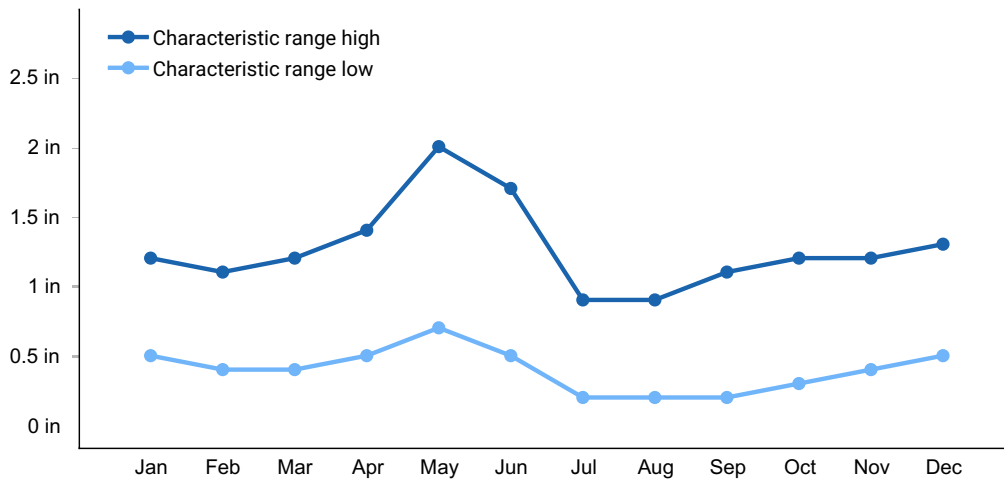


Figure 1. Monthly precipitation range

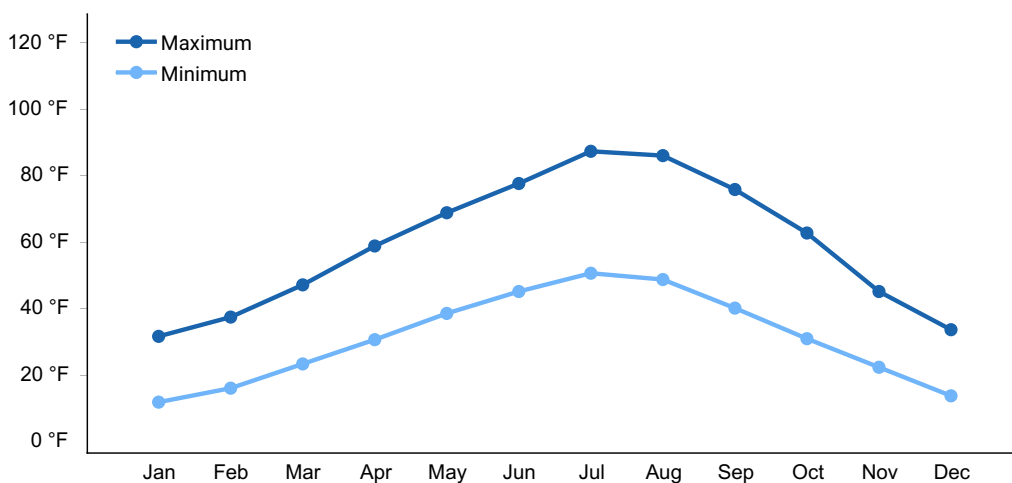


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are shallow to deep, well drained, with moderately rapid to impermeable permeability above bedrock or through the duripan. Runoff is low to high. The erosion hazard is slight to high by water, and slight to moderate by wind. The available water holding capacity (AWC) is very low to moderate. These soils are usually 20-40 inches deep to either basalt bedrock or a duripan. The surface texture is generally gravelly loams, very stony silt loams, extremely stony sandy loams. The subsoil is usually slightly to well developed with clay ranging from approximately 11 to 40 percent. These soils are characterized by low to moderate AWC with an aridic soil moisture regime. Soil temperature regime is either mesic or frigid.

Soil Series Correlated to this Ecological Site

Broncho Waycup Diston
Catchell Modkin
Trevino

Table 4. Representative soil features

Surface texture	(1) Extremely stony sandy loam (2) Very stony loam (3) Gravelly silt loam
Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderately rapid
Soil depth	8–60 in
Surface fragment cover ≤3"	0–20%
Surface fragment cover >3"	0–15%
Available water capacity (0-40in)	1.6–4.6 in
Calcium carbonate equivalent (0-40in)	0–10%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–13
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–68%
Subsurface fragment volume >3" (Depth not specified)	0–40%

Ecological dynamics

The dominant visual aspect of this site is Wyoming big sagebrush in the overstory with bluebunch wheatgrass in the understory. Composition by weight is approximately 60 to 70 percent grasses, 10 to 20 percent forbs, and 15 to 25 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, pronghorn antelope, lagomorphs, and small rodents.

Fire has historically occurred on the site at intervals of 50-70 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 bluebunch wheatgrass and Thurber's needlegrass in the understory and Wyoming big sagebrush in the overstory. Subdominant species include Sandberg bluegrass, arrowleaf balsamroot and tapertip hawksbeard. There is a large variety of other grasses, forbs, and shrubs that can occur in minor amounts. Threetip sagebrush can be a significant component of the plant community. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 800 pounds per acre (896 kilograms per hectare) in a normal year. Production in a favorable year is 1125 pounds per acre (1260 kilograms per hectare). Production in an unfavorable year is 400 pounds per acre (448 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 livestock grazing in the spring, early summer, and fall. The only restrictions to grazing are stones on the surface and inadequate water supplies.

The site provides winter and spring range for mule deer. It has some value as sage grouse brood rearing.

The site has limited value for recreation but does provide some hunting, hiking, and photography opportunities but limited access due to stones.

Although the site is on gentle slopes and has relatively low production, this site is not easily degraded by livestock due to the surface stones. 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 (50-70 years), Wyoming big

sagebrush is reduced significantly. Rabbitbrush and threetip sagebrush 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 and Thurber's needlegrass. These species may be replaced by Sandberg bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site. These fine fuels will increase the fire frequency.

Threetip sagebrush is a component of the plant community. Threetip sagebrush has been found to be a weak sprouter in some locations and a strong sprouter in others. This suggests the species has ecotypic variation from one geographic location to another. Fire in one location may result in killing most of the plants while in another location, threetip sagebrush may become a significant component following a fire event. Threetip sagebrush in this site description is considered to be a weak sprouter, but more data is needed.

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. Threetip sagebrush may increase if present in the community.

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

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. 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 and 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, early summer and 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.

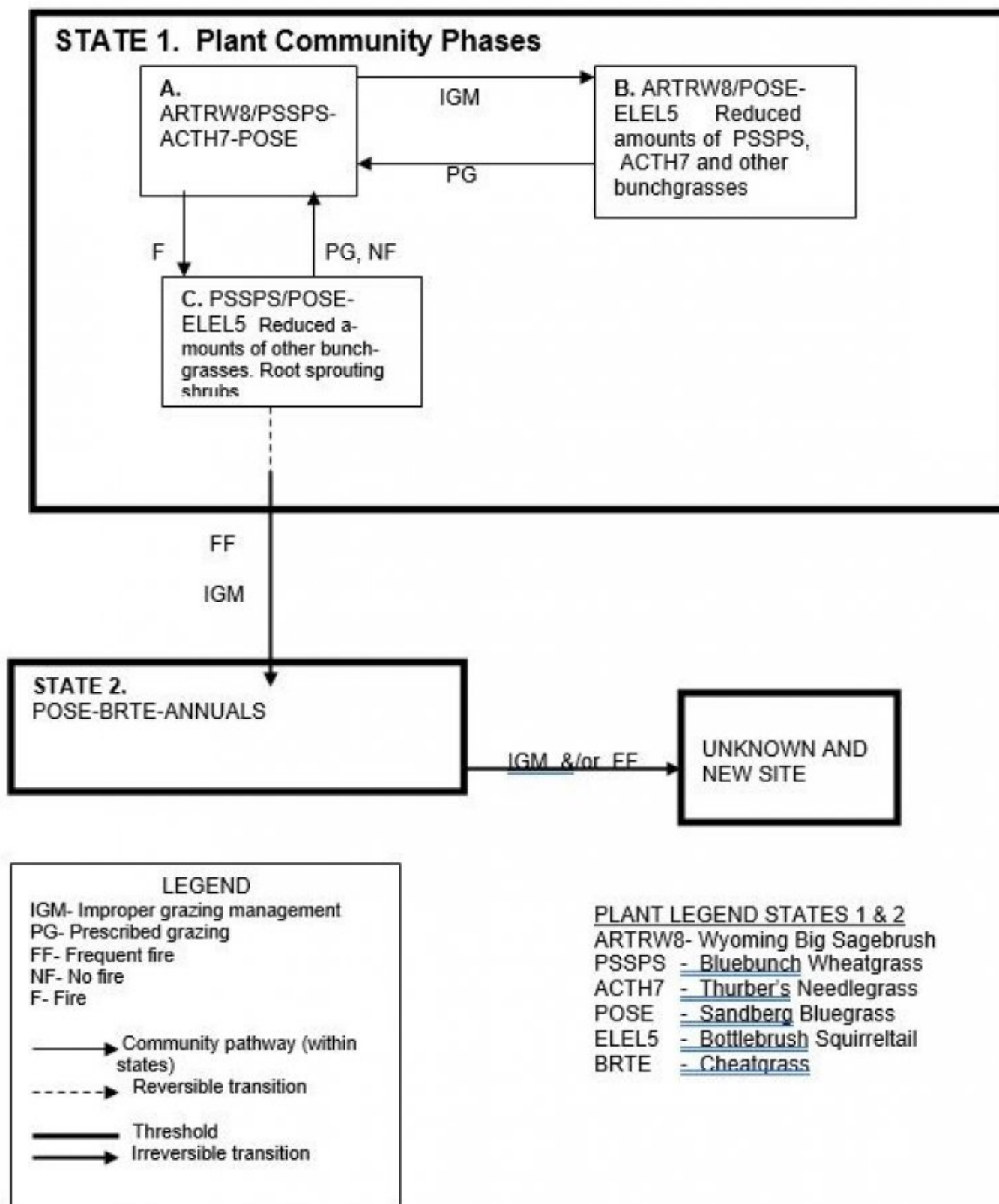
State 1 Phase C to State 2. Develops through frequent fire and continued improper grazing management. The site has crossed the threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

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:

The surface stones create moderate to severe limitations to the implementation of grazing practices. Moderate to severe limitations exist on this site for implementing practices such as water developments, fencing and trails. The surface stones cause severe limitations for any vegetation manipulation projects or rangeland seeding which require ground moving equipment.

State and transition model



State 1 State 1 Phase A

Community 1.1 State 1 Phase A

This plant community has Wyoming big sagebrush in the overstory with bluebunch

wheatgrass dominating the understory. Thurber’s needlegrass is the subdominant grass. Other significant species include Sandberg bluegrass, tapertip hawksbeard and arrowleaf balsamroot. Threetip sagebrush can be a significant component in the plant community. There can be a variety of other grasses, forbs, and shrubs in minor amounts. Natural fire frequency is 50-70 years.

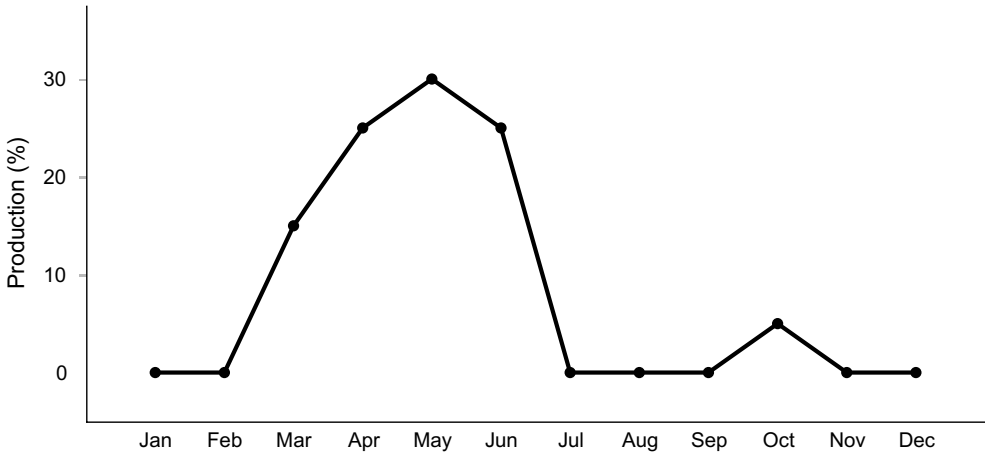


Figure 3. Plant community growth curve (percent production by month). ID0605, ARTRW8 -PSSPS . State 1.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is dominated by Wyoming big sagebrush with reduced amounts of bluebunch wheatgrass. Sandberg bluegrass and bottlebrush squirreltail have increased in the understory. Thurber’s needlegrass gradually decreases. There is a reduced amounts of other perennial grasses. All deep-rooted bunchgrasses are typically in low vigor. Wyoming big sagebrush has increased. Threetip sagebrush may increase if present in the community. This state has developed due to improper grazing management. Some cheatgrass may have invaded the site.

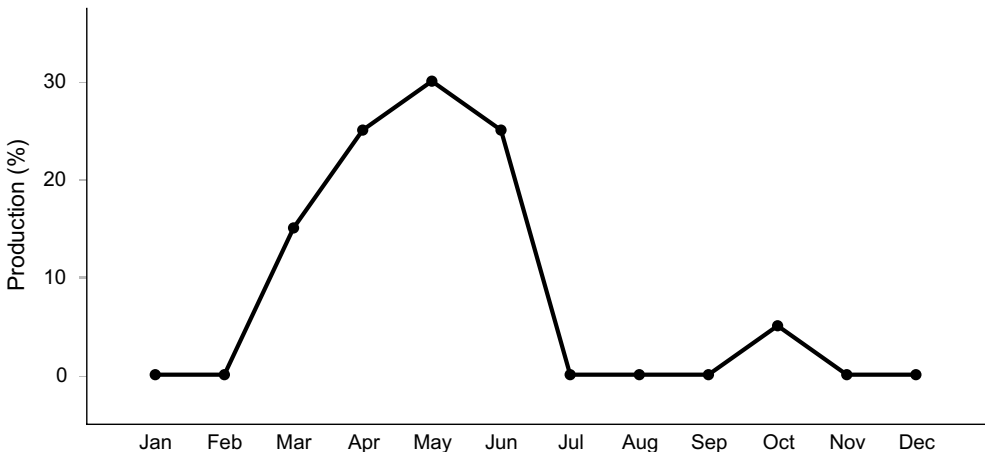


Figure 4. Plant community growth curve (percent production by month).

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 needleglass may be lost due to fire. Bottlebrush squirreltail and thickspike wheatgrass have increased. Forbs and basin wildrye remain about in the same proportion as Phase A. Little Wyoming sagebrush is present due to wildfire, but some rabbitbrush and horsebrush are present due to sprouting. Threetip sagebrush may increase from sprouting if present in the community. Some cheatgrass has invaded the site. This plant community is the result of wildfire.

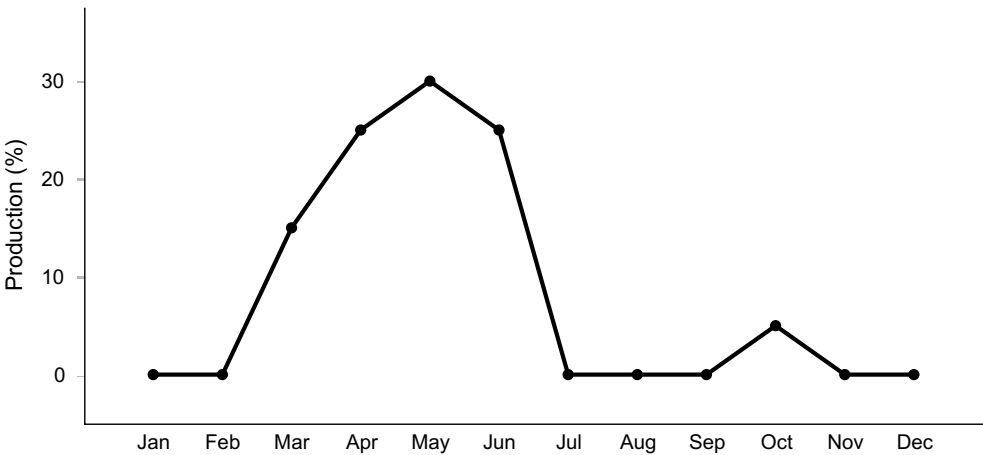


Figure 5. Plant community growth curve (percent production by month). ID0605, ARTRW8 -PSSPS . State 1.

State 4
State 2

Community 4.1
State 2

This plant community is dominated by Sandberg bluegrass, cheatgrass and other annuals. Root sprouting shrubs such as rabbitbrush, horsebrush and threetip sagebrush can be present, dependent upon, how frequent, fire has occurred. 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.

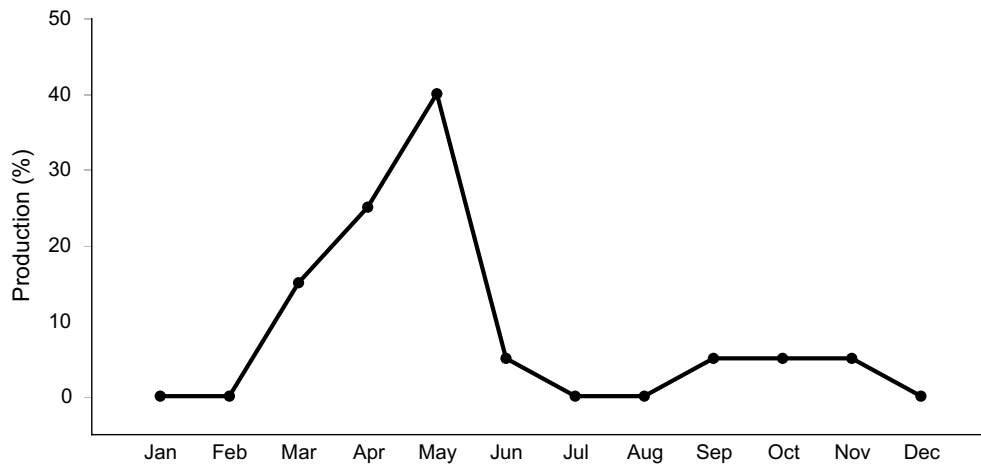


Figure 6. Plant community growth curve (percent production by month). ID0611, POSE/ BRTE/ ANNUALS . State 2.

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

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 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. 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, sage sparrow, brewer's sparrow, and sage thrasher. Water features are sparse provided by seasonal streams, artificial water catchments and springs. This rangeland ecological site is commonly 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 - Wyoming Big Sagebrush/ Bluebunch Wheatgrass/ Thurber's Needlegrass/ Sandberg Bluegrass Reference Plant Community (RPC): This plant community provides a diversity of grasses, forbs, and shrubs, used by native insect communities that assist in pollination. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, western toad, boreal chorus frog, and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Spring developments that capture all available water would preclude the use of these sites by amphibians. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Critical habitat (lek sites, nesting areas, brood-rearing, winter cover and food) for sage-grouse is provided by this diverse plant community. The plant community supports seasonal (spring through early winter) needs of large mammals (mule deer, antelope, and elk) providing food and cover. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize this plant community.

State 1 Phase 1.2 - Wyoming Big Sagebrush/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of improper grazing management. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. An increase in threetip sagebrush may occur leading to a further increase in sagebrush canopy cover. The reduced herbaceous understory results in a reduced diversity of insects. Diversity and populations of reptiles may decline due to a less diverse prey base. A reduced herbaceous understory is a key factor in limiting the use of this plant community by ground nesting bird species. Shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Habitat (lek sites, nesting areas, winter cover, and food) for sage-grouse is limited due to a less diverse herbaceous plant community and an increase in three-tip sagebrush. A decrease in herbaceous understory and increase in three-tip sagebrush reduces the forage value of the plant community for mule deer, antelope and elk. Thermal and young of year cover would be provided for large mammals. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize this plant community.

State 1 Phase 1.3 - Bluebunch Wheatgrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail 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 and limits use by animals dependent on shrub cover. 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 prevent 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 sagebrush cover is adjacent to the site. The site would not provide suitable winter or nesting cover for sage-grouse. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer, antelope, and elk) use for foraging would be seasonal (spring through fall) but the site would offer little thermal cover and young of year cover. Small mammal diversity would be reduced. This plant community could exhibit an increase in three-tip sagebrush. When the three-tip cover increases a limited amount of cover would be provided for reptiles, birds and large mammals listed above.

State 2 - Sandberg Bluegrass/ Cheatgrass and Annual Plant Community: This plant community is the result of continued improper grazing management and frequent fire. The loss of the native shrub and herbaceous plant community would not support a diverse insect community. 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 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. The populations of small mammals would be dominated by grassland species like the Columbian ground squirrel. This plant community could exhibit an increase in three-tip sagebrush. When the three-tip cover increases a limited amount of cover would be provided for reptiles, birds and large mammals listed above.

State 3 - Range Seeding Plant Community: The seeding mixture (native or non-native) determines the animal species that utilize this site. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the plant community described in State 1 phase 1.3. A diverse seed mixture of grasses, forbs and shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.2. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, avians, mammals, or sagebrush obligate 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 this community looking for prey species.

Grazing Interpretations:

This site is most suitable for livestock grazing in the spring, early summer, and late fall. Natural water supplies may be insufficient or absent and livestock water may have to be piped, pumped from wells, hauled or otherwise made available for livestock using the 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 B. When the hydrologic conditions of the vegetative cover is good the natural erosion hazard is slight.

Recreational uses

This site has very little recreational value. It has some spring blooming flowers which offer aesthetic value and photographic opportunities. It has some value for hunting coyotes, rabbits, etc. and occasionally mule deer or pronghorn antelope.

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: Power County, ID	
Township/Range/Section	T6S R28E S24

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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National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
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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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Date	04/01/2008

Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** they rarely occur on this site. If they do occur they are most likely to be on slopes greater than 15% and immediately following wildfire. Stones on the surface reduce erosion and development of rills.

2. **Presence of water flow patterns:** they rarely occur on this site except on slopes greater than 15%. When they do occur, they are short, disrupted by cool season perennial grasses, tall shrubs, and stones and are not extensive.

3. **Number and height of erosional pedestals or terracettes:** both are rare on this site. In areas of greater than 15% slopes where flow patterns and/or rills are present, a few pedestals and terracettes may be expected.

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

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

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.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 2 feet or further following a significant run-off event or wind. Coarse litter generally does not move.

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 thin and moderate thick platy, weak fine and moderate fine granular, and weak fine to medium subangular blocky. Soil organic matter (SOM) ranges from 1 to 3 percent. The surface horizon is typically 2 to 7 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, slow run-off and increase infiltration. Shrubs accumulate snow in the interspaces. Terracettes provide a favorable micro-site for vegetation establishment, which further increases infiltration.
-

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

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 800 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 60-70 percent of the total, forbs 10-20 percent, and shrubs 15-25 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 tumblemustard, 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 normal years.
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