Ecological site R011XB009ID
Shallow Stony 8-12 PZ ARTRW8/PSSPS

Last updated: 4/06/2020
Accessed: 05/20/2024

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 bedrock, with >35% coarse fragments (by volume), increasing with depth, skeletal
not strongly or violently effervescent in the surface mineral 10”
Surface textures range from fine sandy loam to silt 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

R011XB003ID	**Stony Loam 8-12 PZ ARTRW8/PSSPS**
R011XB006ID	**Loamy 8-12 PZ ARTRT/LECI4**
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**
R025XY041ID	**GRAVELLY 10-12**

Similar sites

R011XB003ID	**Stony Loam 8-12 PZ ARTRW8/PSSPS**
R011XB013ID	**Shallow Loamy 8-12 PZ ARAR8/PSSPS**

Table 1. Dominant plant species

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

Physiographic features

This site occurs on level to gently sloping lava plains, terraces and alluvial fans. Slopes are less than 30 percent. It is often associated with basalt outcrops. Elevations range from 4000 to 5000 feet (1200-1550 meters).

Table 2. Representative physiographic features

Landforms	(1) Lava plain (2) Terrace (3) Alluvial fan
Flooding frequency	None
Ponding frequency	None
Slope	0–30%
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

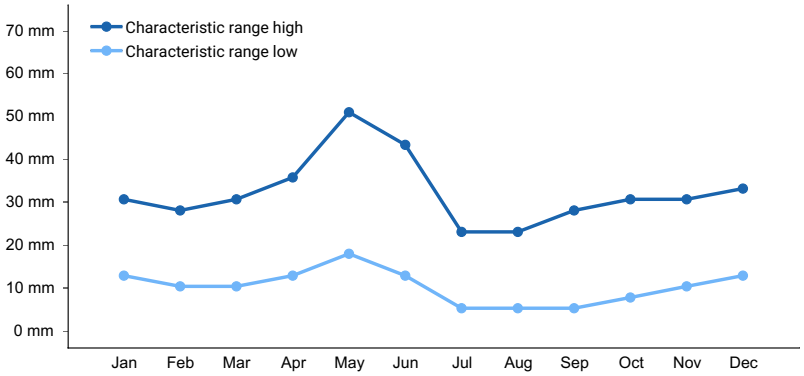


Figure 1. Monthly precipitation range

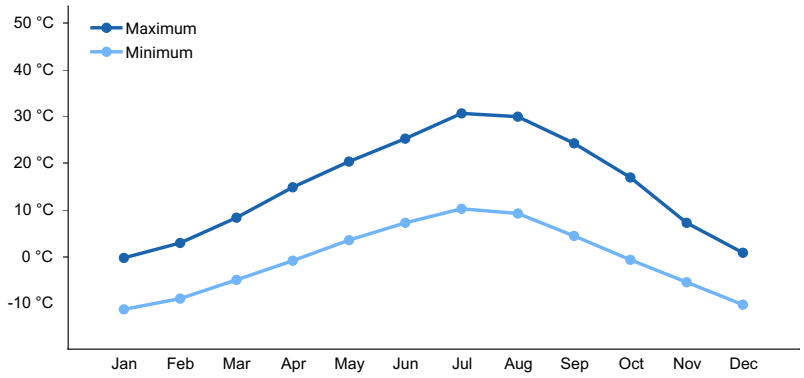


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are shallow, well drained, with impermeable to moderately rapid permeability above bedrock. Runoff is low to very 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 8 to 20 inches deep to basalt bedrock. The surface texture is generally stony fine sandy loams, stony loams, or stony silt loams. The subsoil is usually slightly developed with clay ranging from approximately 8 to 25 percent. These soils are characterized by limited AWC with an aridic soil moisture regime. Soil temperature regime is either mesic or frigid.

Soil Series Correlated to this Ecological Site

Bondfarm Thornock
Deuce Trevino
Mike
Mulett
Scoon

Table 4. Representative soil features

Surface texture	(1) Gravelly silt loam (2) Stony loam (3) Very stony fine sandy loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	20–51 cm

Surface fragment cover <=3"	0–25%
Surface fragment cover >3"	0–45%
Available water capacity (0-101.6cm)	2.54–9.14 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–10
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–45%
Subsurface fragment volume >3" (Depth not specified)	0–70%

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is bluebunch wheatgrass with Wyoming big sagebrush in the overstory. Wyoming big sagebrush is often less than 18 inches tall. Composition by weight is approximately 40 to 50 percent grasses, 10 to 20 percent forbs and 30 to 45 percent shrubs.

During the last few thousand years, this site has evolved in an 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) moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The HCPC is Phase A. This plant community is dominated by bluebunch wheatgrass in the understory and Wyoming big sagebrush in the overstory. Subdominant species include Sandberg bluegrass, Nevada bluegrass, tapertip hawksbeard, and long leafed phlox. Threetip sagebrush may occur in some stands. There is a large variety of other grasses, forbs and shrubs that can occur in minor amounts. The plant species composition of Phase A is listed later under “HCPC Plant Species Composition”.

Total annual production is 450 pounds per acre (504 kilograms per hectare) in a normal year. Production in a favorable year is 650 pounds per acre (728 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 medium shrubs being more dominant than perennial forbs while shallow rooted bunchgrasses are subdominant.

FUNCTION.

This site is suited for livestock grazing in the spring and fall. The amount of stones on the surface limits grazing. The distance to water may be a problem in some areas.

The site provides winter and spring range for mule deer and pronghorn antelope. 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. The

amount of surface stones does limit the use.

Although the site has gentle slopes and relatively low production, this site is not easily degraded from improper grazing 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 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 along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site. These fine fuels will increase the fire frequency.

Influence of improper grazing management:

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

Continued improper grazing management potentially 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 reduction can lead to gradual increases in Wyoming big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management should be carefully planned, as a reduction in shrubs without a suitable understory of desirable perennial bunchgrasses can lead to an increase in cheatgrass which will result in more frequent fire intervals.

Weather influences:

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

Below normal temperatures in the spring can have an adverse impact on total production regardless of 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 changes in fire frequency.

Influence of Insects and disease:

Outbreaks can affect vegetation health. 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.
Perennial and annual weeds 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 use this site in the spring 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 or continued improper grazing management. This site has crossed the threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

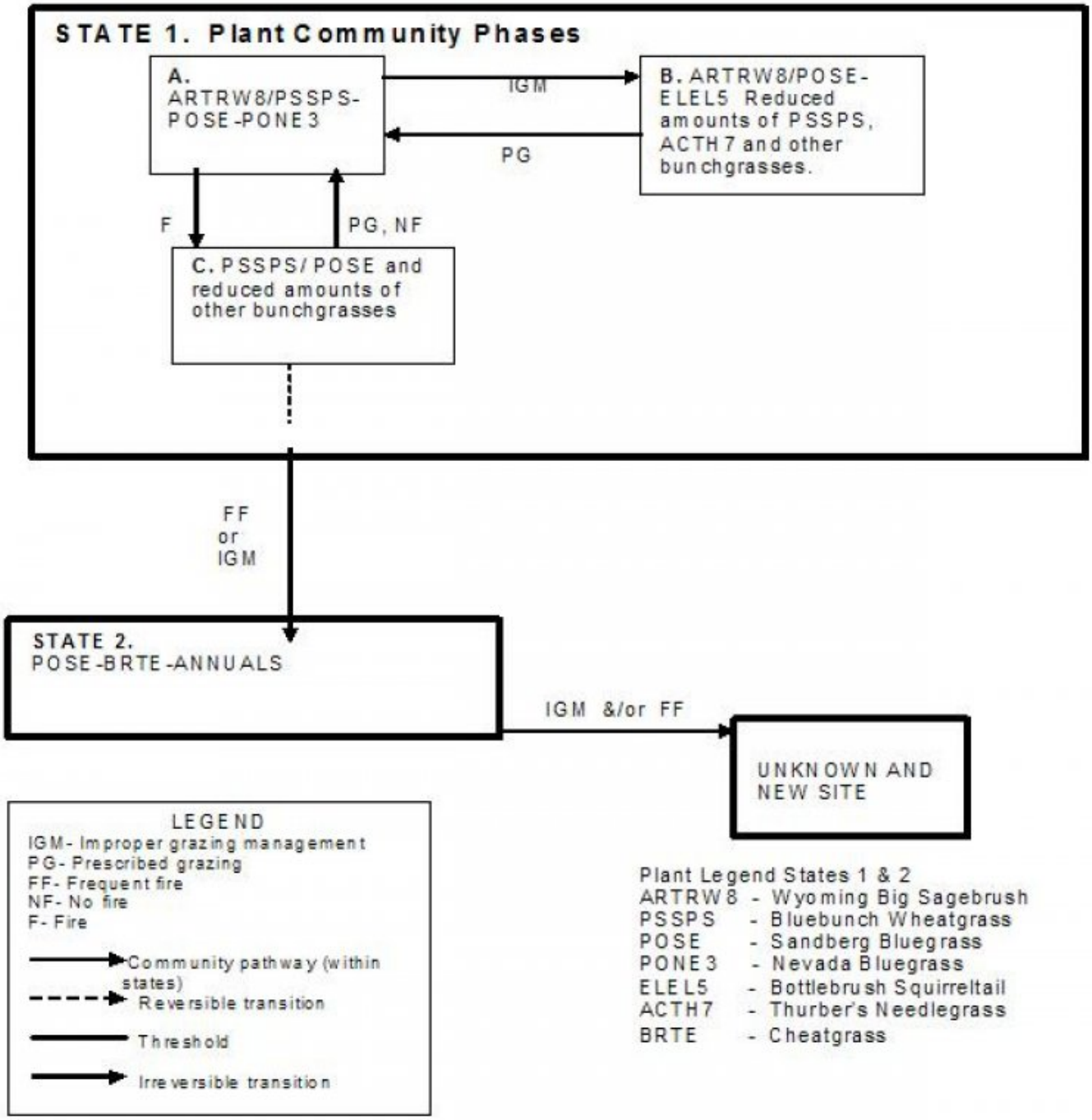
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is generally not economically feasible to move this state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

Practice Limitations:

Severe limitations exist on this site for seeding due to stoniness and low available water holding capacity of the soil. Severe limitations exist on this site for brush control by ground moving equipment due to stoniness. Removal of Wyoming big sagebrush can result in a significant invasion of cheatgrass.

State and transition model

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



State 1
State 1

Community 1.1
State 1

This plant community is dominated by Wyoming big sagebrush in the overstory and bluebunch wheatgrass in the understory. Subdominant species include Sandberg bluegrass, Nevada bluegrass, tapertip hawksbeard, and long leaf phlox. Threetip sagebrush may occur in some stands. There is a large variety of other grasses, forbs and shrubs that can occur in minor amounts. Natural fire frequency is 50-70 years.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	157	235	336
Shrub/Vine	129	191	280
Forb	50	78	112
Total	**336**	**504**	**728**

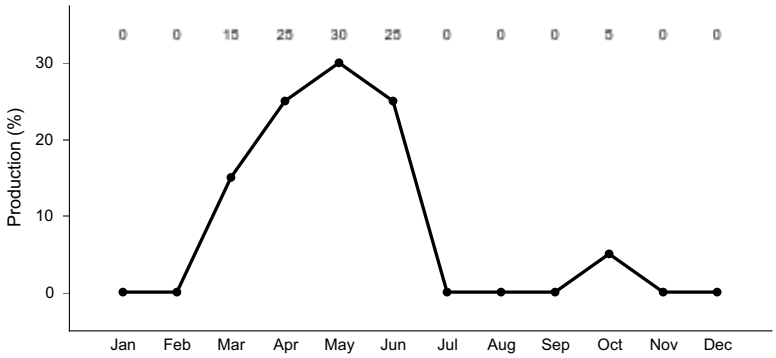


Figure 4. Plant community growth curve (percent production by month). ID0605, ARTRW8 -PSSPS . State 1.

State 2
State 1, Plant community B

Community 2.1
State 1, Plant community B

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

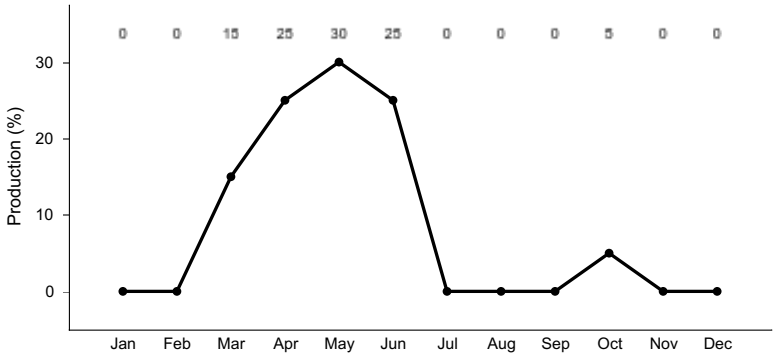


Figure 5. Plant community growth curve (percent production by month). ID0605, ARTRW8 -PSSPS . State 1.

State 3
State 1, Plant community C

Community 3.1
State 1, Plant community C

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Some Thurber's needlegrass may be lost due to fire. Bottlebrush squirreltail has increased. Forbs remain about in the same

proportion as Plant Community A. Very little Wyoming sagebrush is present due to wildfire, but some rabbitbrush is present due to sprouting. Threetip sagebrush also has sprouted after the fire, if present. Some cheatgrass has invaded the site. This plant community is the result of wildfire.

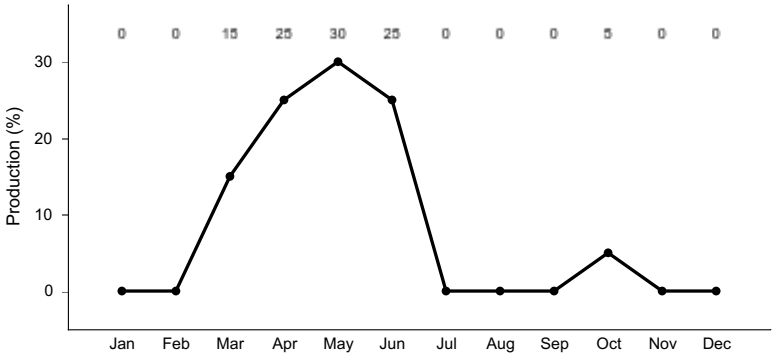


Figure 6. Plant community growth curve (percent production by month). ID0605, ARTRW8 -PSSPS . State 1.

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 can be present, dependent upon, how frequent, fire has occurred. Some soil loss has occurred. This state has developed due to frequent fires or improper grazing management. The site has crossed the threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

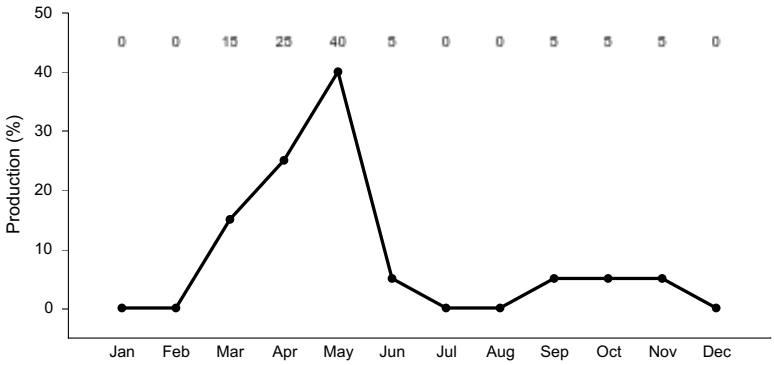


Figure 7. Plant community growth curve (percent production by month). ID0611, POSE/ BRTE/ ANNUALS . State 2.

State 5
Unknown new site

Community 5.1
Unknown new site

This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This state has developed due to continued improper grazing management and/or frequent fires. 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

The plant production is low in this ecological site due to shallow soils but it provides diverse habitat for many native wildlife species. Large herbivore use of this ecological site is dominated by mule deer and pronghorn antelope. Important seasonal habitat is provided for resident and migratory animals including western toad, sagebrush lizard, western rattlesnake, shrews, 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 provided critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water features are sparse provided by seasonal streams, artificial water catchments, and springs. 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/ Sandberg Bluegrass/ Nevada 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 and antelope) with Wyoming big sagebrush 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 lower diversity of insects. Diversity of reptiles may decline due to a less diverse prey base. Shrub-steppe obligate 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 ground nesting bird species. Habitat (lek sites, nesting areas, brood-rearing, winter cover, and food) for sage-grouse is limited due to a less diverse herbaceous plant community. A decrease in herbaceous understory and increase in three-tip sagebrush reduces the forage value of the plant community for mule deer and antelope although thermal and young of year cover would be provided. 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 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. Horsebrush would provide early summer pollinator habitat. Assuming horsebrush and threetip sagebrush are not a significant part of the plant community, 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 habitat for sage-grouse. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer and antelope) use for foraging would be seasonal (spring) 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 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 state has developed due to frequent fires and/or improper grazing management. 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 conditions. 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 deer and antelope 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 gray horsebrush and three-tip sagebrush. When the shrub cover increases a limited amount of cover would be provided for reptiles, birds, and large mammals identified 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 suited for grazing by livestock in the spring and fall. The stony surface can limit livestock access. There may be limited livestock water available.
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 hydrologic conditions of the vegetation cover is good, natural erosion hazard is slight to moderate.

Recreational uses

Recreational uses are limited on this site due to the stoniness of the surface.

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
Leah Juarros, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD
Joe May, State Rangeland Management Specialist, NRCS, Idaho

Other references

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

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

Approval

Kendra Moseley, 4/06/2020

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Contact for lead author	Brendan Brazee, State Range Conservationist USDA-NRCS 9173 W. Barnes, Suite C Boise, ID 83709
Date	03/28/2007

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

Indicators

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

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2. **Presence of water flow patterns:** Water-Flow Patterns: 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.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or Terracettes: 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.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground: ranges from 10-20 percent.

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Litter Movement: fine litter in the interspaces may move up to 2 feet 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):** Soil Surface Resistance to Erosion: 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):** Soil Surface Loss or Degradation: the surface horizon is typically 2 to 6 inches thick. 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.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant Community Composition and Distribution Relative to Infiltration: bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Shrubs accumulate snow in the

interspaces.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compaction Layer: not present.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Functional/Structural Groups: cool season deep-rooted perennial bunchgrasses > medium shrubs> perennial forbs> shallow rooted grasses.

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Plant Mortality/Decadence: Wyoming big sagebrush will become decadent in the absence of 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):** Litter Amount: annual litter cover in the interspaces will be 5-10 percent to a depth of

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual Production: is 450 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 40-50 percent of the total, forbs 10-20 percent, and shrubs 30-45 percent.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Invasive Plants: 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:** Reproductive Capability of Perennial Plants: all functional groups have the potential to reproduce in favorable years.
