USDA Natural Resources
Conservation Service

Ecological site R011XB005ID
Fractured Loamy 8-16 PZ ARTRW8/PSSPS

Last updated: 4/06/2020
Accessed: 05/11/2025

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

Major Land Resource Area (MLRA): 011X – Snake River Plains
Precipitation or Climate Zone: 8-16” 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 fractured basalt bedrock, with >35% coarse fragments (by volume) in the soil subsurface, skeletal not strongly or violently effervescent in the surface mineral 10”
Textures range from 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

R011XA003ID	**Shallow Loam 8-12 PZ ARTRT/PSSPS**
R011XB001ID	**Loamy 8-12 PZ**
R011XB016ID	**Sand 8-12 PZ ARTRT-PUTR2/HECOC8**

Similar sites

R011XA003ID	**Shallow Loam 8-12 PZ ARTRT/PSSPS**

Table 1. Dominant plant species

Tree	Not specified

Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on nearly level areas between outcrops of lava flows or pressure ridges which are highly fractured and have vegetation growing where soil material has accumulated. Slopes range from 0-30 percent. It occurs on all aspects and elevations range from 4800-5600 ft (1450-1700 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill
Flooding frequency	None
Elevation	4,800–5,600 ft
Slope	0–30%
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

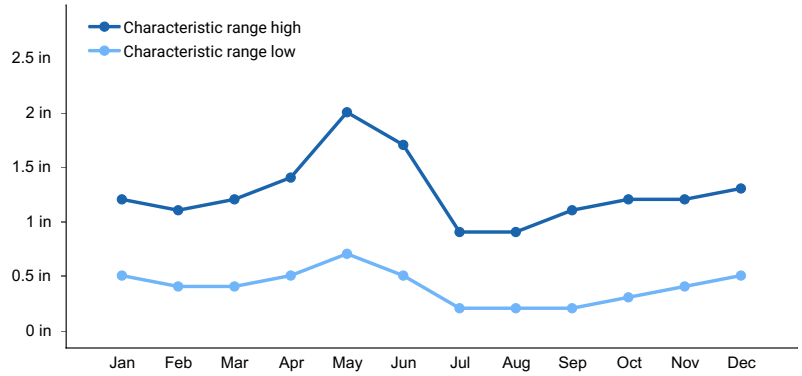


Figure 1. Monthly precipitation range

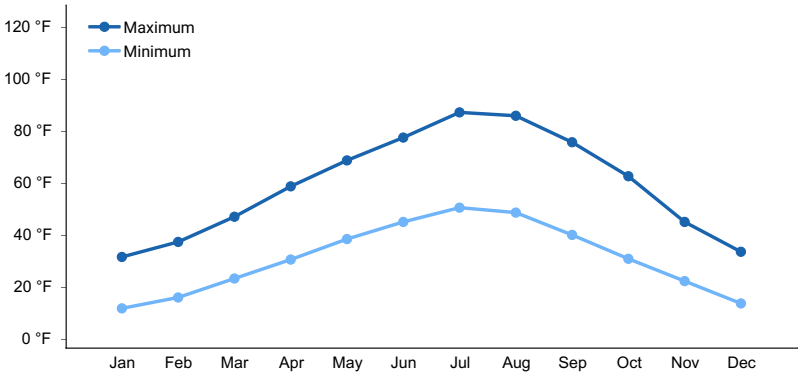


Figure 2. Monthly average minimum and maximum temperature

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 basalt bedrock, well drained, with moderate permeability above the bedrock. Runoff is low to moderate. The erosion hazard is slight to high by water and moderate to high by wind. The available water holding capacity (AWC) is very low to low. These soils are usually 5 to 10 inches deep to fractured basalt bedrock. The surface texture is silt loam with surface stones. Usually, the subsoil is weakly developed with clay ranging from approximately 15 to 22 percent. These soils are characterized by limited AWC, a xeric soil moisture regime, and a frigid soil temperature regime.

Soil Series Correlated to this Ecological Site

Pingree

Table 4. Representative soil features

Surface texture	(1) Stony sandy loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	5–10 in
Surface fragment cover <=3"	7–15%
Surface fragment cover >3"	0–7%
Available water capacity (0-40in)	1.2–1.8 in

Electrical conductivity (0-40in)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-40in)	7.4–7.8
Subsurface fragment volume <=3" (Depth not specified)	15–30%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The dominant visual aspect of this site is medium shrubs and bluebunch wheatgrass. Composition by weight is approximately 45-55 percent grasses, 5-15 percent forbs, and 35-45 percent shrubs.

During the last few thousand years, this site has evolved in a semi-arid climate characterized by warm, dry summers and cold, wet winters. Herbivory has historically occurred on the site at low levels of utilization. Herbivores include pronghorn antelope, mule deer, sage grouse, lagomorphs, and small rodents. Fire has historically occurred on this site every 100-150 years. Fire occurs only in years with above normal precipitation.

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 Wyoming big sagebrush. Subdominant species include Sandberg bluegrass , Nevada bluegrass , bottlebrush squirreltail, and Hooker’s Balsamroot. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 175 pounds per acre (194 Kg/ha) in a normal year. Production in a favorable year is 300 pounds per acre (333 Kg/ha). Production in an unfavorable year is 75 pounds per acre (83 Kg/ha). Structurally, cool season deep-rooted perennial bunchgrasses are very dominant, followed by medium height shrubs with perennial forbs and shallow rooted perennial bunchgrasses being sub-dominant.

FUNCTION:

This site is best suited for livestock grazing in spring and early fall. Total average annual production for livestock use is low. Natural water supplies are limited. This site provides fair to good habitat for various upland wildlife species. Mule deer, pronghorn antelope, and sage grouse make use of the site throughout the year.

Where the site is accessible to livestock, it can be easily degraded by improper grazing management due to the moderate slopes. The numerous rock outcrops that typically surround this site provide a degree of physical protection to the plants by limiting livestock access. The inherent low production on the site makes it susceptible to accelerated degradation where livestock have access. The site offers minimal recreation or aesthetic values.

Impacts on the Plant Community.

Influence of fire:

This site historically had a very low fire frequency, approximately every 100-150 years. Most of the shrubs, especially antelope bitterbrush and Utah juniper, evolved in the absence of fire, therefore they can be severely damaged when burned. Rabbitbrush, broom snakeweed, snowberry, and horsebrush will increase after fire. Three-tip sagebrush, if present, may increase after fire. Cheatgrass can be a troublesome invader on this site after fire, preventing perennial grass and shrub re-establishment and increasing the fire frequency. Sandberg bluegrass is usually maintained in the community.

Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be detrimental to this site. This type of management leads to

reduced vigor of bluebunch wheatgrass and other deep- rooted perennial 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, Utah juniper, Sandberg bluegrass, and invasive plants. Once Sandberg bluegrass becomes strongly dominant, reestablishment of more productive grasses such as bluebunch wheatgrass may take a long period of time. Continued improper grazing management influences fire frequency with an increase in cheatgrass.

Weather influences:

Above normal precipitation in April, May, and June can dramatically increase total annual production. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Extended periods of drought significantly impact this site due to the shallowness of the soil and its' low water holding capacity. Extended drought reduces vigor of the perennial grasses and shrubs. Extreme drought may cause plant mortality.

Influence of insects and disease:

Outbreaks can affect vegetation health. Bitterbrush can be severely affected by the western tent caterpillar (Malacosoma fragilis). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. It seldom kills the entire stand. Mormon crickets and grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak. Outbreaks of black grass bugs commonly occur on basin wildrye and the wheatgrasses. They seldom kill the plants but do reduce vigor and affect the palatability for grazing animals.

Influence of noxious and invasive plants:

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. Cheatgrass along with other annual forbs can be very invasive on this site, especially after fire. Once they become established the fire frequency increases. As a result, the shrub component can be lost.

Influence of wildlife:

Relatively low numbers of wildlife use this site and have little impact on it. Pronghorn antelope is the dominant large herbivore using the site. They use the site yearlong but prefer it in the spring, fall, and early winter. Sage grouse use the site for strutting grounds. Sage grouse may also use the site during the winter. Winter and spring use by mule deer occasionally occurs.

Watershed:

Decreased infiltration and increased runoff on slopes greater than 10 percent occur when Wyoming big sagebrush is removed with frequent fires, particularly following the fire event. The increased runoff also increases wind, sheet, and rill erosion. 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 fire (approximately every 100-150 years). Fire only occurs in above normal precipitation (favorable) years.
Phase A to C. Develops under improper grazing management and no fire.
Phase C to A. Develops under a prescribed grazing management program and no fire.
Phase B to A. Develops from prescribed grazing and no fire.

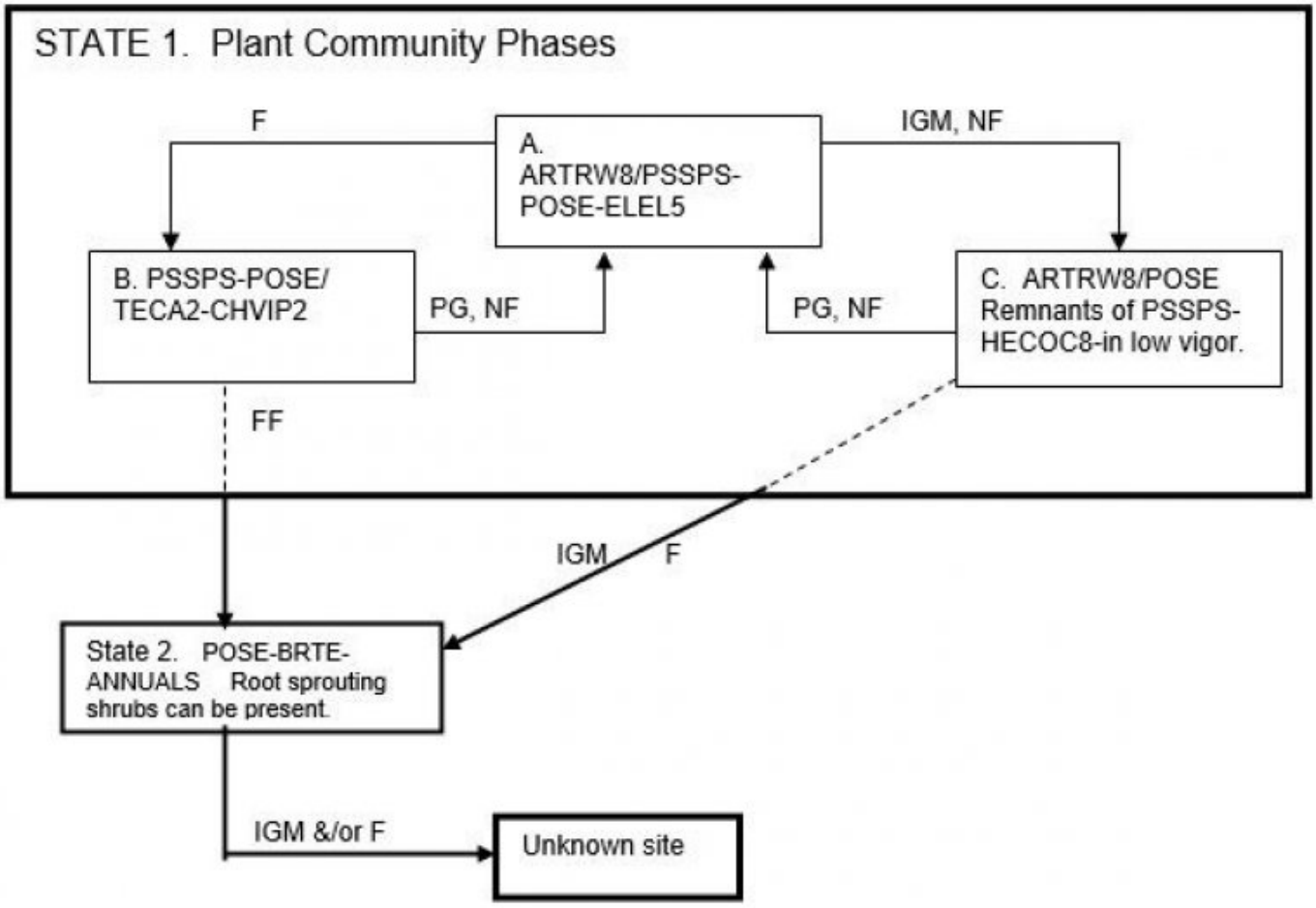
State 1 to State 2.
Develops from Phase B with frequent fire or from Phase C with improper grazing management and fire. The site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

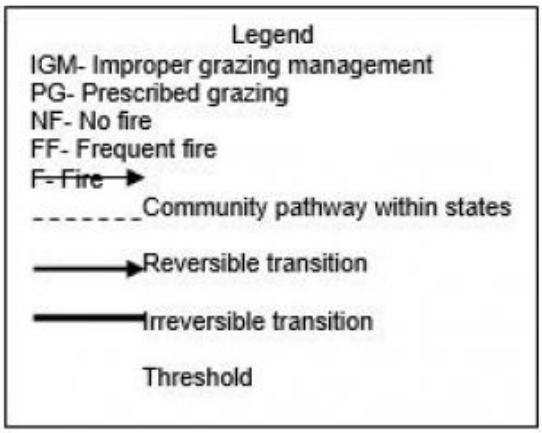
State 2 to Unknown Site.
The site has deteriorated further and soil loss has occurred resulting in a loss of site potential. This has resulted from improper grazing management or fire. The site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

Practice Limitations.

Only slight limitations exist on this site for vegetative management practices. Livestock water may be limiting. Severe limitations exist for facilitating and accelerating practices due to shallow soils and surrounding rock outcrops.

State and transition model





PLANT LEGEND STATES 1 & 2
ARTRW8- Wyoming Big Sagebrush
TECA2 - Gray Horsebrush
CHVIP2 - Dwarf Green Rabbitbrush
PSSPS - Bluebunch Wheatgrass
POSE - Sandberg Bluegrass
ELEL5 - Bottlebrush Squirreltail
HECOC8- Needle and Thread
BRTE - Cheatgrass

State 1
State 1 Phase A

Community 1.1
State 1 Phase A

This plant community is dominated by bluebunch wheatgrass and Wyoming big sagebrush. Subdominant species include Sandberg bluegrass , Nevada bluegrass , bottlebrush squirreltail, and Hooker’s Balsamroot. A wide variety of grasses, forbs, and shrubs occur in minor amounts. The natural fire frequency is about 100-150 years.

Table 5. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

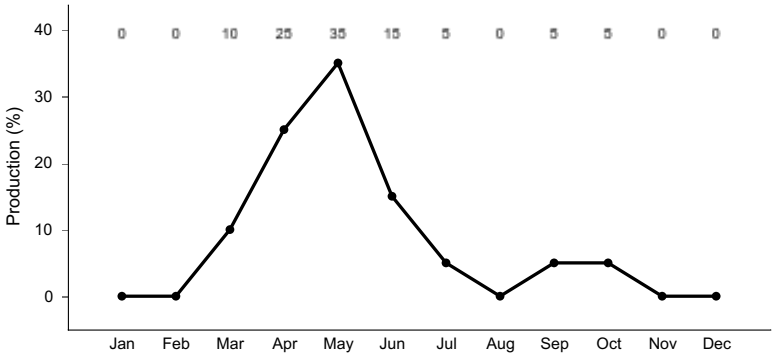


Figure 3. Plant community growth curve (percent production by month). ID0610, ARNO4/ACTH7/PSSPS. State 1.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Small amounts of bottlebrush squirreltail, Nevada bluegrass, and a variety of forbs can be present. Gray horsebrush and dwarf green rabbitbrush have increased. Some annual grasses have invaded. This phase has developed due to fire.

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%

Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

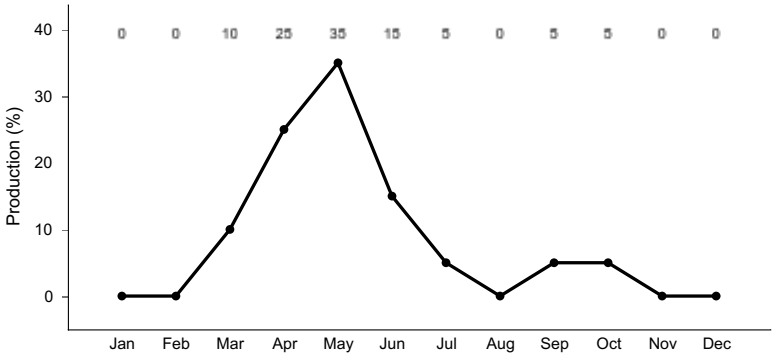


Figure 4. Plant community growth curve (percent production by month). ID0610, ARNO4/ACTH7/PSSPS. State 1.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by Wyoming big sagebrush with Sandberg bluegrass in the understory. Bluebunch wheatgrass and other deep-rooted perennial bunchgrasses are present but in reduced amounts and in low vigor. Some annual grasses have invaded. This phase has developed due to improper grazing management and no fire.

Table 7. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

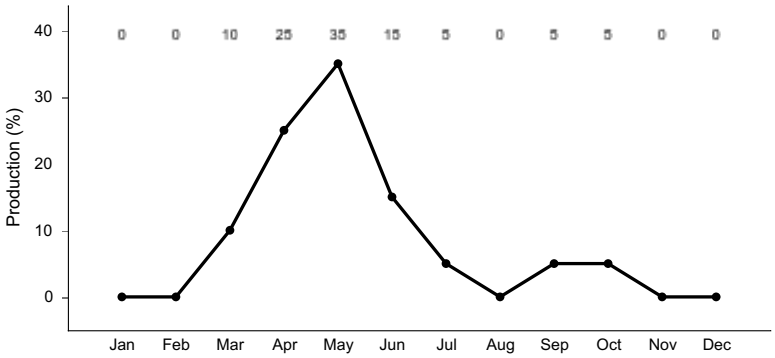


Figure 5. Plant community growth curve (percent production by month). ID0610, ARNO4/ACTH7/PSSPS. State 1.

State 4
State 2

Community 4.1
State 2

This plant community is dominated by Sandberg bluegrass, cheatgrass, and a variety of forbs. Some perennial forbs are present. Dominant shrubs include dwarf green rabbitbrush, gray horsebrush and three-tip sagebrush, if present. The community has developed due to continued improper grazing management and fire from Phase C, State 1 and with frequent fire from Phase B, state 1. Some soil loss has occurred. The site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

Table 8. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

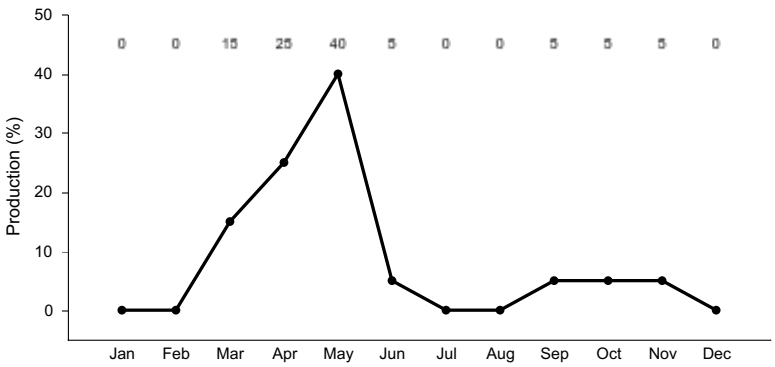


Figure 6. Plant community growth curve (percent production by month). ID0611, POSE/ BRTE/ ANNUALS . State 2.

State 5
State 3

Community 5.1
State 3

Unknown 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 community has developed due to continued improper grazing management and/or fire.

Table 9. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

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 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 provide 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/ Bottlebrush Squirreltail 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, 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 - Bluebunch Wheatgrass/ Sandberg Bluegrass/ Gray Horsebrush/ Dwarf Green Horsebrush 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 is 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 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 1 Phase 1.3 - Wyoming Big Sagebrush/ Sandberg Bluegrass/ 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 further increase in sagebrush canopy cover. The reduced herbaceous understory results in 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, 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. Thermal and young of year cover would be provided for mule deer and antelope. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize this plant community.

State 2 - Sandberg Bluegrass/ Cheatgrass and Annual Plant Community: The community has developed due to continued improper grazing management and 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 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 1.2. A diverse seed mixture of grasses, forbs and shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.3. 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 best suited for livestock grazing in spring, summer, and early fall. Total average annual production for livestock use is low. Natural water supplies are limited.
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

Soils on this site are in hydrologic group C and D .

Recreational uses

The site offers minimal recreation or aesthetic values.

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

Other references

Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush- Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number “35”.
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USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Approval

Kendra Moseley, 4/06/2020

Rangeland health reference sheet

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

Author(s)/participant(s)	Dave Franzen and Jacy Gibbs Intermountain Range Consultants 17700 Fargo Rd. Wilder, ID 83676
Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	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:** rarely occur on this site due to the light textured surface soils. If they do occur it will normally be on slopes greater than 10%.

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2. **Presence of water flow patterns:** normally not present on this site. When they do occur they are short and disrupted by cool season grasses and shrubs. They are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** rarely occur on the site.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** ranges from 65-75 percent but more data is needed.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** does not occur except immediately after wildfire.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter moves by wind or water. Fine litter can move up to 2 feet after a strong summer convection storm. Due to the relatively flat slopes, large litter 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.

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 or weak fine granular. Soil organic matter (SOM) ranges from 0.5 to 1 percent. The surface horizon is typically 1 to 3 inches thick.

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 runoff and increase 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.

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: medium shrubs

    Other: perennial forbs

    Additional: shallow-rooted bunchgrasses

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** very little mortality or decadence is expected on this site. Mortality of shallow rooted grasses may occur due to extended periods of drought.

14. **Average percent litter cover (%) and depth (in):** additional data is needed but is expected to be low and at a shallow depth.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 175 pounds per acre (194 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 45-55 percent of the total production, forbs 5-15 percent, and shrubs 35-45 percent.

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, Russian thistle, yellow salsify, and annual mustards.

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