USDA Natural Resources
Conservation Service

Ecological site R011XA005ID
Claypan 8-12 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

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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
Moderately deep to deep, with <35% coarse fragments (by volume), not skeletal
not strongly or violently effervescent in the surface mineral 10”
Surface textures range from sandy loam to loam the surface mineral 4”
Slope is <30%
Clay content is =<35% in surface mineral 4”
Site has an argillic horizon with >35% clay

Associated sites

R011XA014ID	**Sandy 8-14 PZ ARTRT/HECOC8-ACHY**
R011XY001ID	**Loamy 8-12 PZ**
R011XY015ID	**Loamy Bottom 8-14 PZ ARTRT/LECI4**

Similar sites

R011XA010ID	**Churning Clay 8-12 PZ ARTRW8/PSSPS**

Table 1. Dominant plant species

Tree	Not specified

Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on nearly level to rolling slopes that are less than 10 percent. The site occurs on all aspects. Elevations range from 3500 to 4600 ft. (1050-1400 meters).

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Butte (3) Plateau
Flooding frequency	None
Elevation	3,500–4,600 ft
Slope	0–10%
Water table depth	60 in
Aspect	Aspect is not a significant factor

Climatic features

The Central Snake River Plain, MLRA 11A, has a mean elevation of 3929 feet above sea level, and varies from a minimum of 2575 feet to a maximum of 8586 feet. The average annual precipitation is 10.03 inches, with a range of 8.30 to 11.46 inches, based on 10 long term climate stations located throughout the MLRA. In general, annual precipitation is below the national average, especially during the summer months. Temperatures show considerable variation during the year. A maximum temperature of 112° Fahrenheit was recorded at the Hagerman climate station (# 103932; elevation 2880 feet), and a minimum of -38° was recorded at the Richfield station. Richfield has also recorded up to 186 days below freezing during the year.

The frost-free period ranges from 116 to 140 days. The freeze-free period can be as short as 144 days to as long as 169 days. Each period is greatest on the west side of the MLRA. In general, morning and afternoon relative humidity is at or far below the national average, especially during the months of May through September.

Table 3. Representative climatic features

Frost-free period (average)	140 days
Freeze-free period (average)	169 days
Precipitation total (average)	11 in

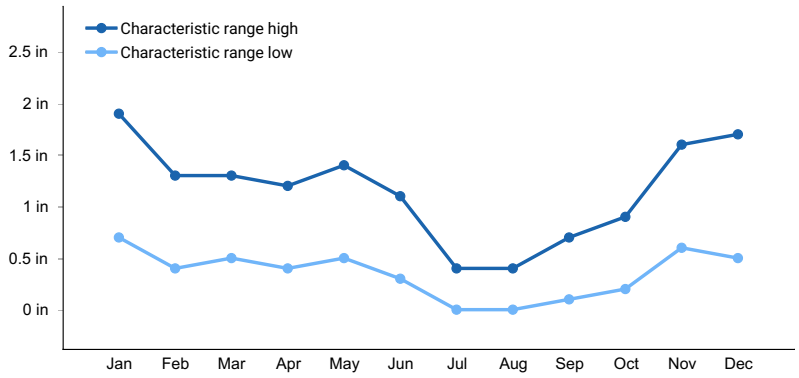


Figure 1. Monthly precipitation range

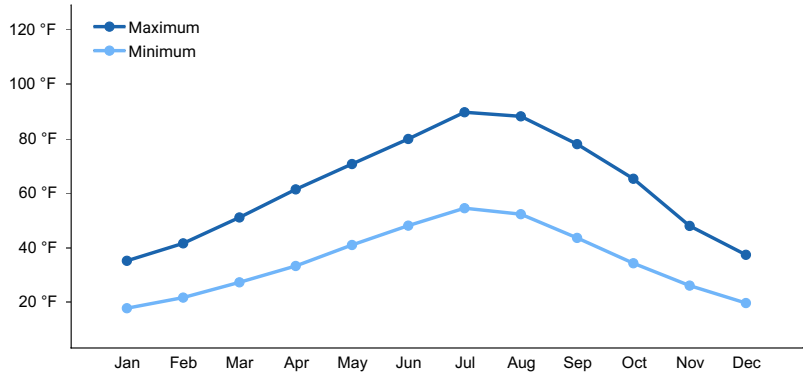


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are moderately deep to deep, well drained, with impermeable to very slow permeability. Runoff is high to very high. The erosion hazard is slight to very severe by water. The available water holding capacity (AWC) is low to moderate. The Catchell and Chilcott soils have a restrictive layer near the surface caused by an abruptic texture change. Gooding has a duripan at 44 inches. The surface texture is generally loamy. All of the soils have a well developed B horizon which slows down the internal water movement within the profile. These soils are characterized by a xeric or aridic bordering on xeric soil moisture regime. Soil temperature regime is mesic.

Soil Series Correlated to this Ecological Site

Catchell
Chilcott
Gooding

Table 4. Representative soil features

Surface texture	(1) Very cobbly sandy loam (2) Loam
Drainage class	Well drained
Permeability class	Very slow
Soil depth	30–60 in
Surface fragment cover <=3"	0–11%
Surface fragment cover >3"	0–23%
Available water capacity (0-40in)	3.2–8.3 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.1–7.8

Subsurface fragment volume <=3" (Depth not specified)	0–23%
Subsurface fragment volume >3" (Depth not specified)	0–26%

Ecological dynamics

The visual aspect of the site is Wyoming big sagebrush in the overstory with bluebunch wheatgrass in the understory. The composition by weight is 45 to 55 percent grasses, 15 to 25 percent forbs, and 20 to 40 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, rocky mountain elk, 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 in the understory and Wyoming big sagebrush in the overstory. Subdominant species include Sandberg bluegrass, Thurber’s needlegrass, bottlebrush squirreltail, Nevada bluegrass, basin wildrye, arrowleaf balsamroot, tapertip hawksbeard, antelope bitterbrush, and three-tip sagebrush. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 700 pounds per acre (777 kilograms per hectare) in a normal year. Production in a favorable year is 1000 pounds per acre (1111 kilograms per hectare). Production in an unfavorable year is 500 pounds per acre (555 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

FUNCTION:

This site is best suited for livestock grazing in the late spring, summer, and fall. There are few limitations to grazing. The distance to water may be a problem in some areas. Usually this site is a key area in a management program. The site is used by mule deer, pronghorn antelope, Rocky mountain elk, lagomorphs, small rodents, and predators. Upland game birds such as chukars also use the site as do various birds indigenous to the area. This site has limited recreation use except hunting.

Due to the low production potential and easy access by animals, this site is easily degraded by improper grazing management or frequent fires. Runoff is slight and erosion hazard is slight to moderate. Runoff, when it does occur, is non-erosive except during high intensity storms that last several days or when rain occurs when soils are frozen. Snow is caught in the shrub interspaces and a mixed stand of shrubs and perennial grasses is necessary to reach 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 many of the primary understory species.

When fires become more frequent than historic levels (50-70 years), Wyoming big sagebrush and antelope bitterbrush are reduced significantly. Rabbitbrush can increase slightly. With continued short fire frequency,

Wyoming big sagebrush and antelope bitterbrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Thurber's needlegrass. Three-tip sagebrush has a wide ecotypic variation and may sprout and increase after fire. At this elevation and precipitation it is usually a weak sprouter. These species may be replaced by Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass and medusahead will invade the site. These fine fuels will increase the fire frequency.

Influence of improper grazing management:

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

Continued improper grazing management influences fire frequency by increasing fine fuels that carry fires. As cheatgrass and medusahead increase and become 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. Due to the shrub species present, brush management should be carefully planned to protect any bitterbrush present. A reduction in shrubs without a suitable understory of perennial grasses can increase cheatgrass and medusahead which will lead to more frequent fire intervals. This can result in elimination of shrub species important to wildlife and livestock.

Weather influences:

Above normal precipitation in March, April, and May can dramatically increase total annual production of the plant community. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Likewise, below normal precipitation during these spring months can significantly reduce total annual production and be detrimental to viable seed production. Overall plant composition is normally not affected when perennials have good vigor
.
Below normal temperatures in the spring can have an adverse impact on total production regardless of the precipitation. An early, hard freeze can occasionally kill some plants. Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment, and production are usually reduced. Mortality can occur. Prolonged drought can lead to a reduction in fire frequency.

Influence of Insects and disease:

Outbreaks can affect vegetation health. 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.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency.
Annual and perennial invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory.

Influence of wildlife:

Big game animals use this site in the spring, summer, and fall and in moderate winters. Their numbers are seldom high enough to adversely affect the plant community. Burrowing rodents can create microsites for establishment of noxious and invasive plants.

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 and in the absence of fire.
Phase A to C. Develops with fire.
Phase B to A. Develops with prescribed grazing and no fire.
Phase C to A. Develops with prescribed grazing and no fire.

State 1 to State 2. Develops through frequent fire and improper grazing management. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

State 2 to State 3. Results from range seeding.

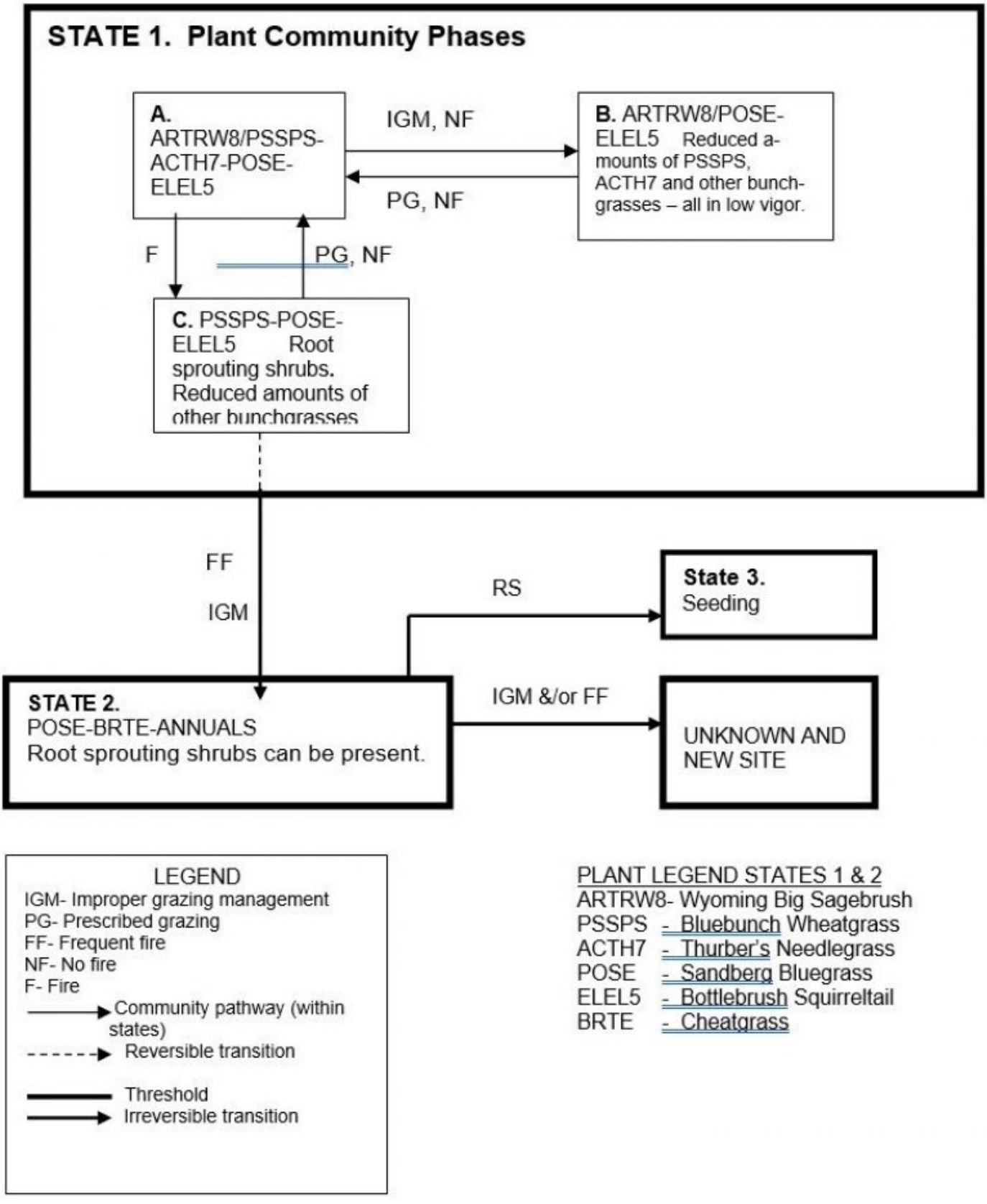
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is economically impractical to return this plant community to State 1 with accelerating practices.

Practice Limitations.

Only slight to moderate limitations exist on this site for implementing vegetative management practices. Usually this site is a key area for livestock management due to flatter slopes and non-stony soils. This site is suited to seeding if needed but slight to moderate limitations exist. Mechanical, chemical, and fire are satisfactory methods of brush management on this site. Planning should carefully analyze the stand of perennial grasses and forbs, because removal of Wyoming big sagebrush can result in a significant increase in cheatgrass and medusahead. If the plant community becomes dominated with cheatgrass, increased fire frequency could irreversibly degrade the community. Slight to moderate limitations exist on this site for implementing facilitating practices such as water developments, salting, and fencing.

Due to the heavy textured soils and relatively flat slopes, this site can be easily degraded by grazing when the soils are wet.

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, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot, tapertip hawksbeard, antelope bitterbrush, gray rabbitbrush, and green rabbitbrush are common. Natural fire frequency is 50-70 years.

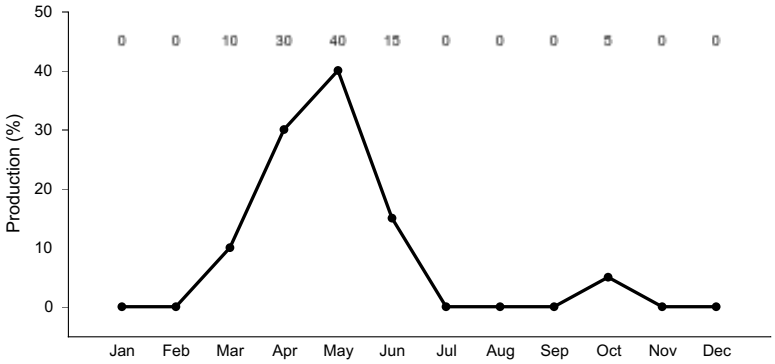


Figure 3. Plant community growth curve (percent production by month). ID0501, KRLA2/ ACHY. HCPC.

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 and other deep-rooted bunchgrasses. Sandberg bluegrass and bottlebrush squirreltail has increased in the understory. All deep-rooted bunchgrasses are typically in low vigor. Wyoming big sagebrush has increased as well as some other tall shrubs. This state has developed due to improper grazing management and lack of fire. Some cheatgrass and medusahead may have invaded the site.

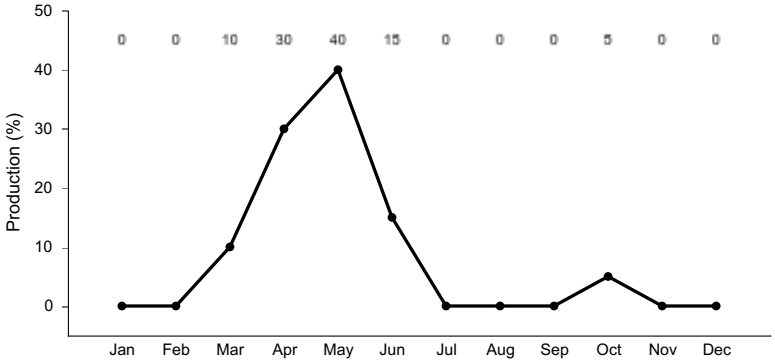


Figure 4. Plant community growth curve (percent production by month). ID0501, KRLA2/ ACHY. HCPC.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by bluebunch wheatgrass, Sandberg bluegrass and tall root-sprouting shrubs. Thurber’s needlegrass can be lost due to fire. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Phase A. Wyoming big sagebrush and antelope bitterbrush have been reduced significantly due to wildfire. Some cheatgrass and medusahead may have invaded the site. This plant community is the result of wildfire.

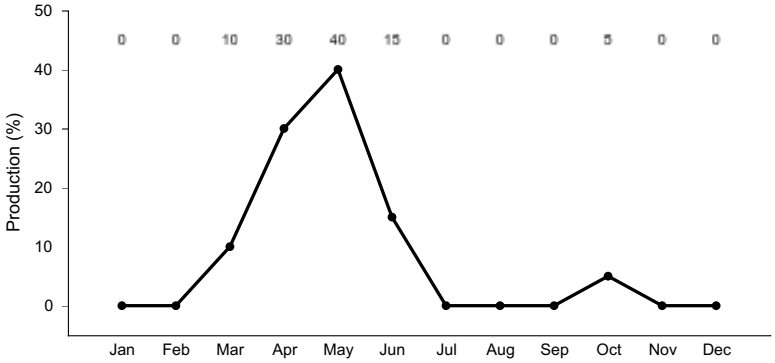


Figure 5. Plant community growth curve (percent production by month). ID0501, KRLA2/ ACHY. HCPC.

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 and horsebrush 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. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

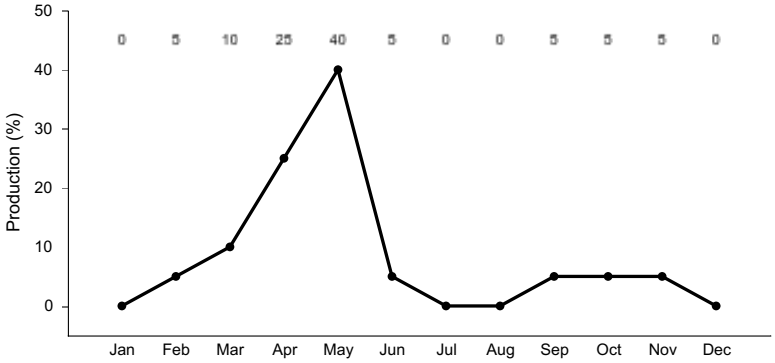


Figure 6. Plant community growth curve (percent production by month). ID0502, POSE/ BRTE- ANNUALS. State 2.

State 5
State 3

Community 5.1
State 3

This plant community results from range seeding. The seeding may be introduced species or it may be made up of native species that attempt to mimic the historic plant community.

State 6
State 4

Community 6.1
State 4

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

impractical to return this plant community to State 1 with accelerating practices.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. Large herbivore use of this ecological site is dominated by mule deer, pronghorn antelope, and elk. Important seasonal habitat is provided for resident and migratory animals including western toad, sagebrush lizard, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. Area sensitive species include pygmy rabbit, burrowing owl, great basin ground squirrel, and Townsend pocket gopher. Changes in the plant community composition can reduce the number and diversity of wildlife species in the area. With reduced shrub cover shrub obligate avian and mammal species become rare including sage-grouse, brewer's sparrow, sage sparrow, sage thrasher, and pygmy rabbits. Fragmentation of large stands of this plant community has reduced the quality of the habitat for many shrub-steppe obligate animal species. Water features are sparse provided by seasonal streams, artificial water catchments and springs.

State 1 Phase 1.1 - Wyoming Big Sagebrush/ Bluebunch Wheatgrass/ Thurber's Needlegrass/ 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 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. Area sensitive species include pygmy rabbit, burrowing owl, great basin ground squirrel and Townsend pocket gopher. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Fragmentation of this plant community reduces the value of the habitat for these shrub-steppe obligate animals. Critical habitat (lek sites, nesting areas, winter cover and food) for sage grouse is provided by this diverse plant community. The plant community provides thermal cover and young of year cover mule deer and elk. Forage habitat for deer and elk is provided throughout the year. Wyoming big sagebrush and antelope bitterbrush are preferred browse for wild ungulates. Antelope would not prefer this habitat due to the height of the sagebrush. 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 phase has developed due to improper grazing management and no fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. The reduced herbaceous understory results in lower diversity and numbers of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink and western rattlesnake. The reduced diversity and populations of insects will reduce reptile diversity and populations. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Key shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. The quality of nesting and brood-rearing habitat for sage-grouse is reduced due to a less diverse herbaceous plant community. The increase in canopy cover of sagebrush may reduce quality of habitat for the burrowing owl. The plant community provides a shorter forage season in the spring for mule deer and elk. Winter cover is provided for mule deer, elk and antelope. Wyoming big sagebrush and antelope bitterbrush are preferred browse for wild ungulates. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots, and pygmy rabbits 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 fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure and limits use by shrub obligate animals. Insect diversity would be reduced but a diverse native forbs community would still support select pollinators. An increase in rabbitbrush would provide fall pollinator habitat. 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 brood- rearing habitat for sage-grouse when sagebrush cover is nearby. The site does not provide suitable winter or nesting cover for sage grouse. Burrowing owls may utilize this open habitat. Mule deer, antelope, and elk use for foraging would be seasonal but the site would offer reduced thermal cover and young of year cover. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse and kangaroo rat would utilize this site for nesting and/or foraging. The plant community would not provide suitable habitat for pygmy rabbits.
State 2 - Sandberg Bluegrass/ Cheatgrass and Annual Plant Community: This state has developed due to frequent fires and 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. 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 open grassland species like the Columbian ground squirrel and deer mouse.

Grazing Interpretations.

This site is best suited for livestock grazing in the late spring, summer, and fall. There are few limitations to grazing. The distance to water may be a problem in some areas. Usually this site is a key area in a management program. This site should not be grazed in early spring when the soils are wet.
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

Because of the soil depth, time of year, and the form in which most of the precipitation comes, the soils should be capable of holding all of the normal precipitation that falls on them. In the Reference State (State 1) and under proper management, these soils have little surface runoff and thus only a slight to moderately slight erosion hazard rating. As the condition class declines, the erosion hazard rating will become more severe. Two exceptions to this are when (1) it rains hard for several continuous days or (2) when the ground is frozen and a quick thaw occurs, combined with heavy rains. In both these situations the soil profile will become saturated to the B horizon. Because of the slow permeability of this horizon the amount of runoff will increase, and so will the amount of sediment that is moved.

Recreational uses

This site has limited recreation use except hunting.

Wood products

None

Other products

None

Other information

Field Offices

Mountain Home, ID

Marsing, ID
Gooding, ID
Twin Falls, ID
Jerome, ID
Shoshone, ID
Burley, ID
Rupert, ID

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. Those involved in developing this site description include:
Dave Franzen, co-owner, Intermountain Rangeland Consultants, LLC
Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC
Jim Cornwell, Range Management Specialist, IASCD
Dan Ogle, Acting State Rangeland Management Specialist, NRCS, Idaho
Leah Juarros, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Other references

Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number “35”.
USDA Forest Service, Rocky Mountain Research Station. 2004. Restoring Western Ranges and Wildlands. General Technical Report RMRS-GTR-136-vols. 1-3.
USDA, NRCS.2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov.). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
USDA, Forest Service, Fire Effects Information Database. 2004. www.fs.fed.us/database.
USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Approval

Kendra Moseley, 4/06/2020

Rangeland health reference sheet

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

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Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	03/31/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills rarely occur on this site. If rills are present they are most likely to occur after a hard rain for several continuous days, rain on frozen ground and immediately following wildfire.

2. **Presence of water flow patterns:** water-flow patterns rarely occur on this site except following a hard rain over several continuous days or after a rain on frozen ground event. When they occur they are short, disrupted by cool season perennial grasses and tall shrubs and are not extensive.

3. **Number and height of erosional pedestals or terracettes:** both are rare on this site. Do not misinterpret frost heaving for pedestals. Terracettes provide a favorable micro-site for vegetative establishment which further increases infiltration.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** data not available. On sites in mid-seral status, bare ground may range from 30-40 percent.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** usually does not occur. Some wind erosion may occur immediately following a wildfire on soils that have fine textured surface soils.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move less than 2 feet following a significant run-off event. 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 to 6 but needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** structure ranges from moderate fine granular to weak or strong, thin and medium platy. Soil organic matter (SOM) is 1 to 3 percent. The A or A1 horizon is typically 2 to 8 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 run-off and increase infiltration. Shrubs accumulate snow in the interspaces.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** may be present in areas where livestock trailing occurs. It will be most prevalent if grazing occurs when the soils are wet.

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

    Dominant: cool season deep-rooted perennial bunchgrasses

    Sub-dominant: tall shrubs

    Other: perennial forbs

    Additional: shallow rooted grasses

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Wyoming big sagebrush will become decadent in the absence of fire and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase.

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14. **Average percent litter cover (%) and depth (in):** annual litter cover in the interspaces will be 20-30 percent to a depth of <0.1. Under the mature shrubs litter is greater than 0.5 inches.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 700 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 45-55 percent of the total, forbs 15-25 percent, and shrubs 20-40 percent.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** includes cheatgrass, medusahead rye, bulbous bluegrass, rush skeletonweed, scotch thistle, and spotted and diffuse knapweed.

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