USDA Natural Resources
Conservation Service

Ecological site R011XA010ID
Churning Clay 8-12 PZ ARTRW8/PSSPS

Last updated: 4/06/2020
Accessed: 05/20/2025

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

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
Deep, with <35% coarse fragments (by volume), not skeletal
not strongly or violently effervescent in the surface mineral 10”
Surface textures range from fine sandy clay loam to clay loam the surface mineral 4”
Soil surface cracking during summer months
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

R025XY033ID	**CLAY SEEP 12-16**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on slopes than range from 0 to 20 percent, most areas are less than 10 percent. The site occurs on all aspects but is most common on southerly aspects. Elevations range from 3500-4600 ft. (1050-1400 meters).

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Mesa (3) Escarpment
Flooding frequency	None
Elevation	3,500–4,600 ft
Slope	0–20%
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

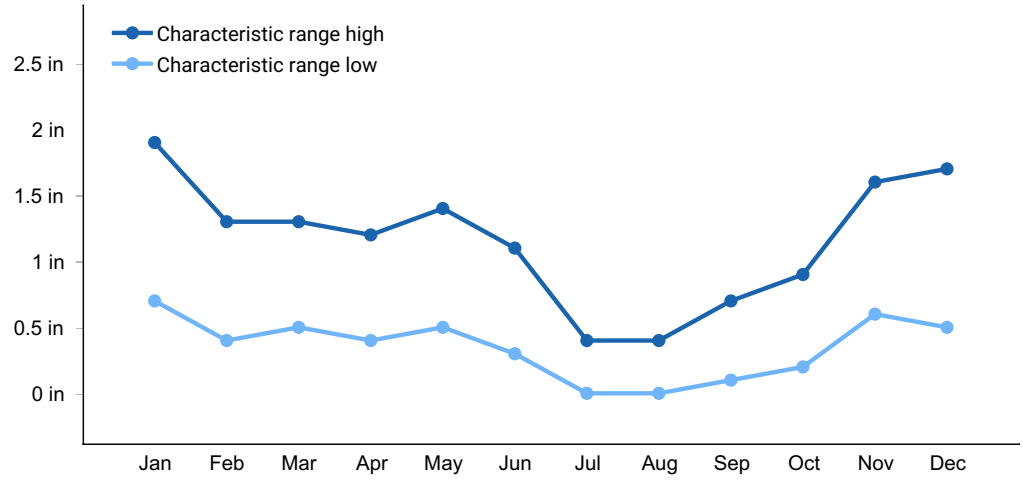


Figure 1. Monthly precipitation range

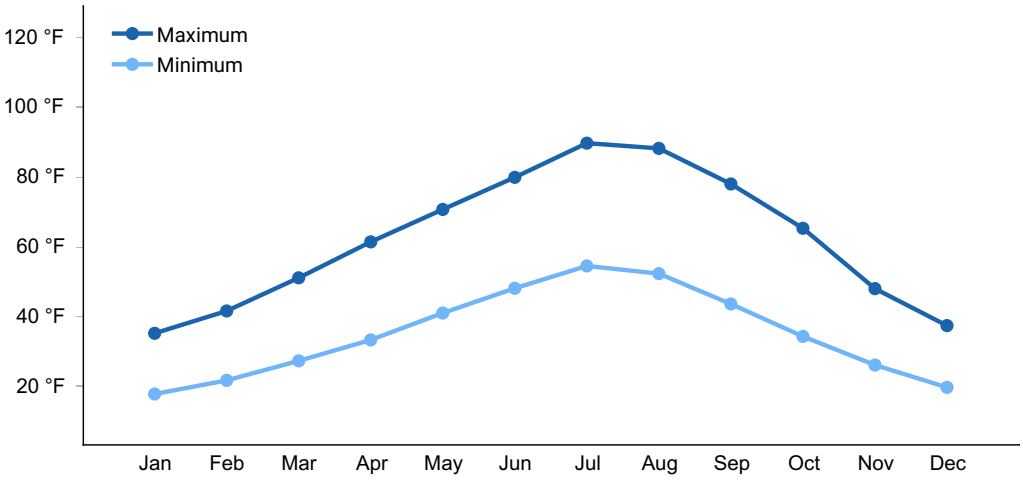


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are deep to a duripan, well drained, and impermeable. Runoff is high to very high. The erosion hazard is slight to severe by water. The available water holding capacity (AWC) is low to moderate. The surface texture is clayey with 32 percent clay. All of the soils have a well developed B horizon with 48 percent clay. They are all vertisols. The soils are easily distinguish-able by their granular surface appearance when dry or by the large cracks which open from the surface to deeper than 18 inches into the profile. These cracks appear as the soil dries during the summer months. These soils are characterized by a xeric soil moisture regime. Soil temperature regime is mesic.

Soil Series Correlated to this Ecological Site

McHandy

Table 4. Representative soil features

Surface texture	(1) Stony sandy clay loam
Drainage class	Well drained
Permeability class	Not specified
Soil depth	40–60 in
Surface fragment cover <=3"	0–6%
Surface fragment cover >3"	0–29%
Available water capacity (0-40in)	5.3–7.8 in
Soil reaction (1:1 water) (0-40in)	6.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–9%
Subsurface fragment volume >3" (Depth not specified)	0–6%

Ecological dynamics

The dominant visual aspect of this 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 80-100 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, tapertip hawksbeard, tall gray rabbitbrush, 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 450 pounds per acre (500 kilograms per hectare) in a normal year. Production in a favorable year is 600 pounds per acre (666 kilograms per hectare). Production in an unfavorable year is 300 pounds per acre (333 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 suited for early summer to fall grazing by domestic livestock. Grazing should not be allowed when soils are wet which can cause trampling damage. Some hazard may occur to sheep or small calves due to large cracks which can occur under dry conditions. The site provides good habitat for lagomorphs, upland game birds, songbirds, rodents, and predators. Mule deer use the site during the winter. The site has poor aesthetics and recreation values.

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 an displace most of the primary understory species.

When fires become more frequent than historic levels (80-100 years), Wyoming big sagebrush is reduced significantly. Medusahead is likely to invade following fire. 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. These species may be replaced by a variety of annual and perennial forbs including noxious and invasive plants. These fine fuels will increase the fire frequency.

Influence of improper grazing management:

Season-long grazing, excessive utilization, and grazing when the soils are wet 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 rabbitbrush along with noxious and invasive plants. 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 low production on the site, any brush management should be carefully planned, as a reduction in shrubs without a suitable understory of perennial grasses can increase cheatgrass and medusahead which will lead to 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 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.

Influence of Insects and disease:

Insect and disease outbreaks can affect health of vegetation but no specific data is available for this site. Grasshopper and mormon cricket outbreaks occur sporadically. Since the outbreak usually occurs for only one year, their impact causes little mortality on the vegetation.

Influence of noxious and invasive plants:

Medusahead can be a very invasive on this site. This species and other invasive plants 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, primarily mule deer, utilize this site in the spring, summer, fall, and winter. Their numbers are seldom high enough to adversely affect the plant community. Pronghorn antelope use this site very little due to the height of Wyoming big sagebrush.

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 no fire.
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 primarily through frequent fire. Continued improper grazing management can accelerate the transition. This site has crossed the threshold. It is economically impractical to return this site to State 1 with accelerating Practices.

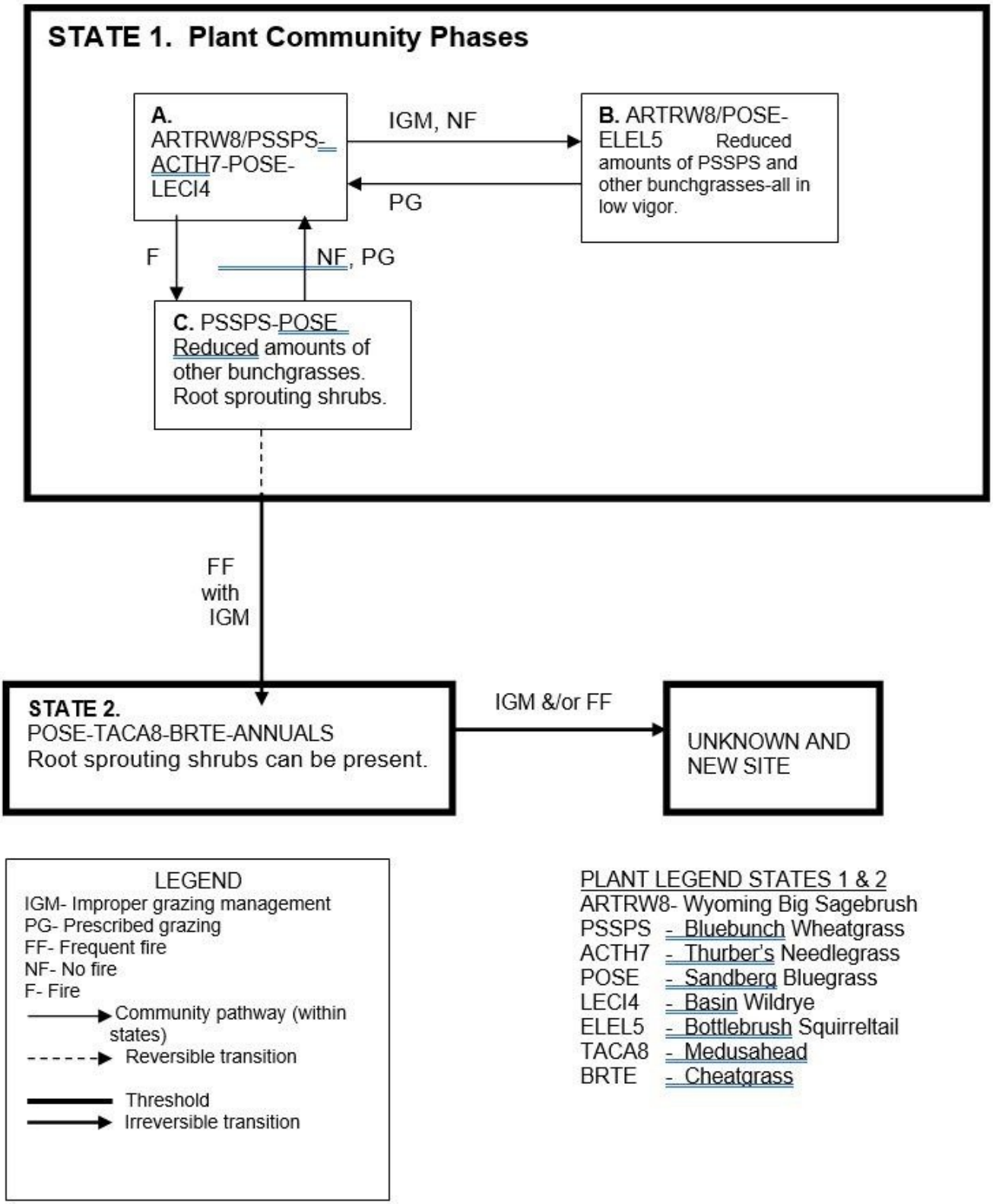
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is economically impractical to return this site to State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

Practice Limitations.

Severe limitations exist for seeding on this site, especially at the lower end of the precipitation range due to adverse soil textures and structure. Late winter to early spring seedings offer the best opportunity for successful establishment. Few limitations exist for brush management on this site, however, removal of Wyoming big sagebrush may trigger an increase of medusahead. 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, especially 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 and Thurber’s needlegrass dominating the understory. Subdominant species include Sandberg bluegrass, bottlebrush squirreltail, Nevada bluegrass, basin wildrye, tapertip hawksbeard, tall gray rabbitbrush, and three-tip sagebrush. Natural fire frequency is 80-100 years.

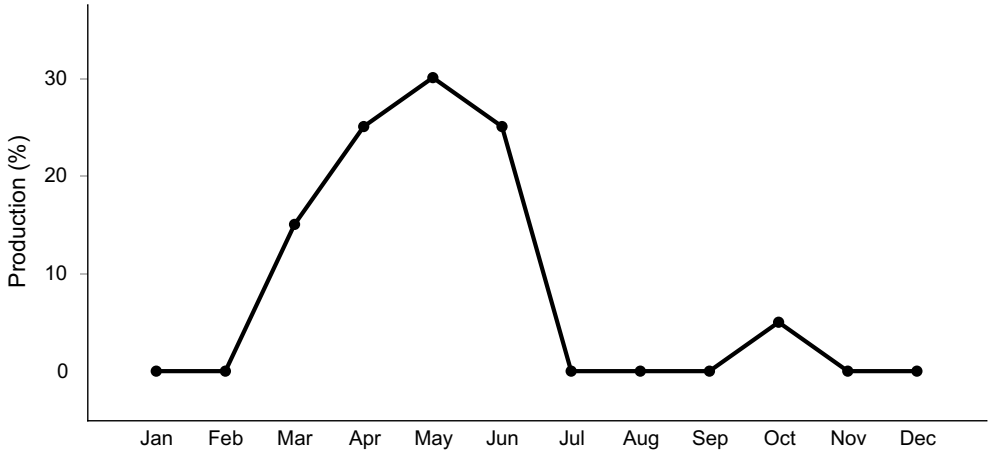


Figure 3. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is dominated by Wyoming big sagebrush with reduced amounts of bluebunch wheatgrass and Thurber’s needlegrass. All deep-rooted bunchgrasses are typically in low vigor. Wyoming big sagebrush, Sandberg bluegrass, and bottlebrush squirreltail are increasing. This state has developed due to improper grazing management and no fire. Some medusahead and cheatgrass may have invaded the site.

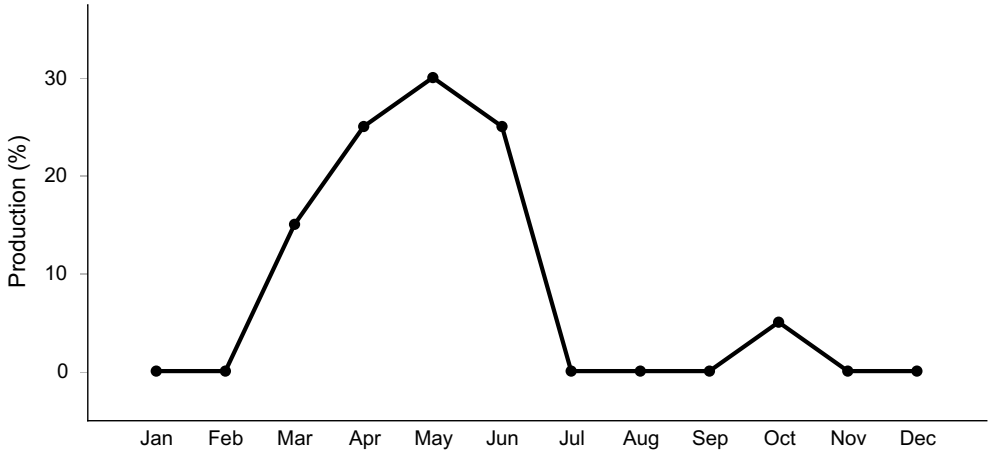


Figure 4. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Thurber’s needlegrass, if present, is in low vigor. Forbs remain about in the same proportion as Phase A. Little Wyoming big sagebrush is present due to wildfire, but some rabbitbrush and horsebrush are present due to sprouting. Some medusahead and cheatgrass may have invaded the site. This plant community is the result of wildfire.

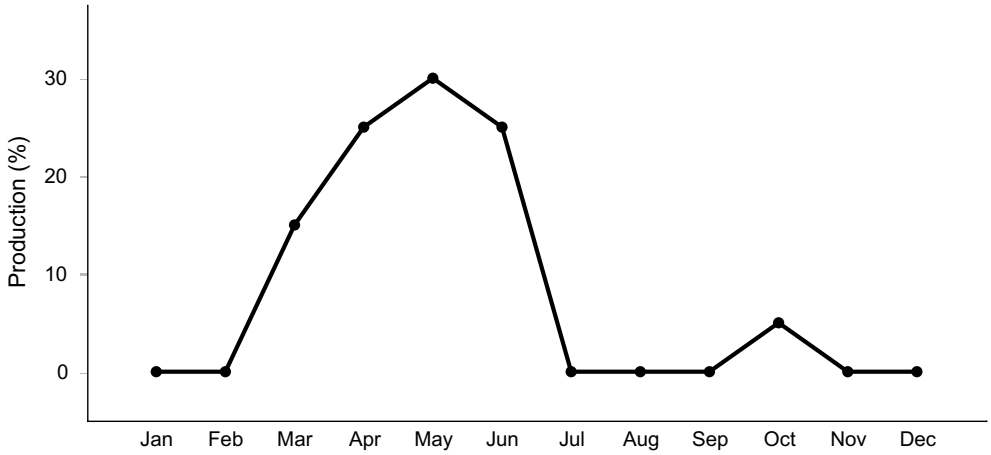


Figure 5. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

State 4
State 2

Community 4.1
State 2

This plant community is dominated by Sandberg bluegrass, medusahead , 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 primarily due to frequent fires but improper grazing management can accelerate the transition to the unknown site. This plant community has crossed the threshold. It is not economically feasible to move this state back towards State 1.

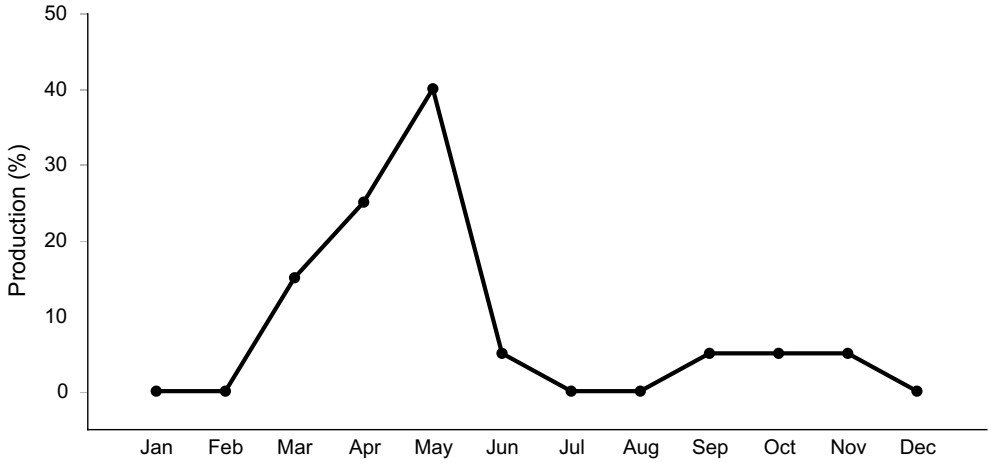


Figure 6. Plant community growth curve (percent production by month). ID0511, BRTE-ANNUALS. State 2.

State 5
State 3

Community 5.1
State 3

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

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, and 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/ Basin Wildrye 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 for mule deer and elk. Forage habitat for deer and elk is provided throughout the year. Wyoming big sagebrush is 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 is 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 forb community would still support select pollinators. Reptile use, including

short horned lizard, sagebrush lizard and western rattlesnakes, would be limited or excluded due to the absence of sagebrush. The dominance of herbaceous vegetation with little sagebrush canopy cover would prevent use of these areas for nesting by Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. This plant community provides 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. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). 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, kangaroo rat, and elk would utilize this site for nesting and/or foraging. The plant community would not provide suitable habitat for pygmy rabbits.
State 2 - Sandberg Bluegrass/ Medusahead/ Cheatgrass and Annual Plant Community: This state has developed primarily due to frequent fires but improper grazing management can accelerate the transition. 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 suited for early summer to fall grazing by domestic livestock. Grazing should not be allowed when soils are wet which can cause trampling damage. Some hazard may occur to sheep or small calves due to large cracks which can occur under dry conditions. 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 D. When hydrologic conditions of the vegetation cover are good, natural erosion hazard is moderate.

Recreational uses

The site has poor values for aesthetics and recreation.

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 on slopes greater than 10 percent. The churning action of the soil obliterates any signs of surface erosion each year.

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2. **Presence of water flow patterns:** water-flow patterns do not occur on this site due to the relatively flat slopes. If water flow patterns do develop, they are broken up by the churning action of the soil.

3. **Number and height of erosional pedestals or terracettes:** both are rare on this site. Do not misinterpret frost heaving for pedestals.

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 40-60 percent.

5. **Number of gullies and erosion associated with gullies:** none.

6. **Extent of wind scoured, blowouts and/or depositional areas:** usually does not occur. Some wind erosion may occur immediately following a wildfire.

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. Cracks in the soil surface that occur during the summer and fall, trap litter. 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 moderate medium granular. Soil organic matter (SOM) is 1 to 2 percent. The A or A1 horizon is typically 2 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. The churning action of the soil tends to breakdown the compaction layer where it occurs.

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: season deep-rooted perennial bunchgrasses

    Sub-dominant: tall shrubs

    Other: perennial forbs

    Additional: shallow rooted grasses

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Wyoming big sagebrush becomes decadent in the absence of fire and ungulate grazing. Mortality of grasses and forbs occurs from the shrinking and swelling of the soil.

14. **Average percent litter cover (%) and depth (in):** annual litter cover in the interspaces will be 5-10 percent to a depth of <0.1. Under the mature shrubs litter is greater than 0.5 inches. Fine litter falls or blows into the surface cracks in the soil.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 450 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.

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:** medusahead is the most troublesome invasive species on this site. Others that may be found on the site include cheatgrass, 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.
