

Ecological site R011XA013ID Slickspot Sodic 8-14 PZ

Last updated: 2/08/2022
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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 011X–Snake River Plains

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Precipitation or Climate Zone: 8-14" P.Z.

LRU notes

Site does not receive additional moisture

Soils are:

saline or saline sodic; high amount of exchangeable sodium

Deep to very 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 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

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

This ecological site meets the NESH 2014 requirements for PROVISIONAL. A provisional ecological site is established after ecological site concepts are developed and an initial state-and-transition model is drafted. Following quality control and quality assurance reviews of the ecological site concepts, an identification number and name for the provisional ecological site are entered into ESIS. A provisional ecological site may include literature reviews, land use history information, some soils data, legacy data, ocular estimates for canopy and/or species composition by weight, and even some line-point intercept information. A provisional ecological site does not meet the NESH 2014 standards for an Approved ESD, but does provide the conceptual framework of soil-site correlation for the development of the ESD.

Associated sites

R011XY001ID	Loamy 8-12 PZ
R011XY004ID	Shallow Loamy 8-12 PZ
R011XY015ID	Loamy Bottom 8-14 PZ ARTRT/LECI4

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> var. <i>wyomingensis</i>
Herbaceous	(1) <i>Achnatherum thurberianum</i>

Physiographic features

This site occurs on nearly level to undulating slopes of 1 to 2 percent on all aspects. Elevations range from 2000 to 5200 feet (600-1600 meters). The site occurs as a mosaic of small barren or nearly barren areas in association with other sites.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Plain
Flooding frequency	None
Elevation	2,000–5,200 ft
Slope	0–2%
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

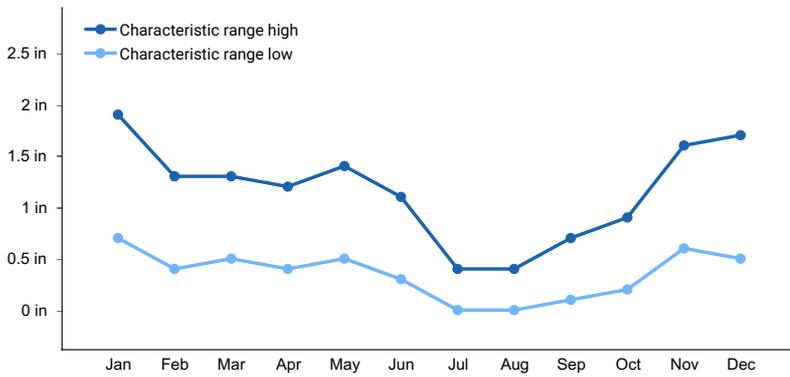


Figure 1. Monthly precipitation range

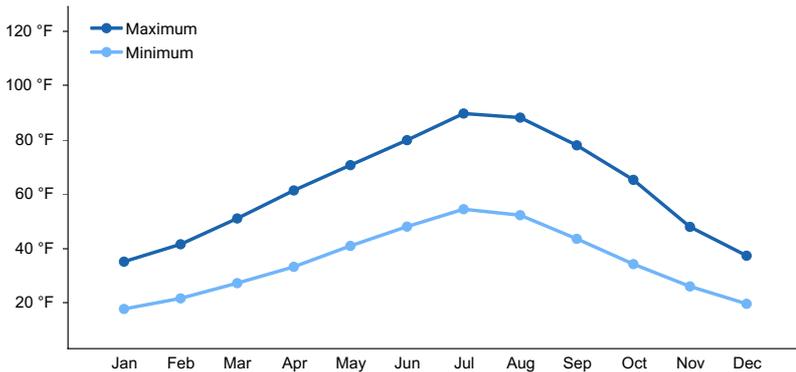


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

The soils supporting this site are deep to very deep, but are affected by salt and alkali between 1 and 8 inches. The soils are “slick” at the surface when moist or wet. They are well drained, and are either impermeable or have very slow permeability. Runoff is high to very high because of the slow intake, not steepness of slope. The available water holding capacity (AWC) is low to moderate. Erosion hazard is slight for water. The surface is typically silt loam. The “Sebree” soil has an E horizon at the surface which is 0-2 inches thick, very pale brown, and a very fine sandy loam. The soils are moderately deep loams or silt loams on the surface with a silty clay loam or silty clay subsoil at 1-3 inches. The subsoil has a “coffee-ground” granular structure. There is a high percentage of exchangeable sodium and there may be an indurated silica cemented hardpan at 20-40 inches.

Salt and alkali restrict the movement of roots through the profile. These soils are characterized by an aridic soil moisture regime. The soil temperature regime is mesic.

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Very fine sandy loam
Drainage class	Well drained
Permeability class	Very slow
Soil depth	60 in
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0–3%
Available water capacity (0-40in)	3.9–6.4 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)	6.6-9
Subsurface fragment volume <=3" (Depth not specified)	0-6%
Subsurface fragment volume >3" (Depth not specified)	0-3%

Ecological dynamics

The site occurs as a mosaic of small barren or nearly barren areas in association with other sites. The visual aspect of the site is the small barren areas in association with Wyoming big sagebrush sites, usually Loamy 8-10" or Loamy 10-12". The site itself is either barren or nearly devoid of vegetation. The nearly barren areas may be from 2 to 15 feet across. The dominant species on the site are Wyoming big sagebrush and small amounts of perennial bunchgrasses such as Thurber's needlegrass, bluebunch wheatgrass, Sandberg bluegrass, or bottlebrush squirreltail. Composition by weight is approximately 55 to 65 percent grasses, 10 to 20 percent forbs, and 20 to 30 percent shrubs.

During the last few thousand years, this site has evolved in a semi-arid climate characterized by dry summers and cold, wet winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, pronghorn antelope, lagomorphs, and small rodents.

Fire history is related to the associated sites as the site itself has very low production and low amounts of fine fuels. Associated sites historically burned 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 1.1. This plant community is rarely dominated by any one species but bluebunch wheatgrass, Thurber's needlegrass, Sandberg bluegrass, and bottlebrush squirreltail can occur in variable amounts in the understory. Scattered Wyoming big sagebrush plants occur in the overstory. The dominant forbs include pepperweed and Hoods phlox with a variety of other forbs and shrubs in small amounts. The plant species composition of Phase 1.1 is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 75 pounds per acre (84 kilograms per hectare) in a normal year. Production in a favorable year is 100 pounds per acre (112 kilograms per hectare). Production in an unfavorable year is 25 pounds per acre (28 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:

The site is normally too small a component in the association to have any values of its own.

This site has very little value for livestock grazing due to the sparse vegetation. The use is related to the use of the associated sites that are usually suited to spring and fall grazing.

The site has limited value for wildlife but is used incidentally by wildlife using adjacent associated sites.

The recreation values for this site are usually an extension of the other sites with which it is associated.

The site can be easily degraded with improper grazing management due to low potential production and ease of access, although the site and its associated sites often have limited livestock water.

Impacts on the Plant Community.

Influence of fire:

Fire has little influence on the site itself due to the low production and lack of fine fuels. In the absence of normal fire frequency in the associated Wyoming big sagebrush sites, a small increase of shrubs can occur. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, Wyoming big sagebrush can displace most of the primary understory species, particularly since lateral shrub roots from the adjacent sites can extend into this site.

When fires become more frequent than historic levels (50-70 years), Wyoming big sagebrush is reduced significantly. Rabbitbrush can increase slightly. With continued short fire frequency, Wyoming big sagebrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Thurber's needlegrass. These species may be replaced by bottlebrush squirreltail along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site. These fine fuels will increase the fire frequency.

Influence of improper grazing management:

The site is used with the associated sites. 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 increases in Wyoming big sagebrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels. As cheatgrass increases and becomes co-dominant with Sandberg bluegrass and other annuals, fires become more frequent.

Proper grazing management that addresses frequency, duration, and intensity of grazing can also keep fine fuels from developing, thereby reducing fire frequency. This can lead to gradual increases in Wyoming big sagebrush. Any brush management should be carefully planned, as a reduction in shrubs without a suitable understory of perennial grasses can increase cheatgrass which will lead to more frequent fire intervals.

Weather influences:

Above normal precipitation in 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 reduction in fire frequency.

Influence of Insects and disease:

Outbreaks can affect vegetation health. The sagebrush defoliator moth (*Aroga websterii*) causes mortality in relatively small patches. It seldom kills the entire stand. Mormon cricket and grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency. 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:

Wildlife's use of this site is incidental to their use of associated sites. Big game animals associated use of this site occurs in the spring, summer, fall, and in moderate winters. Their numbers are seldom high enough to adversely affect the plant community. Burrowing rodents can alter soil profiles and allow invasion of undesirable 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 1.1 to 1.2. Develops with improper grazing management.

Phase 1.1 to 1.3. Develops with fire.

Phase 1.2 to 1.1. Develops with prescribed grazing.

Phase 1.3 to 1.1. Develops with prescribed grazing and no fire.

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

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

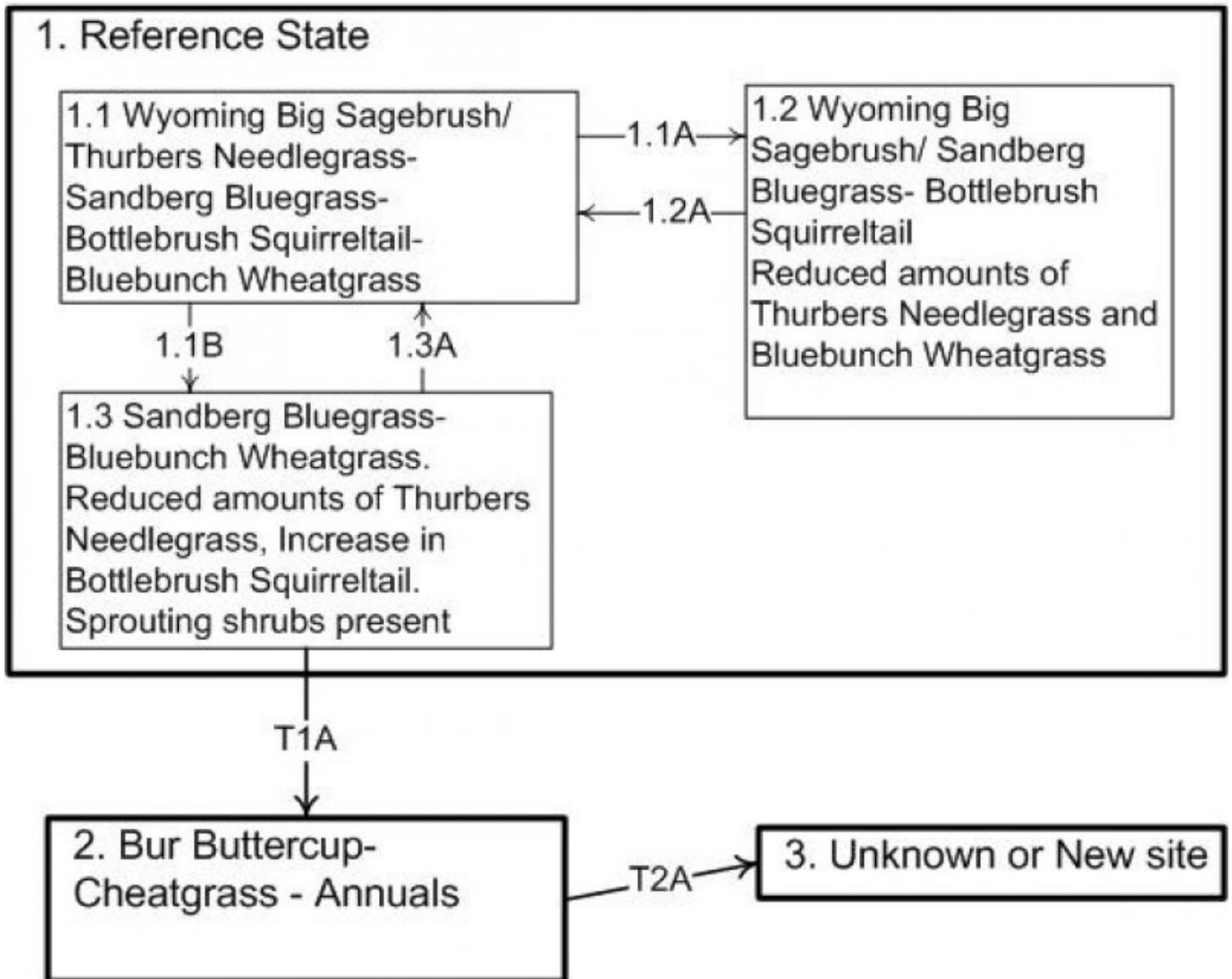
Practice Limitations:

Only slight limitations exist on this site for implementing vegetative management and facilitating practices. The ability to implement these practices would be influenced by the limitations of the associated sites.

Because this site occurs as a small percentage of any given area, no accelerating practices would be applied specifically to this site. The application would be incidental to the practice applied on associated sites. Severe limitations for implementation of accelerated practices exist on this site because of the high sodium content of the soils and the shallow depth to the heavy clay or silty clay layers.

State and transition model

R011AY013ID – Slick Spot Sodic 8-14 ARTRW8-ACTH7



**State 1
Reference State**

**Community 1.1
Reference Plant Community**

This plant community is rarely dominated by any one species but bluebunch wheatgrass, Thurber's needlegrass, Sandberg bluegrass, and bottlebrush squirreltail can occur in variable amounts in the understory with scattered Wyoming big sagebrush in the overstory. The dominant forbs include pepperweed and Hoods phlox with a variety of other forbs and shrubs in small amounts. Natural fire frequency of the associated sites is 50-70 years.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	15	45	60
Shrub/Vine	6	20	25
Forb	4	10	15
Total	25	75	100

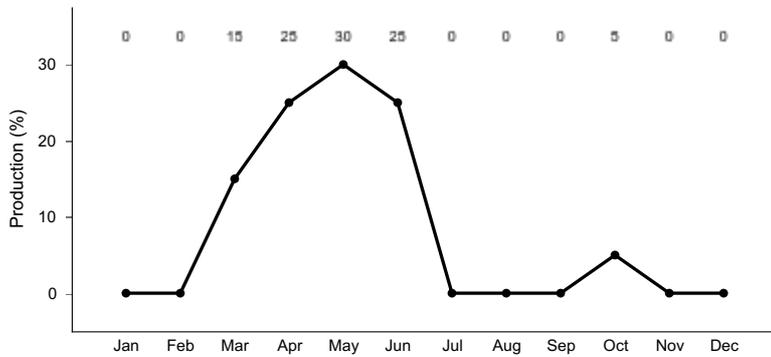


Figure 4. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

Community 1.2 Wyoming Big Sagebrush - Low vigor bunchgrasses

This plant community is dominated by Wyoming big sagebrush with Sandberg bluegrass in the understory. Bottlebrush squirreltail has increased in the understory. Thurber's needlegrass and bluebunch wheatgrass have decreased. All deep-rooted bunchgrasses are typically in low vigor. Wyoming big sagebrush has increased. This state has developed due to improper grazing management. Some cheatgrass and burr buttercup may have invaded the site.

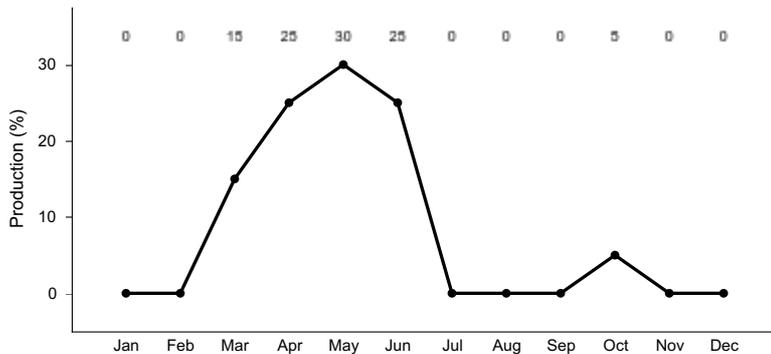


Figure 5. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

Community 1.3 Sandberg Bluegrass- Bluebunch Wheatgrass

This plant community is dominated by Sandberg bluegrass and bluebunch wheatgrass. Some Thurber's needlegrass may be lost due to fire. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Phase A. Little Wyoming sagebrush is present due to wildfire, but some rabbitbrush and horsebrush are present due to sprouting. Some cheatgrass and burr buttercup have invaded the site. This plant community is the result of wildfire.

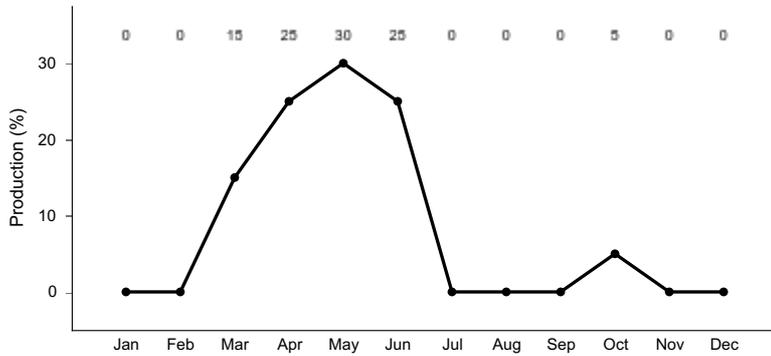


Figure 6. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

State 2 Annuals

Community 2.1 Bur Buttercup- Cheatgrass

This plant community is dominated by bur buttercup, 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. The site has crossed the threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

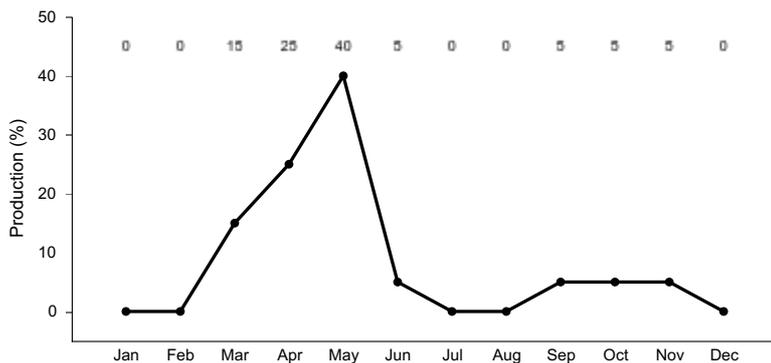


Figure 7. Plant community growth curve (percent production by month). ID0511, BRTE-ANNUALS. State 2.

State 3 Unknown or New Site

Community 3.1 Unknown or New Site

Unknown new site. This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This state has developed due to continued improper grazing management and/or frequent fires. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Grass/Grasslike			15–60	
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	5–20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	5–15	–
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata ssp. spicata</i>	0–10	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–10	–
Forb					
2	Forb			10–15	
	Lava aster	IOAL	<i>Ionactis alpina</i>	1–5	–
	pepperweed	LEPID	<i>Lepidium</i>	0–5	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	1–5	–
Shrub/Vine					
3	Shrub			20–25	
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	1–10	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	1–5	–
	horsebrush	TETRA3	<i>Tetradymia</i>	1–5	–

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site is a mosaic of small barren areas associated with adjacent larger ecological sites. These small barren sites do not produce extensive wildlife habitat value on their own due to the sparse plant community. The animal community listed below uses the slickspot-sodic sites incidentally due to their location within other vegetated ecological sites. Large herbivores that may utilize this ecological site include mule deer, pronghorn antelope, and elk. 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. These animal species would be present only due to the adjacent ecological sites. 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.

State 1 Phase 1.1 - Wyoming Big Sagebrush/ Thurber's Needlegrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail/ Bluebunch Wheatgrass Reference Plant Community (RPC): This plant community has sparse vegetation and rarely provides significant habitat for invertebrates. Annual weeds and slickspot peppergrass provide some pollinator habitat. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink and western rattlesnake. 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. Habitat (lek sites) for sage grouse may be provided by the relatively open plant community. Wyoming big sagebrush is preferred browse for deer, elk and antelope. 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 1.2 - Wyoming Big Sagebrush/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This

phase has developed due to improper grazing management. 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 obligates avians include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. The increase in canopy cover of sagebrush may reduce quality of habitat for the burrowing owl. Winter cover is provided for mule deer, elk and antelope. Wyoming big sagebrush is preferred browse for deer, antelope and elk. 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 - Sandberg Bluegrass/ Bluebunch Wheatgrass 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. 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. Burrowing owls may utilize this open habitat. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, and kangaroo rat may utilize this site.

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 has very little value for livestock grazing due to the sparse vegetation. The use is related to the use of the associated sites that are usually suited to spring and fall grazing. Livestock water may be limiting. 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.

Hydrological functions

The soils in this site are in hydrologic group C. The permeability is very slow and runoff, when it occurs, is rapid.

Recreational uses

The recreation values for this site are usually an extension of the other sites with which it is associated. This site is normally too small a component in the association to have any values exclusively its own.

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

Type locality

Location 1: Twin Falls County, ID	
Township/Range/Section	T13S R13E S20
General legal description	SW 1/4, NW 1/4
Location 2: Owyhee County, ID	
Township/Range/Section	T8S R7E S34

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.

Contributors

Dave Franzen And Jacy Gibbs

Approval

Kirt Walstad, 2/08/2022

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem

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

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Date	04/01/2008
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills rarely occur on this site.

2. **Presence of water flow patterns:** water-flow patterns rarely occur on this site.

3. **Number and height of erosional pedestals or terracettes:** both are rare on this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** ranges from 80 to 95 percent.

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:** usually not present. Immediately following wildfire some soil movement may occur when the cover is reduced on associated sites.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move to the associated site usually from wind. Coarse litter generally does not move.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 4 to 6

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** structure ranges from moderate coarse to strong medium platy. Soil organic matter (SOM) is 0.5 to 2 percent. The A or A1 horizon

is typically 3 to 4 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 at higher elevations.
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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** not present. Do not mistake the B horizon as a compaction layer.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: cool season deep-rooted perennial bunchgrasses
- Sub-dominant: tall shrubs
- Other: perennial forbs
- Additional: shallow rooted grasses
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Wyoming big sagebrush will become decadent in the absence of fire and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase.
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14. **Average percent litter cover (%) and depth (in):** due to low annual production of the site, litter does not accumulate but usually is blown to nearby associated sites. 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 75 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 55-65 percent of the total, forbs 10-20 percent, and shrubs 20-30 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, Russian thistle, burr buttercup, and Jim Hill mustard. Kochia can invade at lower elevations.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in normal years.

