USDA Natural Resources
Conservation Service

Ecological site R011XY004ID
Shallow Loamy 8-12 PZ

Last updated: 3/11/2025
Accessed: 05/12/2025

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
Shallow to moderately deep, with >35% coarse fragments (by volume) with a mixture of fragment sizes <3” and >3”, skeletal
not strongly or violently effervescent in the surface mineral 10”
Textures range from silt loam to silty clay loam in the surface mineral 4”
Slope is <30%
Clay content is =<35% in surface mineral 4”
Site does not have an argillic horizon with >35% clay

Associated sites

R011XY001ID	**Loamy 8-12 PZ**
R011XY007ID	**Gravelly 10-12 PZ**
R011XY008ID	**South Slope 10-12 PZ**
R011XY009ID	**Silty 7-10 PZ KRLA2/ACHY**
R011XY010ID	**Calcareous Loam 7-10 PZ ATCO-PIDE4/ACHY-ACTH7**
R011XY011ID	**Sand 8-12 PZ ARTRT/ACHY**
R011XY014ID	**Sandy Loam 8-12 PZ ARTRW8/ACHY-HECOC8**
R011XY015ID	**Loamy Bottom 8-14 PZ ARTRT/LECI4**

Similar sites

R011XY001ID	**Loamy 8-12 PZ**

Table 1. Dominant plant species

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

Physiographic features

This site occurs on nearly level to hilly slopes that range from 1 to 25 percent and occurs on all aspects. Elevation ranges from 2300 to 4500 feet (700-1370 meters).

Table 2. Representative physiographic features

Landforms	(1) Lava plain (2) Terrace (3) Butte
Flooding frequency	None
Ponding frequency	None
Elevation	2,300–4,500 ft
Slope	1–25%
Aspect	Aspect is not a significant factor

Climatic features

MLRA 11 is part of Idaho’s Snake River Plain. The elevation ranges from 2,077 to 7,549 feet, with a mean of 3,992 feet. Most of the precipitation falls as rain in the fall, winter and spring. Very little precipitation occurs during the summer months. In general this MLRA receives more sun than the U.S. average during the summer, but less than average during the winter.

The average annual precipitation is 10.01 inches (based on 10 long term climate stations located throughout the MLRA), with minimum and maximum values of 8.38 and 11.62 inches, respectively.

The average annual temperature ranges from 38° to 65° Fahrenheit. With a maximum average temperature of 65 degrees F. and a minimum average of 38 degrees F. The frost free interval ranges from 139 to 165 days and the freeze free interval ranges from 168 to 196 days.

Table 3. Representative climatic features

Frost-free period (average)	165 days
Freeze-free period (average)	196 days
Precipitation total (average)	12 in

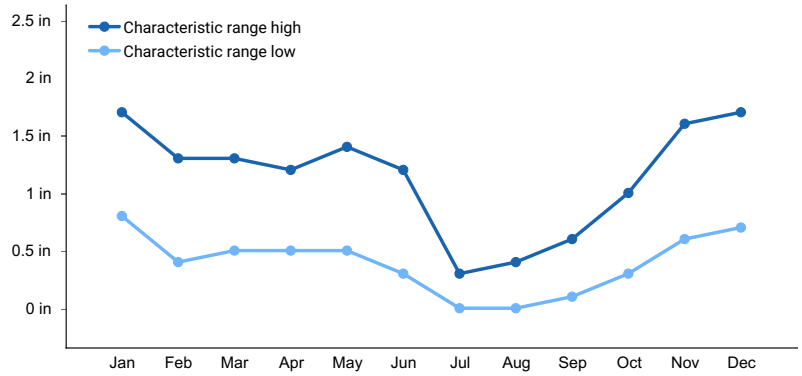


Figure 1. Monthly precipitation range

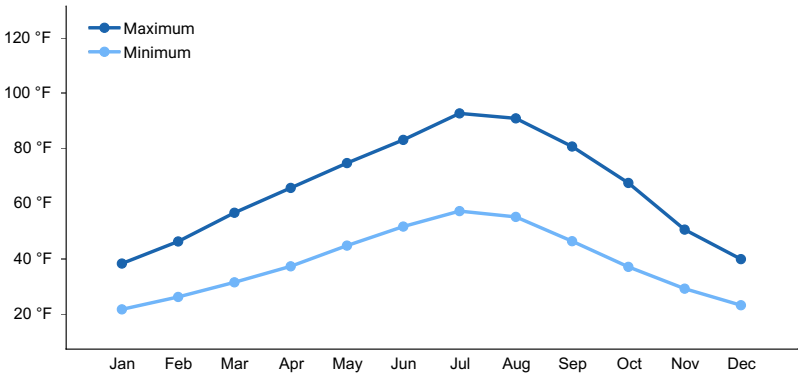


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils on this site are characterized by shallow or moderately deep depth to hardpan or bedrock. They are well drained, with very slow to moderate permeability and very low to low available water holding capacity (AWC). Runoff is low to very high. The erosion hazard is slight to severe by water and slight to severe by wind. The surface texture is generally loamy with surface stones in some areas. These soils are characterized by a xeric or aridic soil moisture regime that borders on xeric. Soil temperature regime is either mesic or frigid.

Table 4. Representative soil features

Parent material	(1) Loess–basalt
Surface texture	(1) Extremely stony silt loam (2) Very cobbly silty clay loam (3) Cobbly loam
Drainage class	Well drained
Permeability class	Very slow to moderate
Soil depth	8–31 in
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–30%
Available water capacity (0-40in)	0.9–4.4 in
Calcium carbonate equivalent (0-40in)	0–10%

Sodium adsorption ratio (0-40in)	0–15
Subsurface fragment volume <=3" (Depth not specified)	0–34%
Subsurface fragment volume >3" (Depth not specified)	0–60%

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is Wyoming big sagebrush with bluebunch wheatgrass in the understory. Composition by weight is approximately 50 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 an arid climate characterized by dry summers and cold, wet winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, pronghorn antelope, lagomorphs and small rodents.

Fire has historically occurred on the site at intervals of 50-70 years.

The Historic Climax Plant Community (HCPC) moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The HCPC is Phase 1.1. This plant community is dominated by bluebunch wheatgrass in the understory and Wyoming big sagebrush in the overstory. Subdominant species include Sandberg bluegrass, bottlebrush squirreltail, Thurber’s needlegrass, Indian ricegrass, arrowleaf balsamroot, and tapertip hawksbeard. There is a large variety of other grasses, forbs, and shrubs that can occur in minor amounts. The plant species composition of Phase 1.1 is listed later under “HCPC Plant Species Composition”.

Total annual production is 450 pounds per acre (504 kilograms per hectare) in a normal year. Production in a favorable year is 650 pounds per acre (728 kilograms per hectare). Production in an unfavorable year is 250 pounds per acre (280 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted bunchgrasses are subdominant.

FUNCTION:

This site is suited for livestock grazing in the spring and fall. There are few limitations to grazing. The distance to water may be a problem in some areas.

The site provides winter and spring range for mule deer and pronghorn antelope. It has some value as brood rearing areas for sage grouse.

The site has limited value for recreation but does provide some hunting, hiking, photography opportunities, and off-road vehicle use.

Due to gentle slopes and relatively low production, this site can easily be degraded from improper livestock management. A mixed stand of shrubs and perennial grasses is necessary to reach the potential of the site.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, Wyoming big sagebrush can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, Wyoming big sagebrush can displace most

of the primary understory species.

When fires become more frequent than historic levels (50-70 years), Wyoming big sagebrush is reduced significantly. Rabbitbrush can increase slightly. With continued short fire frequency, Wyoming big sagebrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass, Indian ricegrass, and Thurber's needlegrass. These species may be replaced by Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive species. Cheatgrass 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 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. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management should be carefully planned, as a reduction in shrubs without a suitable understory of perennial grasses, can increase cheatgrass which leads 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 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. The sagebrush defoliator moth (Aroga websterii) causes mortality in relatively small patches. It seldom kills the entire stand. Mormon cricket and grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency.
Perennial and annual 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 and fall and in moderate winters. Their numbers are seldom high enough to adversely affect the plant community.

Watershed:

Decreased infiltration and increased runoff occur with an increase in Wyoming big sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same results, but to a lesser degree. The long term effect is a transition to a different state.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.
Phase 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 Phase 1.3 to State 2. Develops through frequent fire or 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 State 3: Is a result of rangeland seeding.

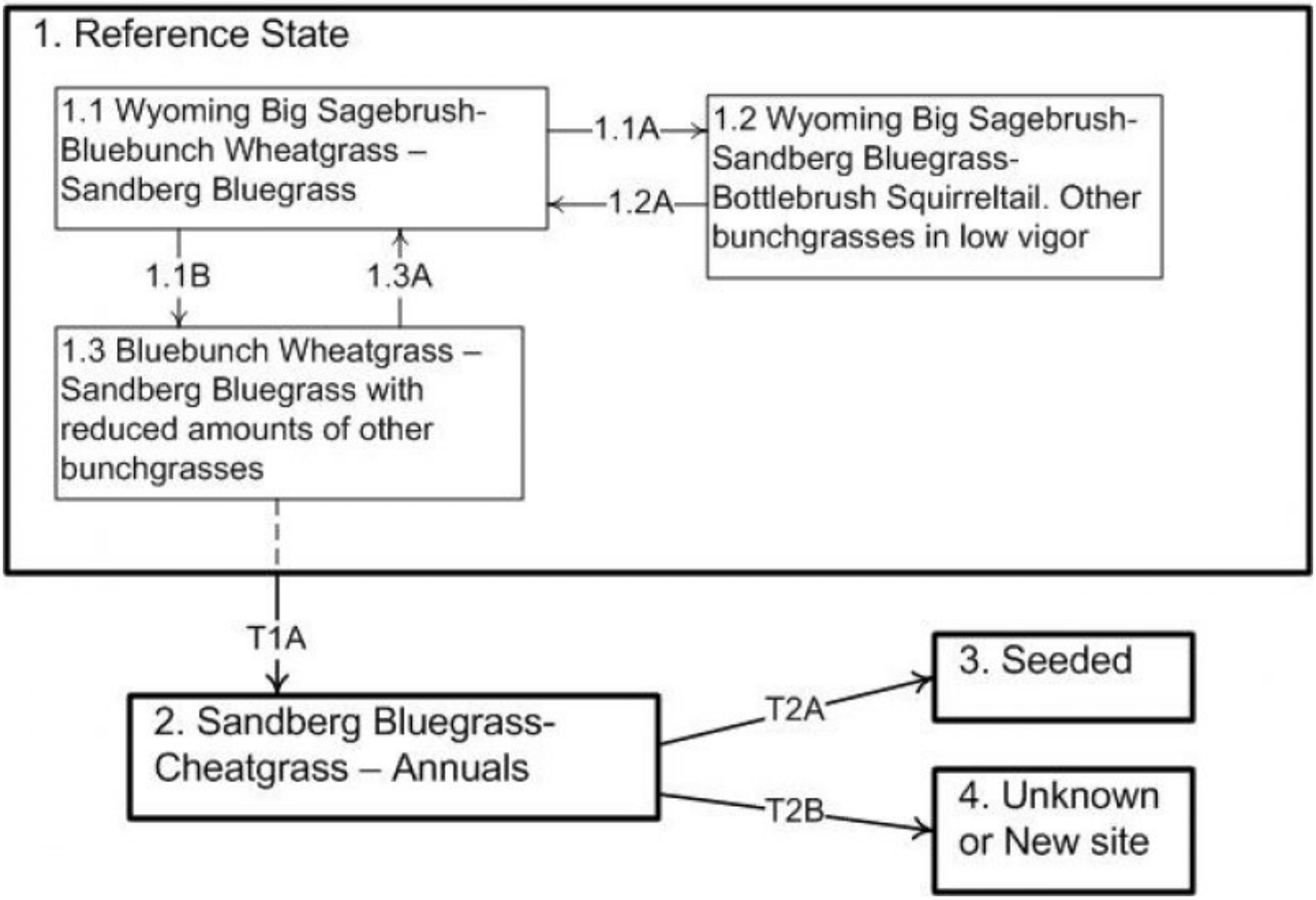
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is generally not economically feasible to move this state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

Practice Limitations:

There are no physical limitations to prevent seeding of this site. Proper seedbed preparation is critical on this site. There is a high chance of seeding failure during unfavorable moisture years. There are no physical limitations for brush management on this site, but careful planning is necessary. Removal of Wyoming big sagebrush without a suitable understory of perennial grasses, can result in a significant invasion of cheatgrass.

State and transition model

R011XY004ID – Shallow Loamy 8-12 ARTRW8/PSSPS



State 1
Reference

Community 1.1
Wyoming big sagebrush - bluebunch wheatgrass

The HCPC has Wyoming big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Subdominant species include Sandberg bluegrass, bottlebrush squirreltail, Thurber's needlegrass, Indian ricegrass, arrowleaf balsamroot, and tapertip hawksbeard. There is a large variety of other grasses, forbs and shrubs that can occur in minor amounts. Natural fire frequency is 50-70 years.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	150	270	390
Shrub/Vine	60	110	160
Forb	40	70	100
Total	**250**	**450**	**650**

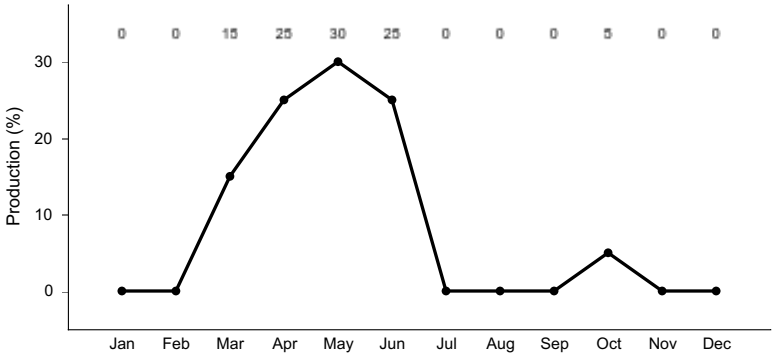


Figure 4. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

Community 1.2
Wyoming big sagebrush - low vigor bunchgrasses

This plant community is dominated by Wyoming big sagebrush with reduced amounts of bluebunch wheatgrass. Sandberg bluegrass and bottlebrush squirreltail has increased in the understory. Thurber's needlegrass gradually decreases. There is a reduced amount of Indian ricegrass and other perennial grasses. 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 may have invaded the site.

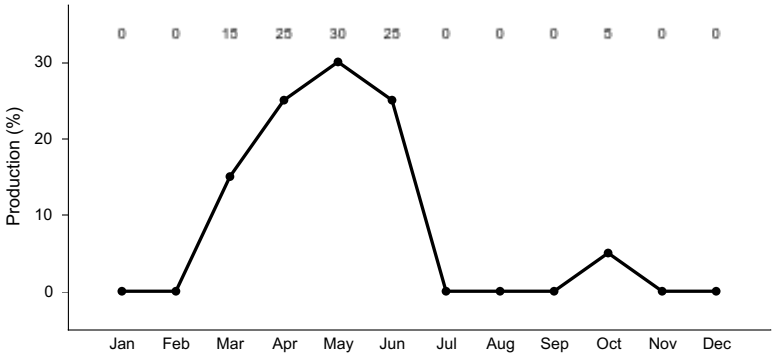


Figure 5. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

Community 1.3
Bluebunch wheatgrass - sandberg bluegrass

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Some Thurber's needlegrass may be lost due to fire. Some Indian ricegrass may be present. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Plant Community A. Very little Wyoming sagebrush is present due to wildfire, but some rabbitbrush is present due to sprouting. Some cheatgrass has invaded the site. This plant community is the result of wildfire.

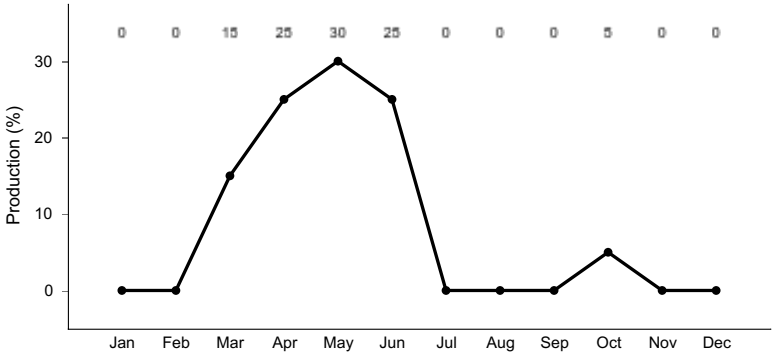


Figure 6. Plant community growth curve (percent production by month). ID0505, ARTRW8 -PSSPS . State 1.

State 2
Shortgrass Annuals

Community 2.1
Sandberg bluegrass - annuals

This plant community is dominated by Sandberg bluegrass, cheatgrass and other annuals. Root sprouting shrubs such as rabbitbrush can be present, dependent upon, how frequent, fire has occurred. Some soil loss has occurred. This state has developed due to frequent fires or improper grazing management. The site has crossed the threshold. It is generally not economically feasible to move this state back to State 1 with accelerated practices.

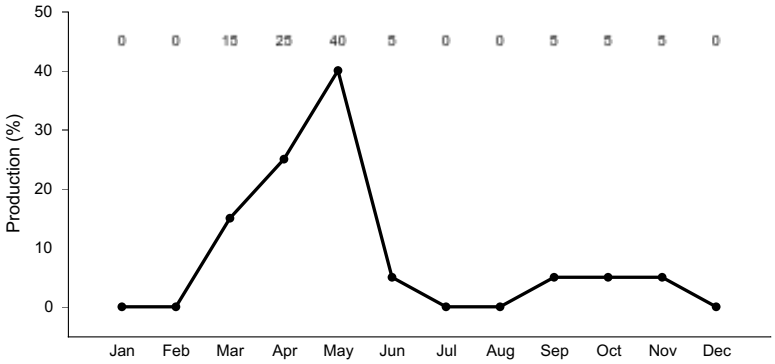


Figure 7. Plant community growth curve (percent production by month). ID0511, BRTE-ANNUALS. State 2.

State 3
Seeded

Community 3.1
Seeded

This plant community is dominated by seeded species. The seeding may be introduced species or natives to mimic the HCPC.

State 4
Unknown or New Site

Community 4.1
Unknown or 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**			150–390	
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	60–160	–
	Sandberg bluegrass	POSE	*Poa secunda*	20–50	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	15–40	–
	squirreltail	ELEL5	*Elymus elymoides*	15–35	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	10–30	–
	thickspike wheatgrass	ELLA3	*Elymus lanceolatus*	0–15	–
	needle and thread	HECO26	*Hesperostipa comata*	0–15	–
	basin wildrye	LECI4	*Leymus cinereus*	0–10	–
	sedge	CAREX	*Carex*	0–10	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–5	–
Forb					
2	**Forbs**			40–100	
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	10–26	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	10–25	–
	lupine	LUPIN	*Lupinus*	5–15	–
	spiny phlox	PHHO	*Phlox hoodii*	1–15	–
	longleaf phlox	PHLO2	*Phlox longifolia*	1–15	–
	desertparsley	LOMAT	*Lomatium*	0–10	–
	milkvetch	ASTRA	*Astragalus*	1–10	–
	Hooker's balsamroot	BAHO	*Balsamorhiza hookeri*	0–10	–
	onion	ALLIU	*Allium*	0–5	–
	pussytoes	ANTEN	*Antennaria*	0–5	–
	aster	ASTER	*Aster*	0–5	–
	fleabane	ERIGE2	*Erigeron*	0–5	–
	buckwheat	ERIOG	*Eriogonum*	0–5	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	0–5	–
	Henderson's biscuitroot	LOHE2	*Lomatium hendersonii*	0–5	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–5	–
	beardtongue	PENST	*Penstemon*	0–5	–
Shrub/Vine					
3	**Shrub**			60–160	
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	60–150	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	1–20	–
	spiny hopsage	GRSP	*Grayia spinosa*	0–10	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–10	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	0–10	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–5	–

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 and pronghorn antelope. 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. Changes in the plant community composition can reduce the number and diversity of wildlife species in the area. Area sensitive species include pygmy rabbit, burrowing owl, Great Basin ground squirrel, long-nosed snake, groundsnake, Great Basin collared lizard, and Townsend pocket gopher. 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. Encroachment of noxious and invasive plant species (cheatgrass, Rush skeleton weed, and knapweed) can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water features are sparse provided by seasonal streams, artificial water catchments, and springs.

State 1 Phase 1.1 - Wyoming Big Sagebrush/ Bluebunch Wheatgrass/ Sandberg Bluegrass Reference Plant Community (RPC): This plant community provides a diversity of grasses, forbs, and shrubs used by native insect communities that assist in pollination. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, and western toad. 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. Native shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Critical habitat (brood-rearing, nesting areas and winter cover) for sage-grouse is provided by this diverse plant community. The plant community supports seasonal needs of large mammals (mule deer and antelope) providing food and cover. 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 1.2 - Wyoming Big Sagebrush/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of improper grazing management. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. Grasses, forbs, and shrubs, are used by native insects that assist in pollination but the reduced herbaceous understory results in lower populations of insects. The reduced diversity and population of insects would reduce reptile diversity. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Key shrub-steppe obligates avian species including Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse are still supported in the plant community but populations may be reduced. Critical habitat (brood-rearing, nesting areas, winter cover) for sage-grouse is limited due to a less diverse herbaceous plant community. The plant community supports seasonal needs of large mammals (mule deer and antelope) providing food, thermal cover, and young of year cover. 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 Plant Community: This plant community is the result of frequent fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure and limits use by shrub obligate animals. Insect diversity would be reduced but a diverse native forb plant 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. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer and antelope) use for foraging would be seasonal but the site would offer little thermal and young of year cover. Antelope use may increase with the reduction of shrub cover. Small mammal diversity would be reduced with an increase in predator hunting success. The plant community would not provide suitable habitat for pygmy rabbits.

State 2 - Sandberg Bluegrass/ Cheatgrass and Annual Plant Community: This plant community is the result of

continued improper grazing management and/or frequent fire. 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. An increase in grasshopper population may occur. Forb production would be limited to invasive plants and annuals. 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. Predator hunting success would increase and as a result, small mammal populations may decrease. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

State 3 - Range Seeding Plant Community: The seeding mixture (native or non-native) determines the animal species that utilize this site. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in State 1 phase 1.3. A diverse seed mixture of grasses, forbs and shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.2. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, avians, mammals, or sagebrush obligate species. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat, and elk would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout this community looking for prey species.

Grazing Interpretations.

This site is best suited for grazing by livestock in the spring and fall. There are few limitations to grazing. The distance to water may be a problem in some areas.
Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

The soils in this site are in hydrologic group C. When hydrologic conditions of the vegetative cover is good, natural erosion hazard is slight.

Recreational uses

This site has very little recreational value. Some use may occur with off-road vehicles. Some value exists for hunting, hiking, photography and sightseeing of wildlife.

Wood products

None

Other products

None

Inventory data references

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

Leah Juarros, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Other references

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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

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Approval

Kirt Walstad, 3/11/2025

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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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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2. **Presence of water flow patterns:** Water-Flow Patterns: rarely occur on this site except on slopes greater than 15%.

When they do occur, they are short, disrupted by cool season perennial grasses and tall shrubs and are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or Terracettes: are rare on this site. In areas of greater than 15% slopes where flow patterns and/or rills are present a few pedestals and terracettes may be expected.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground:expected to range from 30-40 percent.

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Litter Movement: fine litter in the interspaces may move up to 2 feet or further following a significant run-off event. Coarse litter generally does not move.

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

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil Surface Loss or Degradation: the A or A1 horizon is typically 1 to 8 inches thick.
Structure ranges from weak fine or very fine granular to weak very thin or thin, or strong thick play. Soil organic matter (SOM) ranges from 0.5 to 3 percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant Community Composition and Distribution Relative to Infiltration: Bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Shrubs accumulate snow in the interspaces. Terracettes provide a favorable micro-site for vegetation establishment, which further increases infiltration.

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

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

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

Sub-dominant:

Other:

Additional:

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

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14. **Average percent litter cover (%) and depth (in):** Litter Amount: annual litter cover in the interspaces will be 5-10 percent to a depth of <0.1" Under the mature shrubs litter is greater than 0.5 inches. Fine litter can accumulate on the terracettes.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual Production: 450 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 50-65 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:** Invasive Plants: cheatgrass, bulbous bluegrass, rush skeletonweed, scotch thistle, medusahead, spotted and diffuse knapweed, Russian thistle, annual kochia, and halogeton.

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