

Ecological site R010XY005ID North Slope Loamy 16-22 PZ ARTRV/FEID

Last updated: 9/23/2020
 Accessed: 05/05/2024

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.

Associated sites

R010XY021ID	Stony Loam 16-22 PZ ARTRT/PSSPS
R010XY024ID	Dry Meadow PONE3-PHAL2

Similar sites

R010XY013ID	North Slope Granitic 16-22 PZ ARTRV/FEID
R010XY001ID	North Slope Loamy 12-16 PZ FEID-PSSPS

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on hilly to very steep slopes with a north and east exposure. Slopes are generally 30 to 60 percent. Elevations range from 3000 to 5500 feet (900-1650 m).

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope
Flooding frequency	None
Elevation	914–1,676 m
Slope	15–80%
Water table depth	152 cm
Aspect	N, E

Climatic features

The elevation of MLRA 10 ranges from 1791 feet to 9236 feet, with a mean of 4602 feet. Overall, elevation increases from west to east. However, average annual precipitation decreases from west to east, ranging from 16.59 inches to 22.17 inches, with a mean of 19.56 inches, based on 7 long term climate stations throughout the MLRA. In general, precipitation peaks in December and January, with a steady decline to a low in July and August, then a steep increase during the autumn months. Most of the winter precipitation falls as snow, and maximum

annual snowfalls of up to 82 inches have been recorded.

There is considerable variation in temperature throughout the year. Temperatures as low as -52° Fahrenheit and as high as 117° Fahrenheit are on record. Some areas have recorded the occurrence of more than 50 days with temperatures above 90° Fahrenheit. The average maximum annual temperature is 63 degrees F, while the average minimum temperature is 36.2 degrees F. The frost-free period can range from 128 to 152 days, while the freeze-free period can be from 164 to 189 days.

Both the average morning and average afternoon relative humidity values are lowest in July and August, and are below the national average. The number of clear, sunny days peaks during this same period, and is higher than the national average. During the Spring and Summer months high-intensity convective thunderstorms are not unusual.

Table 3. Representative climatic features

Frost-free period (average)	152 days
Freeze-free period (average)	189 days
Precipitation total (average)	559 mm

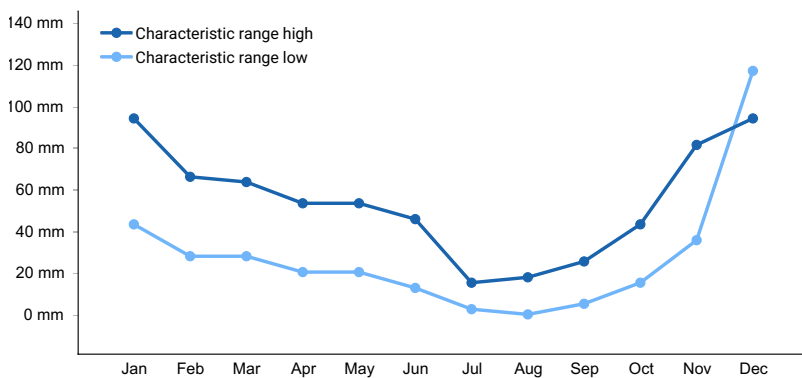


Figure 1. Monthly precipitation range

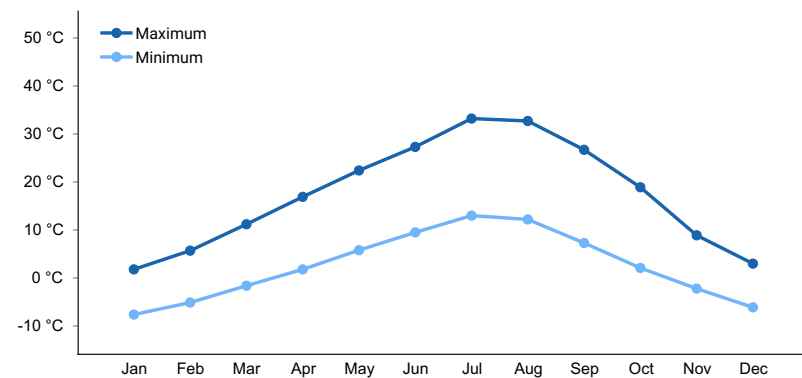


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are moderately deep to deep. The soils are well drained, with moderately slow to moderately rapid permeability. Runoff is high to very high. The erosion hazard is severe to very severe by water. The available water capacity is very low to moderate. The surface texture is very stony loam. These soils are characterized by a xeric soil moisture regime. Soil temperature regime is frigid, Winu is cryic.

Soil Series Correlated to this Ecological Site

Demasters
Ola
Winu

Table 4. Representative soil features

Surface texture	(1) Stony loam (2) Coarse sandy loam
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	61–152 cm
Surface fragment cover <=3"	0–14%
Surface fragment cover >3"	0–8%
Available water capacity (0-101.6cm)	7.37–18.54 cm
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–35%
Subsurface fragment volume >3" (Depth not specified)	0–35%

Ecological dynamics

The dominant visual aspect of this site is sagebrush-grass. Composition by weight is approximately 50-60 percent grass, 20-30 percent forbs and 20-30 percent shrubs.

In 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 25-40 years. The Reference State (State 1) of this site is dominated by Idaho fescue and mountain big sagebrush. Subdominant species include bluebunch wheatgrass, big bluegrass, arrowleaf balsamroot, tapertip hawksbeard, and antelope bitterbrush. Total annual production is 2300 pounds per acre (2576kilograms per hectare) in a normal year. Production in a favorable year is 2800 pounds per acre (3136kilograms per hectare). Production in an unfavorable year is 1500 pounds per acre (1680kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by perennial forbs being more dominant than tall shrubs while shallow rooted bunchgrasses are subdominant.

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. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

This site is suited for grazing by domestic livestock in the late spring, summer, and fall. This site is valuable for wildlife because of the variety and abundance of plant species and the interspersed nature of this site with other habitat types. The site provides habitat for quail, sage grouse, blue grouse, ruff grouse, sharp-tailed grouse, lagomorphs, squirrels, and songbirds as well as habitat for mule deer, Rocky Mountain elk, bear, cougar and coyote. The site is fairly resistant to disturbances that can potentially degrade the site as long as a good herbaceous cover is retained.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, bitterbrush can increase to the point of being co-dominant with mountain big sagebrush. Grasses and forbs decrease as shrubs increase

When fires become more frequent than historic levels (25-40 years), mountain big sagebrush and bitterbrush are reduced significantly. With continued short fire frequency, mountain big sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as Idaho fescue and big bluegrass. These species may be replaced by cheatgrass, Sandberg bluegrass, Kentucky bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plant species. Medusahead will invade on soils with heavier textures.

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 and possibly bitterbrush. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in mountain big sagebrush, green rabbitbrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels that carry fire. If cheatgrass and/or medusahead increase due to improper grazing management 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 mountain big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation of 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 will lead to more frequent fire intervals.

Weather influences:

Above normal precipitation in April, May and June can dramatically increase total annual production of the plant community. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Likewise, below normal precipitation during these spring months can significantly reduce total annual production and be detrimental to viable seed production. Overall plant composition is normally not affected when perennials have good vigor.

Below normal temperatures in the spring can have an adverse impact on total production regardless of the precipitation. An early, hard freeze can occasionally kill some plants.

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment, and production are usually reduced. Mortality can occur. Prolonged drought can lead to a reduction in fire frequency.

Influence of insects and disease:

Outbreaks can affect vegetation health, particularly antelope bitterbrush from western tent caterpillars (*Malacosoma fragilis*). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. 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. Kentucky bluegrass is a very competitive grass on this site. Because of its shallow root system it prevents establishment of desirable, more productive bunchgrasses such as Idaho fescue and bluebunch wheatgrass.

Influence of wildlife:

Big game animals utilize this site in the spring, summer and fall. Their numbers are seldom high enough to adversely affect the plant community. Herbivory can be detrimental to bitterbrush when livestock grazing and browsing by big game occurs at the same time and season. This will occur when both kinds of animal are using the plant in the late summer or fall. The adverse impact is excessive use of the current years' leader growth.

The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

Watershed:

Decreased infiltration and increased runoff occur with an increase of mountain big sagebrush. This increase can be triggered by lack of fire, poor grazing management, and prolonged drought. The 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.

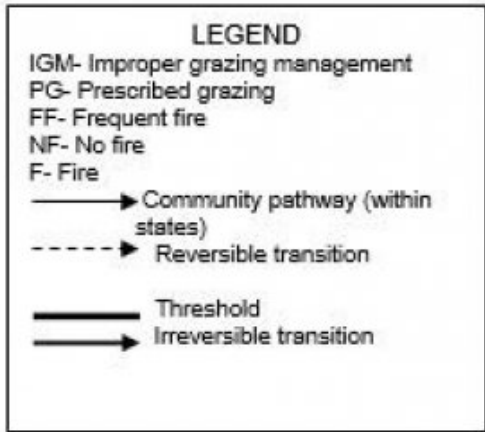
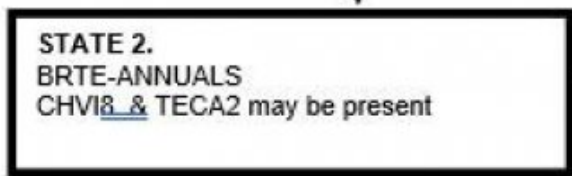
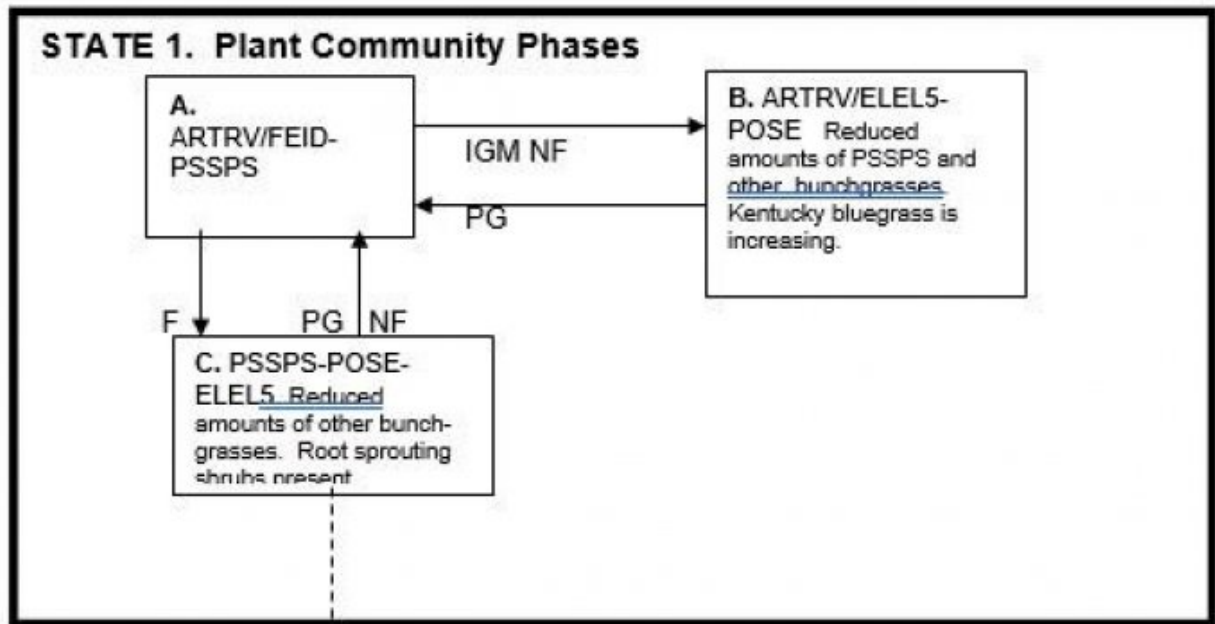
State 1 Phase C to State 2. Develops through frequent fire or continued improper grazing management. The site has crossed the threshold. It is not economically feasible to move this state back towards the HCPC with accelerating practices.

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 not economically feasible to move this state back towards the HCPC with accelerating practices.

Practice Limitations.

Severe limitations exist on this site for seeding and brush control using conventional ground moving equipment due to steep slopes >30 percent.

State and transition model



- Plant Legend States 1 & 2**
- ARTRV - Mountain Big Sagebrush
 - CHVI8 - Tall Green Rabbitbrush
 - PSSPS - Bluebunch Wheatgrass
 - POSE - Sandberg Bluegrass
 - FEID - Idaho Fescue
 - ELEL5 - Bottlebrush Squirreltail
 - BRTE - Cheatgrass
 - TECA2 - Gray Horsebrush

State 1
State 1 Phase A

Community 1.1
State 1 Phase A

This plant community has mountain big sagebrush in the overstory with Idaho fescue, bluebunch wheatgrass, and arrowleaf balsamroot prominent in the understory. Sandberg bluegrass, big bluegrass, prairie junegrass, Columbia needlegrass, tapertip hawksbeard are sub-dominant species. Other significant species in the plant community can include lupine, penstemon, antelope bitterbrush and tall green rabbitbrush. Natural fire frequency is 25-40 years.

Table 5. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	65-75%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

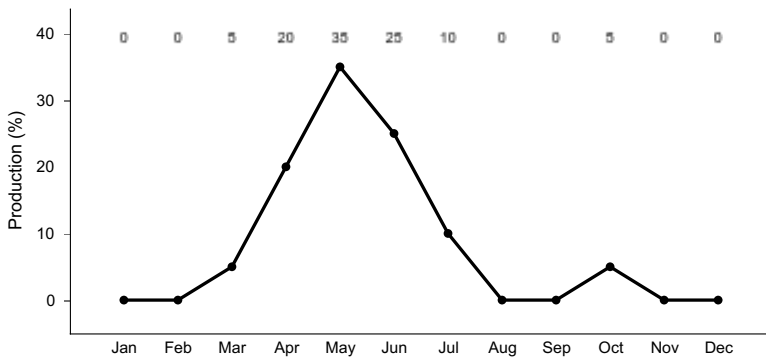


Figure 3. Plant community growth curve (percent production by month). ID0901, D25 ARTRV .

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is dominated by mountain big sagebrush with reduced amounts of Idaho fescue and bluebunch wheatgrass. Bottlebrush squirreltail and Sandberg bluegrass have increased in the understory. All deep-rooted bunchgrasses are typically in low vigor. Mountain big sagebrush and Kentucky bluegrass have increased. This state has developed due to improper grazing management and no fire. Some cheatgrass may have invaded the site.

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	65-75%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%

Bedrock	0%
Water	0%
Bare ground	0%

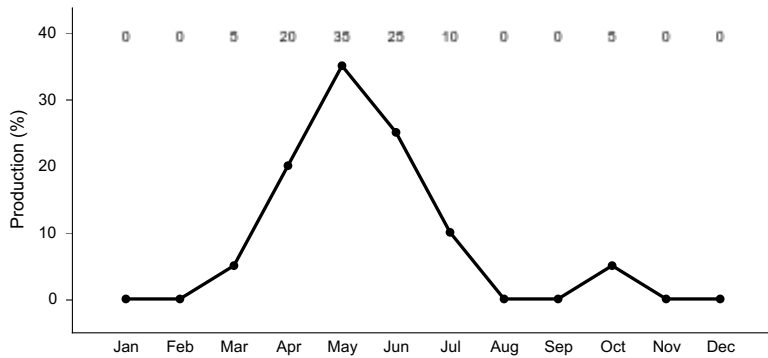


Figure 4. Plant community growth curve (percent production by month). ID0901, D25 ARTRV .

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by bluebunch wheatgrass, Sandberg bluegrass and bottlebrush squirreltail. Big bluegrass, Columbia needlegrass and Idaho fescue can be lost due to fire. Forbs remain about in the same proportion as Plant Community A. Very little mountain big sagebrush is present due to wildfire, but some rabbitbrush, rose, snowberry and horsebrush are present due to sprouting. Some cheatgrass and Kentucky bluegrass may have invaded the site. This plant community is the result of wildfire.

Table 7. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	65-75%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

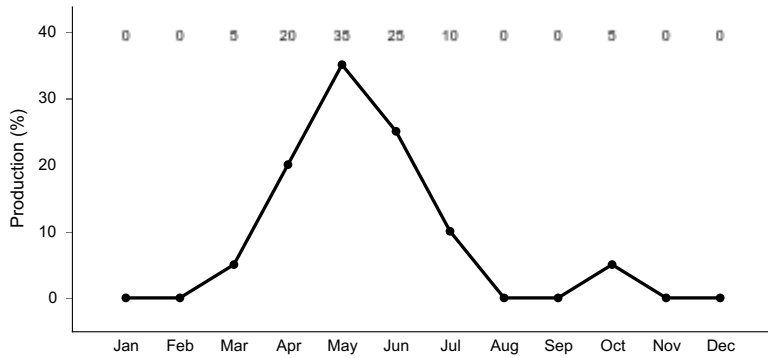


Figure 5. Plant community growth curve (percent production by month). ID0901, D25 ARTRV .

**State 4
State 2**

**Community 4.1
State 2**

This plant community is dominated by 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 or improper grazing management. The site has crossed the threshold. It is not economically feasible to move this state back towards State 1 with accelerating practices.

Table 8. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	65-75%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

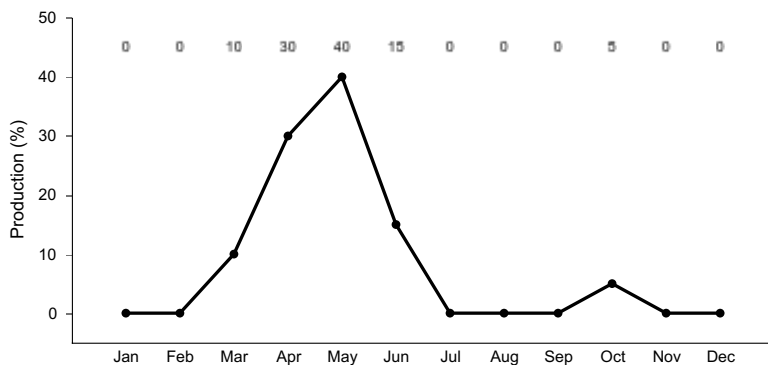


Figure 6. Plant community growth curve (percent production by month). ID0902, D25 ARTRV Early Seral.

State 5
State 3

Community 5.1
State 3

Table 9. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	65-75%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. The plant community exhibits a diverse mixture of forbs throughout the growing season offering excellent habitat for invertebrates. Mule deer and elk are the large herbivores using the site. The site provides seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, shrews, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. Sagebrush obligate avian species include sage-grouse, Brewer’s sparrow and sage thrasher. Sage-grouse an area sensitive species, may utilize the sagebrush plant community for nesting and brood-rearing habitat. A change in the quality of the reference plant community over time can reduce the diversity of native wildlife species in the area. Encroachment of noxious and invasive plant species (cheatgrass and medusahead) in isolated areas 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 – Mountain Big Sagebrush/ Idaho Fescue/ Bluebunch Wheatgrass Reference Plant Community (RPC): This plant community provides a diversity of grasses, forbs and shrubs, used by native insect communities that assist in pollination. An extensive array of forbs is represented throughout the growing season leading to a diverse insect community. Many avian and mammal species utilize this habitat based on the availability of invertebrate prey species. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, western toad, boreal chorus frog and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Spring developments that capture all available water would preclude the use of these sites by amphibians. Native shrub-steppe obligate avian species utilizing the habitat include the Brewer’s sparrow, sage sparrow, sage thrasher and sage-grouse. Sage-grouse may utilize this plant community for nesting and brood-rearing habitat. The plant community provides seasonal forage and cover needs for large mammals including mule deer and elk. Antelope bitterbrush is a component in the plant community and is a preferred browse for mule deer. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, badgers and yellow-bellied marmots utilize this community. Habitat for the pygmy rabbit would be marginal due to slope and high elevation. The deer

mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.2- Mountain Big Sagebrush/ Bottlebrush Squirretail/ Sandberg Bluegrass Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy cover of sagebrush and antelope bitterbrush contributes to a sparse herbaceous understory. The reduced herbaceous understory results in reduced diversity and numbers of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard and western skink. With improper grazing management, the reduction of grasses and forbs in the plant community would reduce the available prey species (insects) and cover for these resident reptile species. Amphibian habitat would be tied to permanent spring sites in the area. Development of spring sites that collect all available water would exclude amphibian use on these sites. Key shrub-steppe avian obligates include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Habitat (nesting cover and brood rearing) for sage grouse is available, although reduced in quality due to a poor understory. The plant community supports forage and cover needs for mule deer and elk. Antelope bitterbrush is present and provides limited browse due to low vigor and hedging. A small mammal population including golden-mantled ground squirrels, chipmunks, badger and yellow-bellied marmots utilize these areas. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.3 – Bluebunch Wheatgrass/ Bottlebrush Squirretail/ Sandberg Bluegrass Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation with little to no sagebrush or antelope bitterbrush would provide limited vertical structure for animals. Insect diversity would be reduced but a diverse native forbs plant community would still support select pollinators. An increase in rabbitbrush would provide fall pollinator habitat. The reptiles including short horned lizard and sagebrush lizard would be limited due to the loss of sagebrush. Amphibian habitat would be tied to permanent spring sites in the area. Development of spring sites that collect all available water would exclude amphibian use on these sites. The dominance of herbaceous vegetation with little sagebrush canopy cover would prevent use of these areas as nesting habitat by Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. This plant community provides limited brood-rearing habitat for sage-grouse if adjacent sagebrush cover is provided. Winter habitat for sage-grouse is eliminated. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer, and elk) forage use would be seasonal (spring, summer and fall), as the community provides little thermal cover and young of year cover. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

State 2 - Cheatgrass /Annuals/Green Rabbitbrush/Gray Horsebrush Plant Community:

This plant community is the result of continued improper grazing management and/or frequent fire. Invasive herbaceous plants and patches of root sprouting shrubs like rabbitbrushes and mountain snowberry can be present. The plant community does not support a diverse insect or pollinator community. Rabbitbrush would provide fall pollinator habitat. Most 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 available 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.

Grazing Interpretations.

This site is best suited to grazing by livestock in late spring through fall.

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 B. When hydrologic conditions of the vegetation cover are good natural

erosion hazard is slight.

Recreational uses

This site has good aesthetic appeal with the showy spring and summer blooming forbs. Hunting for upland game birds, small game, elk and mule deer is excellent on the site. Snowmobiling and ATV travel has potential on the flatter slopes.

Wood products

None

Other products

None

Other information

Field Offices

Weiser, ID

Emmett, ID

Mountain Home, ID

Meridian, ID

Cascade, 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

Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Washington County, ID

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, 9/23/2020

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	03/25/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** can occur on this site. If rills are present they are likely to occur immediately following wildfire. Rills are most likely to occur on soils with surface textures of silt loam and clay loam.

- 2. Presence of water flow patterns:** occur on this site. When they occur, they are short and disrupted by cool season grasses, tall shrubs and the occasional surface stone. They are not extensive.

- 3. Number and height of erosional pedestals or terracettes:** both occur on this site but are not extensive. In areas where flow patterns and/or rills are present, a few pedestals may be expected. Terracettes also occur on the site uphill from bases of tall shrubs, large bunchgrasses and surface stones.

- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** may range from 10-20 percent but additional data is needed.

- 5. Number of gullies and erosion associated with 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 on lighter textured soils.

- 7. Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 3 feet following a significant run-off event. Coarse litter generally does not move.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 3 to 5 but needs to be tested.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** the A or A1 horizon is typically 2 to 17 inches thick.
Structure ranges from moderate very fine granular to strong fine granular. Soil organic matter (SOM) ranges from 2 to 6 percent.
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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. Tall shrubs catch blowing snow in the interspaces.
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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.
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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: perennial forbs >>tall shrubs.
- Other:
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** mountain big sagebrush and antelope bitterbrush will become decadent in the absence of normal fire frequency 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):** additional litter cover data is needed but is expected to be 15-30 percent to a depth of 0.1 inches. Under mature shrubs litter is >0.5 inches deep and is 90-100 percent ground cover.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 2300 pounds per acre (2576 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 50-60 percent of the total production, forbs 20-30 percent and shrubs 10-20 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: include cheatgrass, medusahead, bulbous bluegrass, Kentucky bluegrass, rush skeletonweed, musk and scotch thistle and diffuse and spotted knapweed.

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