

## **Ecological site R010XY014ID** **North Slope Granitic 12-16 PZ ARTRX/FEID**

Last updated: 9/23/2020  
 Accessed: 04/29/2024

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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.

### **Classification relationships**

*Artemisia vaseyana* “xericensis”/*Festuca Idahoensis* HT and *Artemisia vaseyana* “xericensis”/*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.”

### **Associated sites**

R010XY008ID	<b>South Slope Granitic 12-16 PZ PUTR2/PSSPS</b>
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### **Similar sites**

R010XY001ID	<b>North Slope Loamy 12-16 PZ FEID-PSSPS</b>
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

### **Physiographic features**

This site generally occurs on steep or very steep north and east facing slopes ranging from 30 to 90 percent. Elevations range from 3000 to 4500 feet (900-1350 m).

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Canyon (3) Mountain
Elevation	914–1,372 m
Slope	25–90%
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

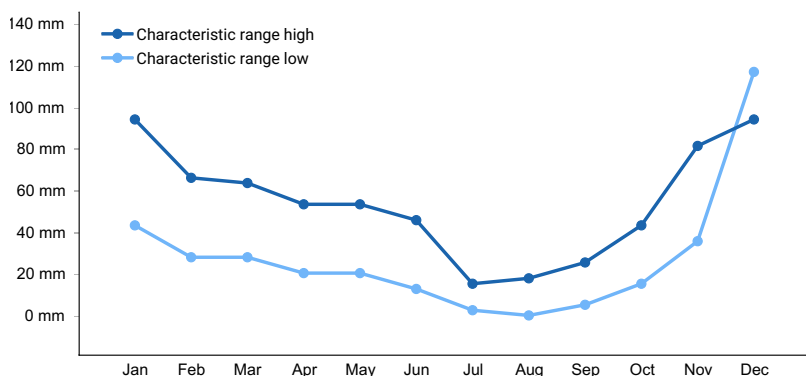
MLRA. In general, precipitation peaks in December and January, with a steady decline to a low in July and August, then a steep increase during the autumn months. Most of the winter precipitation falls as snow, and maximum annual snowfalls of up to 82 inches have been recorded.

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.

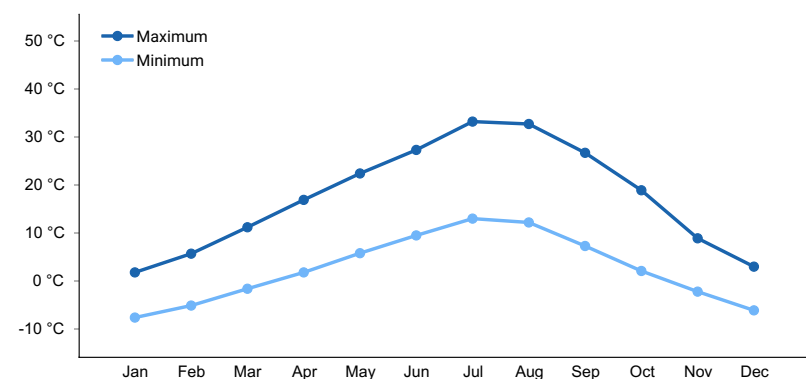
Both the average morning and average afternoon relative humidity values are lowest in July and August, and are below the national average. The number of clear, sunny days peaks during this same period, and is higher than the national average. During the Spring and Summer months high-intensity convective 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 shallow to moderately deep, well to excessively drained, with moderately rapid to rapid permeability. Runoff is medium to high. The erosion hazard is moderate to very severe by water. The available water capacity is very low to low. The surface texture is coarse sandy loam or sandy loam. Mackey has many stones on the surface. Gravels and stones may be present throughout the profile but generally do not affect kind and amount of vegetation on the site. Soils generally have rapid warm-up in spring and remain warm throughout the summer due to slope position and aspect. These soils are characterized by a xeric soil moisture

regime. Soil temperature regime is mesic.

#### Soil Series Correlated to this Ecological Site

Kisky  
Payette  
Robbscreek  
Roney  
Shimo

**Table 4. Representative soil features**

Surface texture	(1) Fine gravelly coarse sandy loam (2) Loamy sand
Drainage class	Well drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	25–102 cm
Surface fragment cover <=3"	6–30%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	0.89–9.91 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	15–45%
Subsurface fragment volume >3" (Depth not specified)	0–35%

#### **Ecological dynamics**

The dominant visual aspect is grasses and forbs. Composition by weight is approximately 55-65 percent grass, 10-20 percent forbs and 10-20 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), is dominated by bluebunch wheatgrass and Idaho fescue in the understory and foothills sagebrush in the overstory. Bitterbrush is usually present. Subdominant species include Nevada bluegrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot and lupine. Total annual production is 1000 pounds per acre (1120kilograms per hectare) in a normal year. Production in a favorable year is 1300 pounds per acre (1456kilograms per hectare). Production in an unfavorable year is 700 pounds per acre (784 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by tall shrubs being co-dominant with perennial forbs while shallow rooted bunchgrasses are subdominant.

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 suitable for late spring, summer, and fall grazing by domestic livestock. The steeper slopes will limit livestock movement. Excessive trailing of livestock should be avoided to minimize terracette development and erosion on the steeper slopes. This site provides valuable wildlife food and cover for deer, elk, raptors and other small wildlife species. The site is often key range for mule deer in summer and fall.

Due to the fragile nature of the surface soils, this site is easily degraded by excessive livestock trailing and trampling.

This site provides recreational opportunities for hunting, hiking, photography and horseback riding.

Impacts on the Plant Community.

Influence of fire:

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

When fires become more frequent than historic levels, foothills sagebrush and bitterbrush are reduced significantly. With continued short fire frequency, foothills sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass, Thurber's needlegrass and Idaho fescue. These species may be replaced by cheatgrass, Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants.

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 foothills sagebrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels. If cheatgrass increases due to improper grazing management 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 foothills 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 bunchgrasses can increase cheatgrass which will lead to more frequent fire intervals.

Due to the unstable soil surface, improper grazing management usually results in the development of terracettes. On steeper slopes massive soil erosion can occur during intense convection storms.

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, especially in shallow rooted species. Prolonged drought can lead to a reduction in fire frequency.

Influence of insects and disease:

Insects and disease outbreaks can affect vegetation health, particularly bitterbrush from western tent caterpillars (*Malacosoma fragilis*). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available. Grasshopper and Mormon cricket outbreaks occur periodically. Since defoliation occurs only once during the growing season, mortality seldom occurs.

Influence of noxious and invasive plants:

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

Influence of wildlife:

Big game animals use this site in the spring, summer, and fall. 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 the loss of the herbaceous understory and an increase in foothills sagebrush. 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.

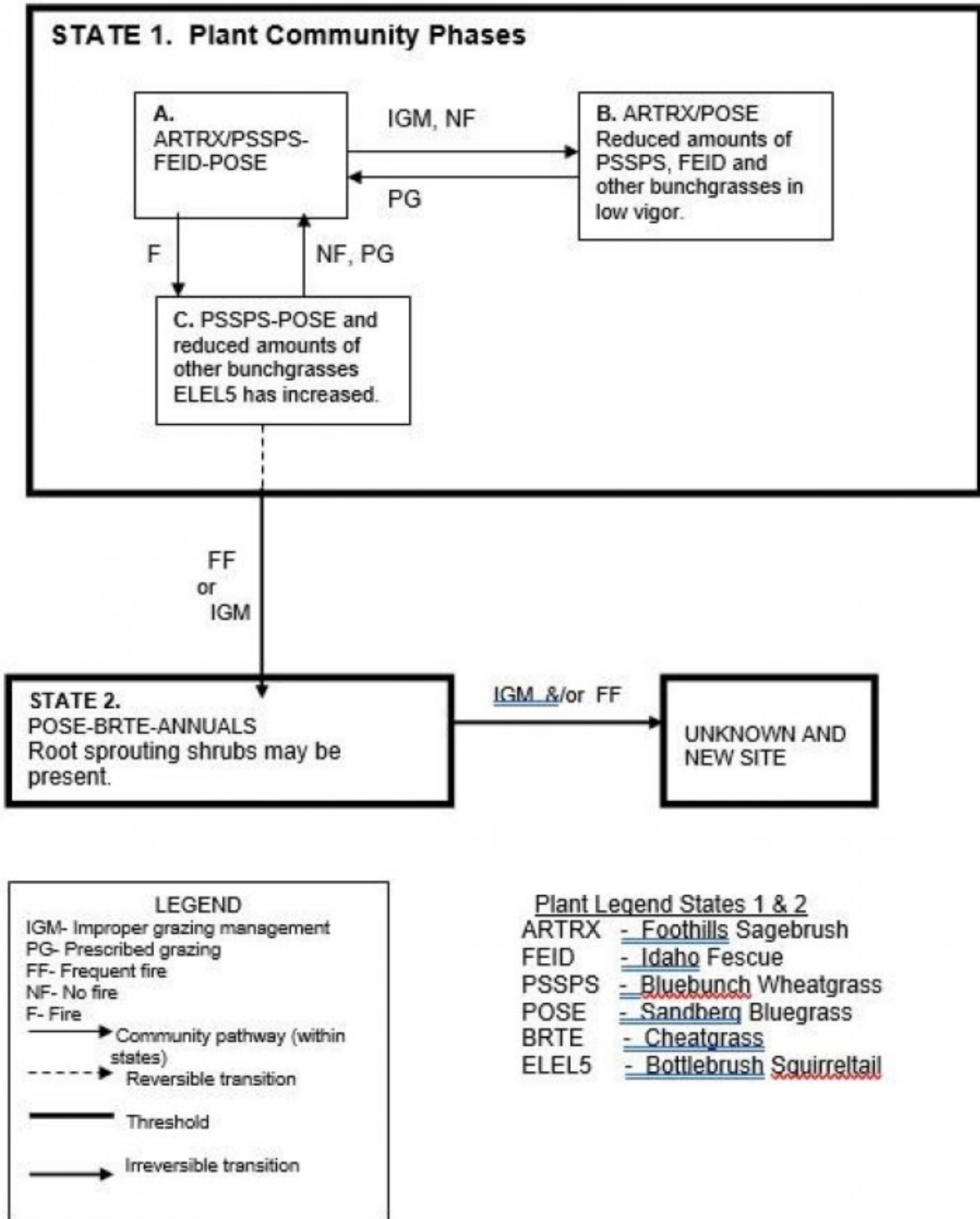
State 1 Phase C to State 2. Develops through frequent fire or continued improper grazing management. This state has crossed the site threshold. It is not economically feasible to move this state back towards State 1.

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 State 1.

Practice limitations.

Severe limitations exist on this site by ground moving equipment for seeding and mechanical brush control due to steep slopes. Steep slopes limit livestock access.

# State and transition model

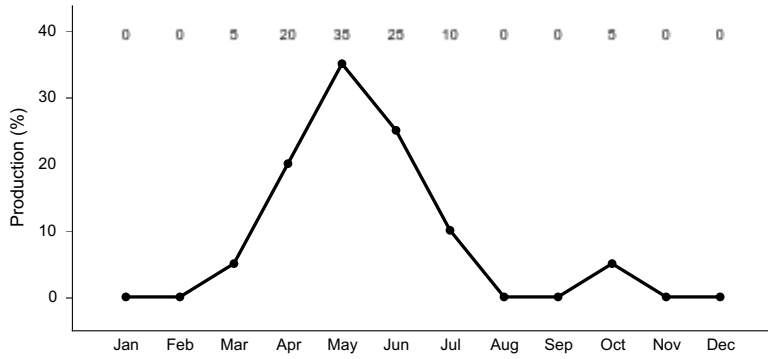


## State 1 State 1 Phase A

### Community 1.1 State 1 Phase A

State 1, Phase A, Reference Plant Community Phase. This plant community has foothills sagebrush in the overstory with bluebunch wheatgrass and Idaho fescue dominating the understory. Nevada bluegrass, Sandberg bluegrass, bottlebrush squirreltail, and arrowleaf balsamroot are sub-dominant species. Other significant species in the plant

community can include eriogonum, lupine, antelope bitterbrush, and Woods' rose. Natural fire frequency is 25-40 years.

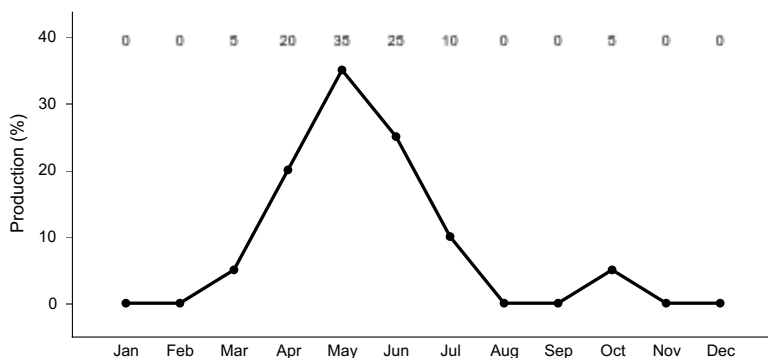


**Figure 3. Plant community growth curve (percent production by month). ID0901, D25 ARTRV .**

**State 2  
State 1 Phase B**

**Community 2.1  
State 1 Phase B**

State 1, Phase B. This plant community is dominated by foothills sagebrush with reduced amounts of bluebunch wheatgrass and Idaho fescue. Sandberg bluegrass and bottlebrush squirreltail have increased in the understory. All deep-rooted perennial bunchgrasses are typically in low vigor. Foothills sagebrush has increased. This state has developed due to improper grazing management and no fire. Some cheatgrass may have invaded the site.

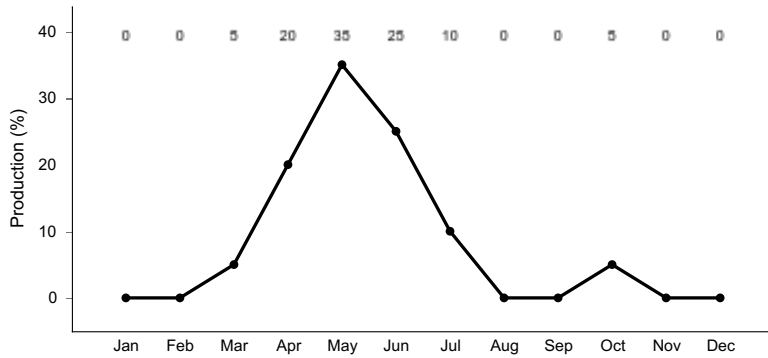


**Figure 4. Plant community growth curve (percent production by month). ID0901, D25 ARTRV .**

**State 3  
State 1 Phase C**

**Community 3.1  
State 1 Phase C**

State 1, Phase C. This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Fine-leaved grasses such as Idaho fescue and Nevada bluegrass can be lost due to fire. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Phase A. Very little foothills sagebrush and antelope bitterbrush are present due to wildfire, but root-sprouting shrubs such as rabbitbrush and horsebrush may be present. Some cheatgrass may have invaded the site. This plant community is the result of wildfire.

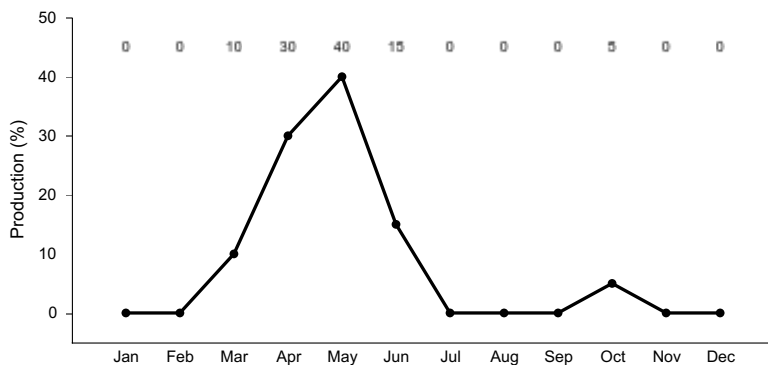


**Figure 5. Plant community growth curve (percent production by month). ID0901, D25 ARTRV .**

**State 4  
State 2**

**Community 4.1  
State 2**

State 2. This plant community is dominated by Sandberg bluegrass, cheatgrass and other annuals. Root sprouting shrubs such as rabbitbrush and horsebrush may be present, dependent upon, how frequent, fire has occurred. Some soil loss has occurred. This state has developed due to frequent fires or continued improper grazing management. This state has crossed the site threshold. It is not economically feasible to move this state back towards State 1.



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

**State 5  
State 3**

**Community 5.1  
State 3**

**Additional community tables**

**Animal community**

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. Large herbivore use of this ecological site is dominated by mule deer and elk. Important seasonal habitat is provided for resident and migratory animals including western toad, sagebrush lizard, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. 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 species become rare including sage-grouse, sage sparrow, brewer's sparrow and sage thrasher. Encroachment of noxious and invasive plant species (cheatgrass, Medusahead and bulbous bluegrass) 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 - Foothills Big Sagebrush/ Bluebunch Wheatgrass/ Idaho Fescue/ 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, 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. The plant community provides habitat for prey species and cover for these resident reptile and amphibian species. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Critical habitat (nesting areas and brood rearing) for sage-grouse is provided by this diverse plant community. The plant community supports seasonal needs of large mammals (mule deer and elk) providing food and cover. Antelope bitterbrush is preferred browse for mule deer. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots and deer mouse would utilize this plant community. The deer mouse is the primary vector for planting bitterbrush seed.

State 1 Phase 1.2 – Foothills Big Sagebrush/Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of improper grazing management and no fire. 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 diversity and numbers of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink and western rattlesnake. Diversity and populations of the reptile community would decline due to a reduced understory and associated loss of invertebrate habitat. Spring developments that capture all available water would preclude the use of these sites by amphibians. Key shrub-steppe avian obligate species include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Habitat (nesting areas and brood rearing) for sage-grouse is limited due to reduced diversity and vigor in the herbaceous plant community. The plant community supports mule deer and elk providing food and cover during spring, summer and fall but the reduced vigor and hedging on antelope bitterbrush will reduce available winter forage on this site. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, deer mouse and yellow-bellied marmots would utilize the available habitat. The deer mouse is the primary vector for planting bitterbrush seed.

State 1 Phase 1.3 - Bluebunch Wheatgrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure and limits use by shrub obligate animals. Insect diversity would be reduced but a diverse native forb 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 reduced sagebrush canopy cover would eliminate use of these areas for nesting by Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. This plant community provides limited brood-rearing habitat for sage-grouse when sagebrush cover is adjacent to the site. The herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Mule deer and elk use for forage would be seasonal (spring, summer and fall) but the site would offer 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 – Sandberg Bluegrass/ Cheatgrass/ 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. 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.

#### Grazing Interpretations.

This site is best used for spring, summer and fall grazing by domestic livestock.

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 condition of the vegetation cover is good, natural erosion hazard is slight to moderate.

#### Recreational uses

Recreation use of this site includes hunting, hiking, horseback riding and plant and animal observation. The site provides fair aesthetic value in spring and early summer when forbs and shrubs are blooming.

Due to the relative abundance of wildlife that use this site, hunting is one of the primary uses.

#### 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

Leah Juarros, Resource Soil Scientist, NRCS, Idaho

#### 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](http://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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Date	04/22/2009
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

- Number and extent of rills:** can occur on this site. If rills are present they are likely to occur on slopes greater than 20 percent and immediately following wildfire. Coarse surface gravels limit rill development.

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- Presence of water flow patterns:** can occur on this site. When they occur they are short and disrupted by cool season grasses and tall shrubs and are not extensive. Water infiltration is generally rapid for the site

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- Number and height of erosional pedestals or terracettes:** Pedestals are rare on this site. Terracettes are common. Significant accumulation of coarse surface fragments develops on the uphill side of larger perennial grasses and shrubs. This accumulation is from concentrated flow and hoof/ foot traffic. Terracettes are a natural occurrence on the site.

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- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 40-50%. This site is naturally unstable due to coarse surface fragments

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5. **Number of gullies and erosion associated with gullies:** do not occur on this site.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** usually not present due to coarse textured, gravelly soil surface.
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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. It generally moves onto terracettes. Coarse litter generally does not move except on the steeper slopes. Litter is also moved mechanically by hoof/ foot traffic
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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):** Values should range from 4 to 6 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 \_\_\_\_\_ inches thick. Structure is \_\_\_\_\_. Soil organic matter (SOM) ranges from 2 to 5 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 accumulate 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: tall shrubs = perennial forbs > shallow rooted bunchgrasses
- Other:
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** foothills sagebrush and bitterbrush will become decadent in the absence of fire and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase. Some grasses and forbs are susceptible to hoof/ foot traffic
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14. **Average percent litter cover (%) and depth ( in):** additional litter cover data is needed but is expected to be 5-10 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 1000 pounds per acre (1120 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 55-65 percent of the total production, forbs 10-20 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, leafy spurge, dalmatian toadflax, bulbous bluegrass, rush skeletonweed, musk and scotch thistle, and diffuse, Russian, and spotted knapweed

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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years. Seedling establishment is limited by coarse textured surface soils

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