Ecological site R010XY013ID
North Slope Granitic 16-22 PZ ARTRV/FEID

Last updated: 9/23/2020
Accessed: 05/06/2024

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

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

Similar sites

R010XY005ID	**North Slope Loamy 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 north and east facing slopes that range from 15 to 60 percent. Most slopes are greater than 30 percent. Elevations range from 4000 to 5500 feet (1200-1650 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill
Flooding frequency	None
Elevation	1,219–1,524 m
Slope	30%
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 then 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

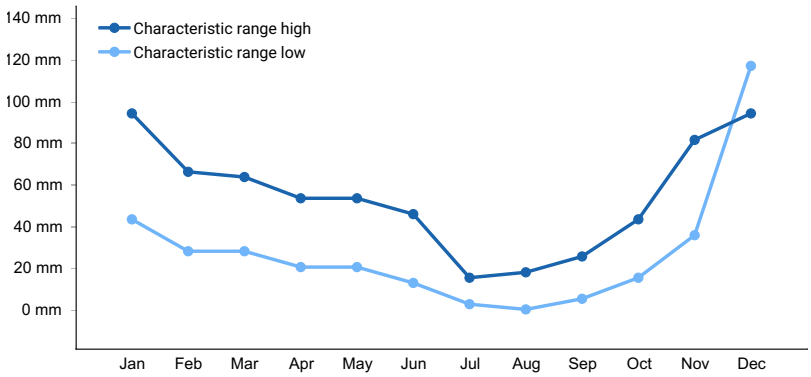


Figure 1. Monthly precipitation range

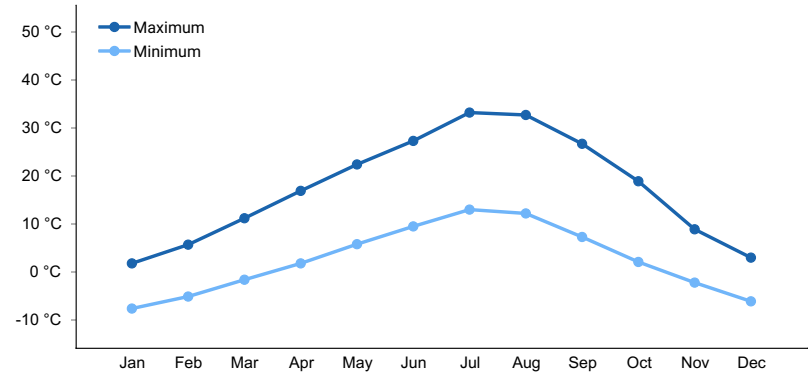


Figure 2. Monthly average minimum and maximum temperature

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 very deep, well drained, with moderately slow to moderately rapid permeability. Runoff is medium to very high. The erosion hazard is severe or very severe by water. The available water capacity is low to moderate. The surface textures are generally coarse phases of sandy loam or gravelly sandy loam. These soils are characterized by a xeric soil moisture regime. Soil temperature regime is cryic, but, Infernocone and Ola are frigid.

Soil Series Correlated to this Ecological Site

Bauscher
Earcree
Friedman
Hal
Infernocone
Lavacreek
Ola
Povey
Tusel

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Very gravelly coarse sandy loam (3) Stony sandy loam
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	5–30%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	6.1–18.54 cm
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	10–65%
Subsurface fragment volume >3" (Depth not specified)	10–65%

Ecological dynamics

The dominant visual aspect is an overstory of shrubs with Idaho fescue and bluebunch wheatgrass co-dominant in the understory. Composition by weight is approximately 55 to 65 percent grasses, 15 to 20 percent forbs and 10 to 15 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 and lagomorphs.

Fire has historically occurred on the site at intervals of 20 to 50 years.

The Reference State (State 1), moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The Reference Plant Community Phase is Phase A. This plant community is dominated by mountain big sagebrush with Idaho fescue and bluebunch wheatgrass co-dominant in the understory. Other common species include prairie junegrass, arrowleaf balsamroot, antelope bitterbrush and chokecherry. A wide variety of other grasses, forbs and shrubs can occur in minor amounts. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 1600 pounds per acre (1792 kilograms per hectare) in a normal year. Production in a favorable year is 2200 pounds per acre (2465 kilograms per hectare). Production in an unfavorable year is 1000 pounds per acre (1120 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are dominant, followed by perennial forbs being slightly more dominant than tall shrubs while shallow rooted bunchgrasses are subdominant.

This site is best suited for late spring, summer, and fall grazing by 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. The site can be used by big game in the spring, summer, and fall for food and cover. It is also suited for recreation use in the spring, summer and fall.

Due to the limited access on steeper slopes and relatively high production, most areas of this site are not easily degraded. Lower footslopes in proximity to bottoms or drainages are most likely to degrade due to access by animals from the adjoining sites. 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, mountain big sagebrush, antelope bitterbrush, and some other shrubs can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, shrubs can displace most of the primary understory species.

When fires become more frequent than historic levels (20-50 years), mountain big sagebrush and bitterbrush are reduced significantly. Rabbitbrush and other root sprouting shrubs can increase slightly. Mountain brome may increase. 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, bluebunch wheatgrass and 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 plant species. Cheatgrass will also invade the site, especially at lower elevations. The establishment of these fine fuel species, will increase the fire frequency.

Influence of improper grazing management:

Season-long grazing and/or excessive grazing can be very detrimental to this site. This type of management leads to a reduction in vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to increase in tall shrubs 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 over time, can also keep fine fuels from developing, thereby reducing fire frequency. This can lead to gradual increases in mountain big sagebrush and tall shrubs. 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 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. Bitterbrush can be severely affected by the western tent caterpillar (Malacosoma fragilis). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. 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. Snow mold can reduce vigor of mountain big sagebrush in some years.

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 make use of 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 year's 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 in mountain big sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same results, but to a lesser degree. The long- term effect is a transition to a different state.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.
Phase A to B. Develops with improper grazing management and in the absence of fire.
Phase A to C. Develops with fire.
Phase B to A. Develops with prescribed grazing and brush management.
Phase C to A. Develops with prescribed grazing and no fire.

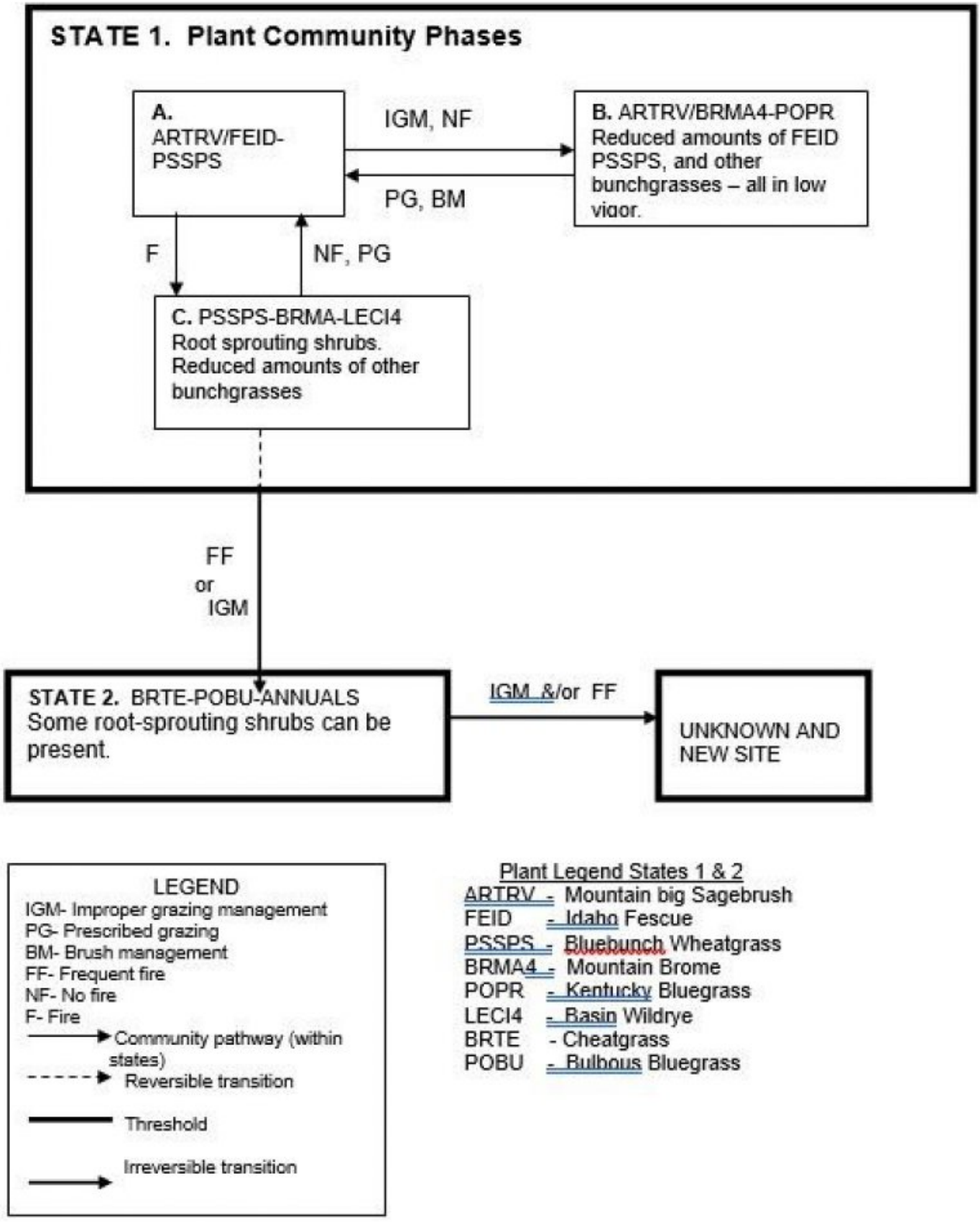
State 1 Phase C to State 2. Develops through frequent fire or improper grazing management. This site has crossed the threshold. It is not economically practical to return this plant community to State 1 with accelerating practices.

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

Practice Limitations:

Severe limitations exist for brush control and seeding on this site with ground moving
equipment due to the steep slopes. Slight to moderate limitations exist for implementing vegetative management and facilitating practices.

State and transition model



State 1
State 1Phase A

Community 1.1
State 1Phase A

This plant community is dominated by mountain big sagebrush with Idaho fescue and bluebunch wheatgrass in the understory. Other common species include prairie junegrass, arrowleaf balsamroot, lupine, antelope bitterbrush and chokecherry. A wide variety of other grasses, forbs and shrubs can occur in minor amounts. Natural fire frequency is 20-50 years.

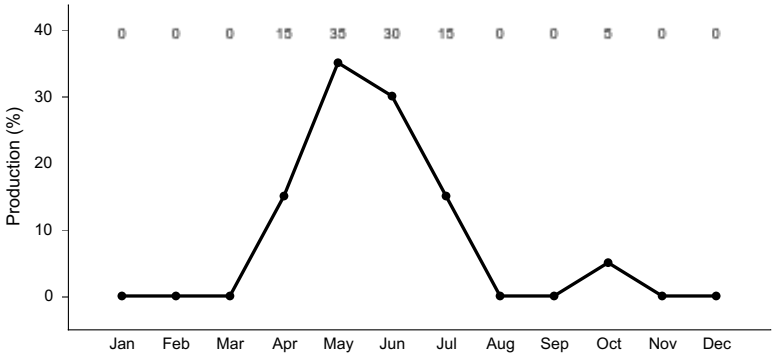


Figure 3. Plant community growth curve (percent production by month). ID0204, D25, ARTRV, NORTH. State 1.

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, bluebunch wheatgrass and other deep-rooted perennial bunchgrasses. Mountain brome has increased in the understory. All deep-rooted bunchgrasses are typically in low vigor. Mountain big sagebrush has increased as well as some other tall shrubs. Antelope bitterbrush is present but in reduced vigor and may be hedged. Forbs are about in the same proportion as Phase A. This state has developed due to improper grazing management and lack of fire. Some cheatgrass, Kentucky bluegrass and bulbous bluegrass may have invaded the site.

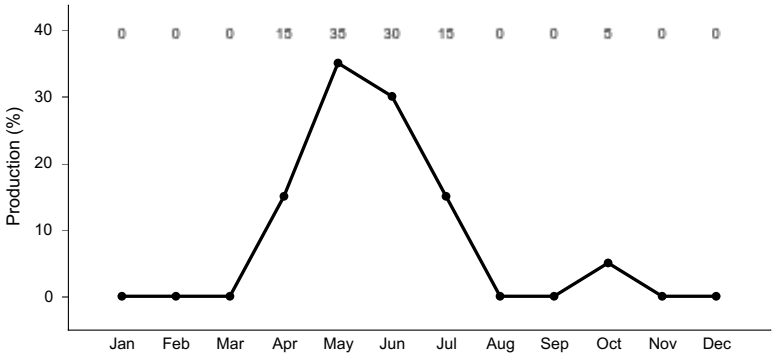


Figure 4. Plant community growth curve (percent production by month). ID0204, D25, ARTRV, NORTH. State 1.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by bluebunch wheatgrass with mountain brome. Some basin wildrye, other fire-resistant grasses and tall root-sprouting shrubs are present. Idaho fescue, Nevada bluegrass, prairie junegrass and needlegrass can be lost due to fire. Forbs remain about in the same proportion as Phase A. Mountain big sagebrush and antelope bitterbrush have been reduced significantly due to wildfire. Some cheatgrass, bulbous

bluegrass and/or Kentucky bluegrasss may have invaded the site. This plant community is the result of wildfire.

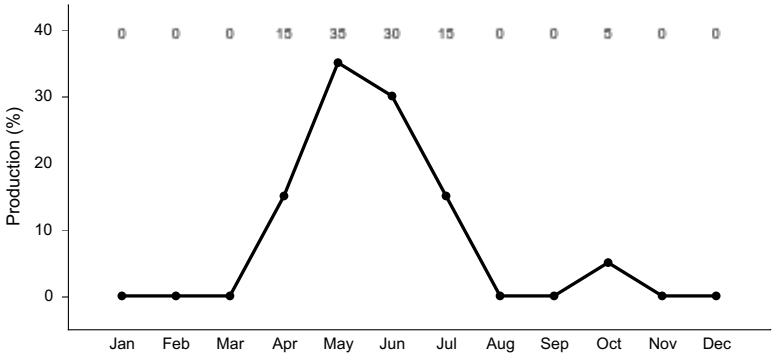


Figure 5. Plant community growth curve (percent production by month). ID0204, D25, ARTRV, NORTH. State 1.

State 4
State 2

Community 4.1
State 2

This plant community is dominated by cheatgrass, bulbous bluegrass and /or other annuals. Root sprouting shrubs such as rabbitbrushes and mountain snowberry 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. This site has crossed the threshold. It is not economically practical to return this plant community to State 1 with accelerating practices.

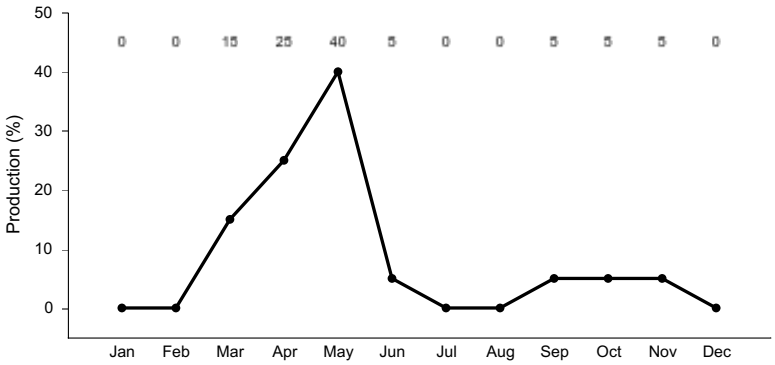


Figure 6. Plant community growth curve (percent production by month). ID0211, POSE/BRTE-ANNUALS. State 2.

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. 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. This site provides seasonal habitat for resident and migratory

animals including western toad, sagebrush lizard, shrews, bats, 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,sage 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 numbers and 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 preferred browse for mule deer. A diverse small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots would utilize this community. Habitat for the pygmy rabbit would be marginal due to steepness 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/ Mountain Brome/ Kentucky Bluegrass Wheatgrass 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. Native insects 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 and western skink. With improper grazing management, the reduction of grasses and forbs in the plant community would reduce the available prey species 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. Fewer prey species and poor understory cover results in limited food, brood-rearing and nesting habitat. Key shrub-steppe obligate avians 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 with poor understory. The plant community supports forage,thermal, and young of year habitat for mule deer and elk. Antelope bitterbrush is present and provides limited browse due to poor vigor and hedging. A small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots would 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/ Mountain Brome/ Slender Wheatgrass 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 less vertical structure for animals. Insect diversity would be reduced but a diverse native forb 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 the majority 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 and the site would offer little thermal or young of year cover. The populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

State 2 - Cheatgrass / Bulbous Bluegrass 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 community. The reduced forb and shrub component in the plant community would support a very limited population of pollinatorsalthoughrabbitbrush 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 suitable for late spring, summer, and fall grazing. The steeper slopes will limit livestock movement. Excessive trailing of livestock should be avoided to minimize erosion on the slopes. The site is best used by livestock in the late spring, summer and 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 C. When hydrologic conditions of the vegetation cover is good, natural erosion hazard is slight to moderate.

Recreational uses

This site has value for hunting, hiking and horseback riding. There is many opportunities for photography of blooming flowers in the spring and early summer.

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
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/feis
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	03/24/2008
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. Coarse surface gravels limit rill development.

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2. **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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3. **Number and height of erosional pedestals or terracettes:** pedestals are rare on this site. Terracettes are common and a natural occurrence. 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.

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4. **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.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** usually not present due to coarse textured, gravelly soi surface.

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.

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

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** the A or A1 horizon is typically 4 to 28 inches thick. Structure ranges from weak fine granular to moderate fine granular. Soil organic matter (SOM) ranges from 1 to 6 percent.

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. Surface stones will also slow water and help infiltration.

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

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>shallow rooted bunchgrasses.

    Other:

    Additional:

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

14. **Average percent litter cover (%) and depth (in):** additional litter cover data is needed but is expected to be 20-30

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 1600 pounds per acre (1792 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 55-65 percent of the total production, forbs 15-20 percent and shrubs 10-15 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.
