

Ecological site R010XY004ID **South Slope Loamy 16-22 PZ ARTRX/PSSPS**

Last updated: 9/23/2020
 Accessed: 07/27/2024

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

R010XY002ID	Very Shallow 12-20 PZ ARRI2/POSE
R010XY003ID	Loamy 16-22 PZ PUTR2/FEID
R010XY005ID	North Slope Loamy 16-22 PZ ARTRV/FEID
R010XY013ID	North Slope Granitic 16-22 PZ ARTRV/FEID

Similar sites

R010XY004ID	South Slope Loamy 16-22 PZ ARTRX/PSSPS
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on mountain slopes with southerly exposures. Slopes vary from 10-60 percent but are mostly 30-60 percent. Elevation ranges from 3000-5000 feet (900-1500 m).

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill (3) Ridge
Flooding frequency	None
Elevation	3,000–5,000 ft
Slope	30–60%
Water table depth	60 in
Aspect	S, W

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)	22 in

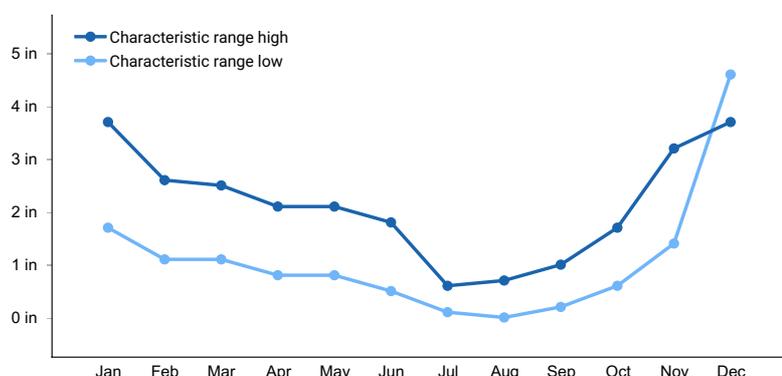


Figure 1. Monthly precipitation range

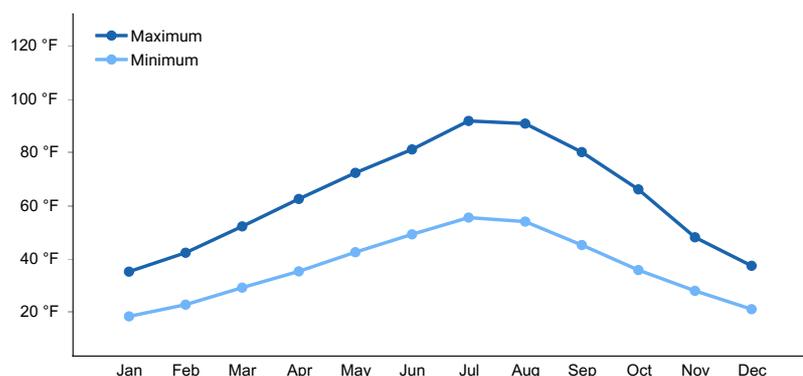


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are shallow over bedrock. The soils are well drained, with slow to moderate permeability above bedrock. Runoff is high to very high. The erosion hazard is moderate to very severe by water. The available water capacity is very low to moderate. The surface texture is stony loam with about 30 percent stones on the surface. These soils are characterized by a xeric soil moisture regime. Soil temperature regime is mesic.

Soil Series Correlated to this Ecological Site

Bluespin
Mehlhorn
Meland

Table 4. Representative soil features

Surface texture	(1) Stony loam (2) Extremely stony
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	20–40 in
Surface fragment cover <=3"	13–15%
Surface fragment cover >3"	12–60%
Available water capacity (0-40in)	1.9–4.7 in
Soil reaction (1:1 water) (0-40in)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	20–30%
Subsurface fragment volume >3" (Depth not specified)	20–35%

Ecological dynamics

The dominant visual aspect of this site is foothills sagebrush and bluebunch wheatgrass interspersed with antelope bitterbrush. Composition by weight is approximately 40-60 percent grass, 30-40 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, small rodents, and lagomorphs.

Fire has historically occurred on the site at intervals of 20-50 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 bluebunch wheatgrass and foothills sagebrush. Subdominant species include Sandberg bluegrass, arrowleaf balsamroot, tapertip hawksbeard and antelope bitterbrush. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 1100 pounds per acre (1230 kilograms per hectare) in a normal year. Production in a favorable year is 1500 pounds per acre (1680 kilograms per hectare). Production in an unfavorable year is 800 pounds per acre (896 kilograms 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.

This site is suited for grazing by domestic livestock from late spring through fall. The site provides good habitat for

chukars, quail, mule deer, small game, and songbirds. It is excellent habitat for Rocky Mountain elk and mule deer during a mild winter. The site has fair values for aesthetic and recreation uses.

Due to the rainfall, elevation and steep topography on this site, it is susceptible to degradation from erosion. Infiltration is good where the community is in mid to late seral status. The site has moderate to slight runoff potential. Runoff, when it does occur can be erosive on steeper slopes particularly during high intensity convection storms. Snow accumulates on the site due to high elevation and presence of tall shrubs.

Impacts on the Plant Community:

Influence of fire:

In the absence of normal fire frequency, foothills sagebrush and antelope bitterbrush can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, foothill sagebrush can displace most of the primary understory species.

When fires become more frequent than historic levels (20-50 years), foothills sagebrush and bitterbrush are reduced significantly. Rabbitbrush can increase slightly. With continued short fire frequency, foothills sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species. These species may be replaced by Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass will invade the site. Medusahead will invade on soils with a clayey surface texture. These fine fuels will increase the fire frequency.

Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be very detrimental to this site. This type of management leads to reduced vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in foothills sagebrush and/or an invasion of noxious and invasive species.

Continued improper grazing management influences fire frequency by increasing fine fuels that carry fires. As cheatgrass and/or medusahead invades 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 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 and other annuals 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 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. 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. Many of the perennial and annual invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory.

Influence of wildlife:

Big game animals use this site in the spring, summer, and fall and in moderate winters. 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 animals are using the plant in the late summer or fall. The adverse impact is excessive use of the current year's leader growth. High numbers of burrowing rodents provide bare ground areas that allow invasion of invasive species.

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 increase in foothills 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 in the absence of fire and improper grazing management.

Phase A to C. Develops with fire.

Phase B to A. Develops with prescribed grazing and no fire.

Phase C to A. Develops with prescribed grazing and no fire.

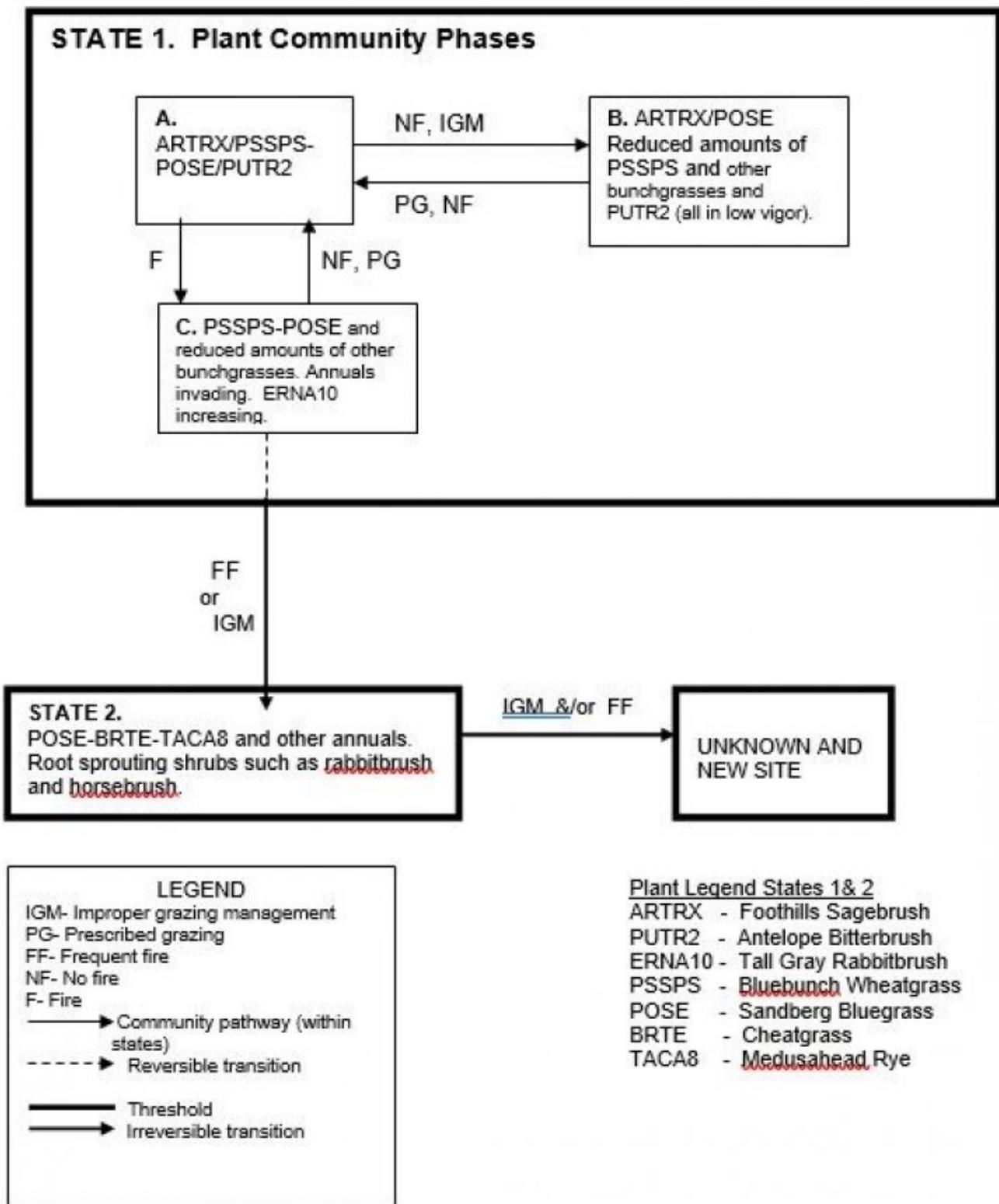
State 1 Phase C to State 2. Develops through frequent fire or improper grazing management. Invasive grasses and forbs are dominating the plant community and result in frequent fires. Erosion is increasing. The site has crossed the threshold. It is not economically feasible to move this state back towards 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 retrogress to a new site with reduced potential. It has crossed the threshold. It is not economically feasible to move this state back towards the HCPC with accelerating practices.

Practice Limitations.

Movement by domestic livestock is somewhat limited since most of the slopes are greater than 30 percent. On slopes greater than 30 percent, installation of facilitating practices is difficult. Severe limitations exist for seeding by ground moving equipment on slopes greater than 30 percent.

State and transition model



State 1
State 1 Phase A

Community 1.1
State 1 Phase A

This plant community has foothills sagebrush in the overstory with bluebunch wheatgrass and Sandberg bluegrass in the understory. Antelope bitterbrush is common on the site. Prominent forbs include arrowleaf balsamroot, tapertip hawksbeard and western yarrow. Natural fire frequency is 20-50 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	50-60%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

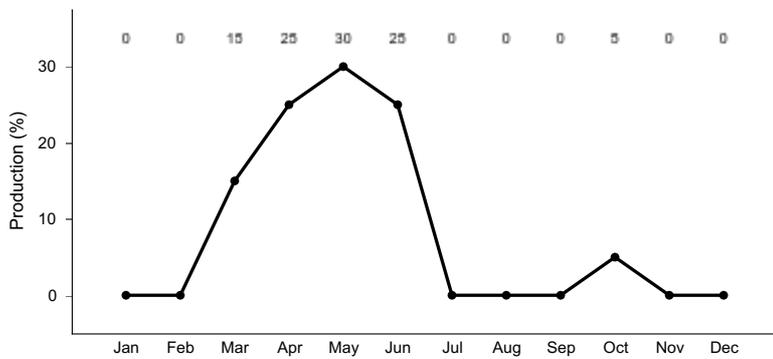


Figure 3. Plant community growth curve (percent production by month). ID0205, D25 ARTRV South. State 1.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is dominated by foothills sagebrush in the overstory and Sandberg bluegrass in the understory. Bluebunch wheatgrass is still present in the plant community but is in low vigor. Antelope bitterbrush is usually hedged and in low vigor. Cheatgrass, medusahead and noxious weeds may be increasing. This state has developed due to the lack of fire and improper grazing management.

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	50-60%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%

Bedrock	0%
Water	0%
Bare ground	0%

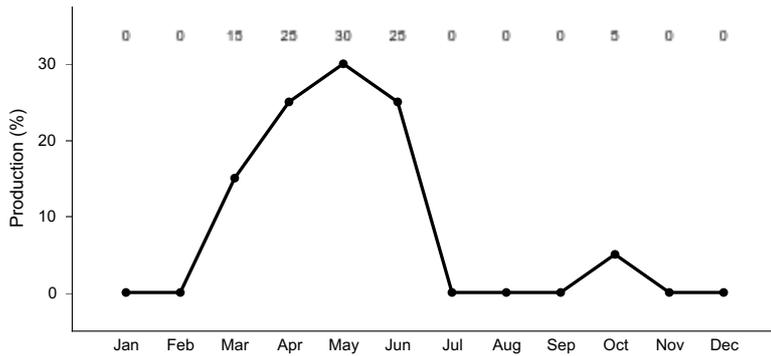


Figure 4. Plant community growth curve (percent production by month). ID0205, D25 ARTRV South. State 1.

State 3 State 1 Phase C

Community 3.1 State 1 Phase C

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Forbs remain about in the same proportion as Phase A. Rabbitbrush is increasing. Some cheatgrass, medusahead and noxious species have invaded the site. Foothills sagebrush and antelope bitterbrush are no longer present. 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	50-60%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

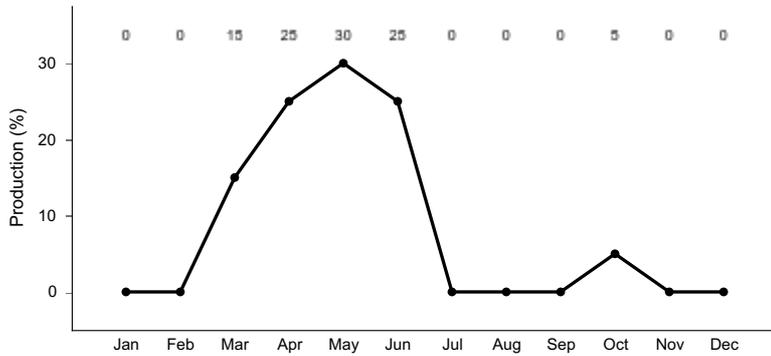


Figure 5. Plant community growth curve (percent production by month). ID0205, D25 ARTRV South. State 1.

**State 4
State 2**

**Community 4.1
State 2**

This plant community is dominated by Sandberg bluegrass, 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	50-60%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

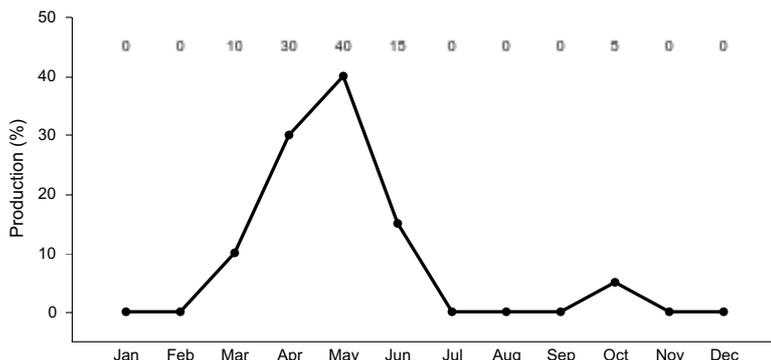


Figure 6. Plant community growth curve (percent production by month). ID0202, B10 PUTR2 Early Seral. State 2.

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	50-60%
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. 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. The south facing slopes can provide winter food habitat for mule deer and elk. The diverse shrub cover provides suitable habitat for brewer's sparrow and sage thrasher. In some areas encroachment of noxious and invasive plant species (cheatgrass, Medusahead) 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/ Sandberg Bluegrass/ Antelope Bitterbrush/ 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 reptiles and amphibians. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Critical habitat (lek sites, nesting areas, winter cover and food) for sage-grouse is provided throughout this ecological site. The plant community supports the needs of large mammals (mule deer and elk) providing food and cover on a seasonal basis. Antelope bitterbrush is preferred browse for mule deer, available during the winter season on these sites. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots and pikas 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/ Plant Community: This state has developed due

to the lack of fire and improper grazing management. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. Grasses, forbs and shrubs, are used by native insects that assist in pollination but the reduced 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 with 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 obligate avians 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. Critical habitat (lek sites, nesting areas, winter cover and food) for sage grouse is limited due to a less diverse herbaceous plant community. The plant community supports limited needs of large mammals (mule deer and elk) providing winter food and cover. The increase in big sagebrush reduces the density of antelope bitterbrush and the value of winter forage habitat. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, deer mouse and yellow-bellied marmots would utilize the habitat. The deer mouse is the primary vector for planting bitterbrush seed.

State 1 Phase 1.3 - Bluebunch Wheatgrass/ Sandberg Bluegrass Plant Community: This plant community is the result of fire. This plant community, dominated by herbaceous vegetation with little to no sagebrush or antelope bitterbrush reduces vertical structure for wildlife. Insect diversity would be reduced. A diverse native forb plant community would still support select pollinators. An increase in rabbitbrush would provide fall pollinator habitat. Reptile use including short horned lizard, sagebrush lizard and western rattlesnakes would be limited due to the absence of sagebrush and antelope bitterbrush. The dominance of herbaceous vegetation with no sagebrush or antelope bitterbrush canopy 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. Sage-grouse would not use the area for winter habitat. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Mule deer and elk forage use would be seasonal (early spring through 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/ Medusahead Rye Plant Community: This plant community is the result of continued improper grazing management or frequent fire. Vertical structure is replaced by rabbitbrushes and horsebrush. Insect diversity and populations would be reduced with the loss of forbs and change in dominance of shrub species. Limited habitat is provided for native reptile species. Vertical structure is present but the reduced insect community will reduce the quality of reptile habitat. This plant community does not support the habitat requirements for sage-grouse and provides limited habitat for sage thrasher, Brewer's sparrow and sage sparrow. 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. Small mammal populations and diversity would be reduced due to less favorable understory vegetation and reduced insect populations.

Grazing Interpretations.

This site is best suited for grazing by domestic livestock from 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 majority of the soils on this site are in hydrologic group B. When hydrologic conditions of the vegetative cover are good, natural erosion hazard is slight to moderate.

Recreational uses

This site has fair values for aesthetic and recreation. Spring and early summer blooming forbs and shrubs offer color contrast. Hunting for mule deer, upland game birds and small game is available.

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:

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Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC

Jim Cornwell, Range Management Specialist, IASCD

Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho

Leah Juarros, Resource Soil Scientist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Washington County, ID

Other references

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USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; version 4-2005.

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	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 and tall shrubs and are not extensive. Surface stones interrupt flows.

3. **Number and height of erosional pedestals or terracettes:** 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 tall shrub bases, stones and large bunchgrasses. They are not extensive.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** data is not available. On sites in mid-seral status bare ground may range from 35-55 percent.

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. Stones on the surface help reduce fine litter movement.

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 3 to 7 inches thick. Structure ranges from weak fine granular to moderate thin platy. 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):** foothill 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 15-20 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 1100 pounds per acre (1230 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 40-50 percent of the total production, forbs 20-35 percent and shrubs 5-15 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 bulbous bluegrass, rush skeletonweed, musk and scotch thistle, and diffuse and spotted knapweed. Cheatgrass can invade the site. Medusahead can be a serious invader on the heavier textured soils.

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