

Ecological site R010XY028ID **South Slope Granitic 16-20 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.

Classification relationships

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

R010XY003ID	Loamy 16-22 PZ PUTR2/FEID
R010XY004ID	South Slope Loamy 16-22 PZ ARTRX/PSSPS
R010XY005ID	North Slope Loamy 16-22 PZ ARTRV/FEID
R010XY013ID	North Slope Granitic 16-22 PZ ARTRV/FEID
R010XY021ID	Stony Loam 16-22 PZ ARTRT/PSSPS
R010XY022ID	Granitic 16-22 PZ PSSPS-FEID

Similar sites

R010XY022ID	Granitic 16-22 PZ PSSPS-FEID
R010XY004ID	South Slope Loamy 16-22 PZ ARTRX/PSSPS

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on foothills, hillslopes and canyon walls. Slopes range from 30-65 percent. It occupies south and west aspects. Elevations range from 3000 to 6000 feet (900-1850 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Canyon
Elevation	3,000–6,000 ft
Slope	30–65%
Water table depth	60 in

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

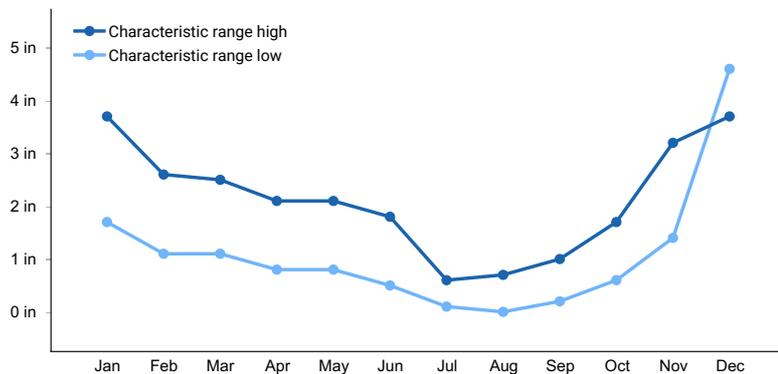


Figure 1. Monthly precipitation range

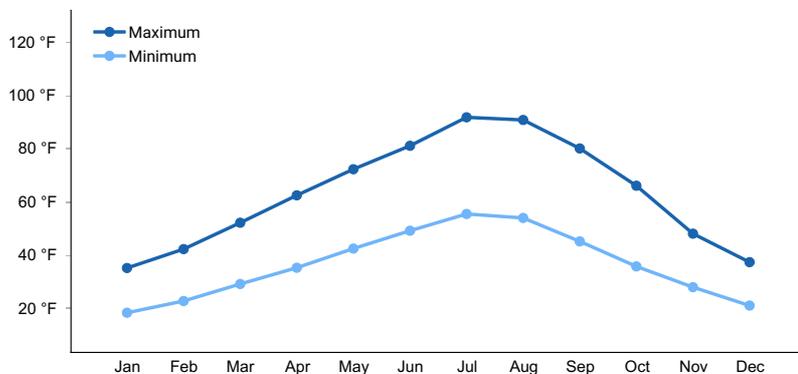


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils supporting this site are moderately deep or very deep coarse sandy loams. They are somewhat excessively to excessively drain, with moderately rapid or rapid permeability. Available water capacity is very low or low. Runoff is low to medium. The soil surface is inherently unstable and is subject to trampling damage by hoof and foot traffic. These soils are characterized by a xeric soil moisture regime. Soil temperature regime is mesic.

Soil Series Correlated to this Ecological Site -

Olaton Roney Schiller Shimo

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Very gravelly coarse sandy loam
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	20–60 in
Surface fragment cover ≤3"	5–40%
Surface fragment cover >3"	0–20%
Available water capacity (0-40in)	2.8–4.8 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.6–6.7
Subsurface fragment volume ≤3" (Depth not specified)	5–50%
Subsurface fragment volume >3" (Depth not specified)	0–15%

Ecological dynamics

The dominant visual aspect of this site is bluebunch wheatgrass and foothills big sagebrush. Composition by weight is approximately 50-60% grass, 20-30% forbs, and 15-25% shrubs.

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

This plant community is dominated by foothills big sagebrush in the overstory and bluebunch wheatgrass in the understory. Bitterbrush is usually present. Subdominant species include Thurber's needlegrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot, and tapertip hawksbeard.

Total annual production is 900 pounds per acre (1000 kilograms per hectare) in a normal year. Production in a favorable year is 1200 pounds per acre (1333 kilograms per hectare). Production in an unfavorable year is 700 pounds per acre (777 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 perennial bunchgrasses are subdominant.

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 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.

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 big sagebrush. Grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (20-50years), foothills big sagebrush and bitterbrush are reduced significantly. With continued short fire frequency, big sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Thurber's needlegrass. 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 big 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 big sagebrush and/or western juniper. 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 and/or juniper, can lead to an increase in 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:

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.

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 an increase of shrubs. 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 B or C to State 2. Develops through frequent fire and/or continued improper grazing management. This site has crossed the threshold. It is not economically feasible to move this state back towards the Reference Plant Community.

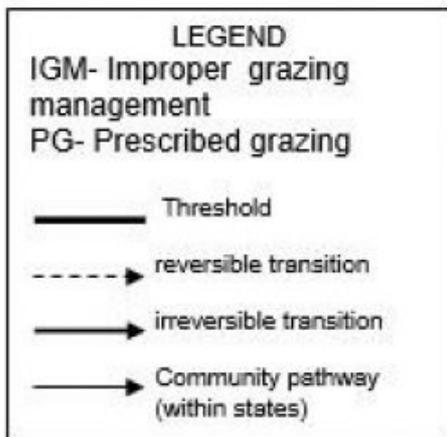
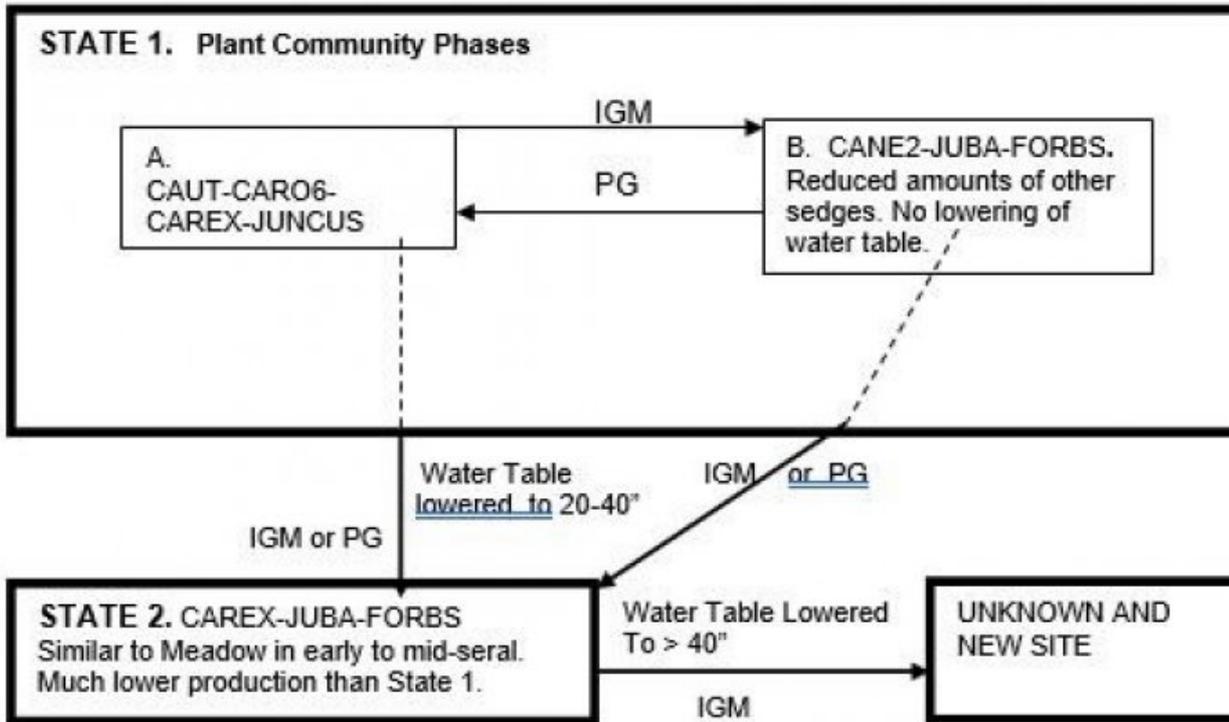
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is not economically feasible to move this state back towards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

Practice limitations.

Severe limitations exist on this site by ground moving equipment for seeding and mechanical brush control due to

steep slopes. Brush management can occur with aerial chemical application or prescribed burning. Steep slopes limit livestock access.

State and transition model



Plant Legend States 1 & 2

CAUT	- Northwest Territory Sedge
CAR06	- Beaked Sedge
CAREX	- Sedges
JUNCUS	- Rushes
CANE2	- Nebraska Sedge
JUBA	- Baltic Rush

State 1

State 1 Phase A

Community 1.1

State 1 Phase A

State 1, Phase A. Reference Plant Community Phase. This plant community is dominated by foothills big sagebrush in the overstory and bluebunch wheatgrass in the understory. Bitterbrush is usually present. Subdominant species include Thurber's needlegrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot, and tapertip hawksbeard. Natural fire frequency is 20-50 years.

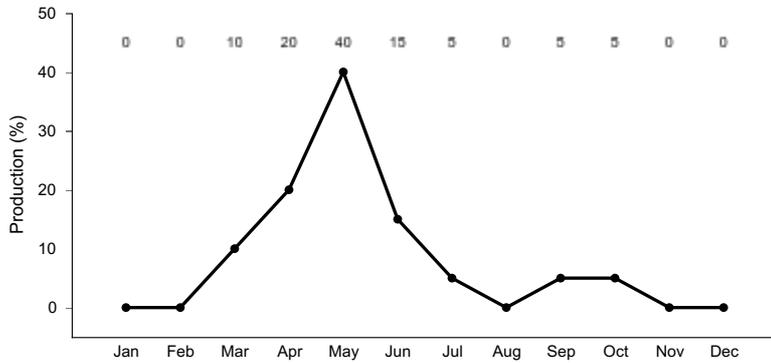


Figure 3. Plant community growth curve (percent production by month). ID0401, KRLA2/ACHY. Reference State.

**State 2
State 1 Phase B**

**Community 2.1
State 1 Phase B**

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

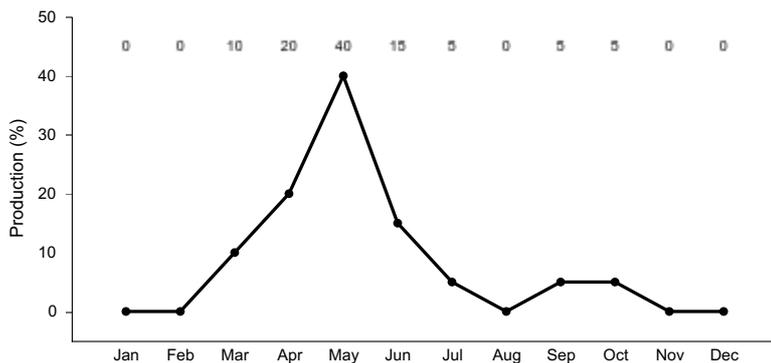


Figure 4. Plant community growth curve (percent production by month). ID0401, KRLA2/ACHY. Reference State.

**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 Thurber's needlegrass 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 big sagebrush and antelope bitterbrush is 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.

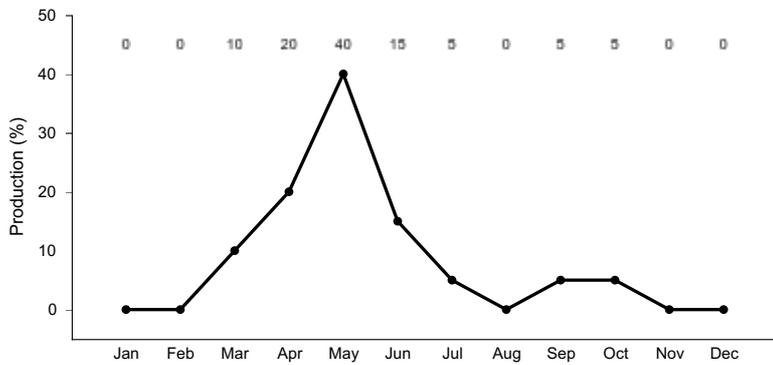


Figure 5. Plant community growth curve (percent production by month). ID0401, KRLA2/ACHY. Reference State.

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 rabbitbrushes 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 and/or improper grazing management. This state has crossed the site threshold. It is not economically feasible to move this state back towards the Reference Plant Community.

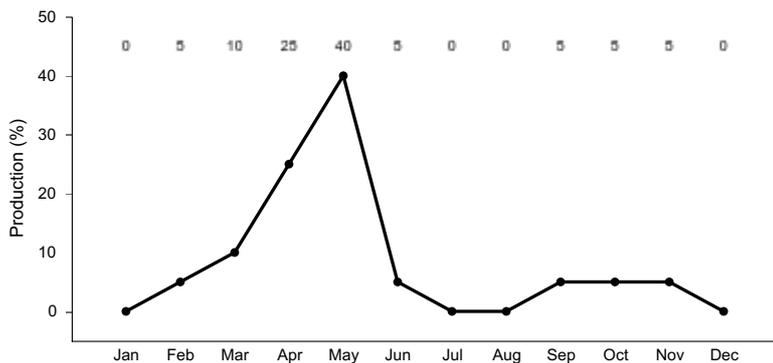


Figure 6. Plant community growth curve (percent production by month). ID0402, POSE-BRTE/ANNUALS. State 2.

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. 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 diverse shrub cover provides suitable habitat for brewer's sparrow, sage

sparrow, sage grouse, 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. Mule deer and elk utilize the site during spring, summer and fall for food and cover. The steep slopes and snow accumulation reduces value of site for winter food for deer and elk. Water features are sparse provided by seasonal streams, artificial water catchments and springs.

State 1 Phase 1.1 - Foothills Big Sagebrush/ Antelope Bitterbrush/ Bluebunch Wheatgrass/ Sandberg Bluegrass/ Thurber's Needlegrass 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. 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 in the spring summer and fall. Antelope bitterbrush is preferred browse for mule deer. A diverse small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots 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 phase 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 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 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 avian 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. 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 has reduced forage value for mule deer and elk due to poor herbaceous understory and loss of antelope bitterbrush. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, deer mice 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/ Bottlebrush Squirreltail 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 reduces vertical structure for wildlife. Insect diversity would be reduced. A diverse native forb plant community similar to Phase 1.1 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, increase in rabbitbrushes and loss of sagebrush and antelope bitterbrush canopy cover would severely limit 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 and/or frequent fire. Vertical structure is provided by rabbitbrushes and horsebrush. Insect diversity and populations would be reduced with the loss of forbs and change in dominant shrub species. Vertical structure is present but the reduced insect community will reduce 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 or 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 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.

Estimated Initial Stocking Rate

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 terracette development and erosion on the steeper slopes.

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

No data.

Recreational uses

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

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

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.
- 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:** 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.

- Presence of water flow patterns:** 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.

- 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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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** no data. This site is naturally unstable due to coarse surface fragments.
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5. **Number of gullies and erosion associated with gullies:** none.
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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 1 to 3 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 surface horizon is typically 3 to 10 inches thick. Soil organic matter (SOM) needs to be measured.
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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):** is 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
- Other: tall shrubs
- Additional: shallow rooted bunchgrasses
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** foothills big 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 900 pounds per acre (1000 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 50-60 percent of the total production, forbs 20-30 percent and shrubs 15-25 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:** includes 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.
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