Ecological site R043BY017ID
Shallow Stony 22+ PZ ARTRV/FEID

Last updated: 2/03/2020
Accessed: 05/18/2024

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.

MLRA notes

Major Land Resource Area (MLRA): 043B–Central Rocky Mountains

Major Land Resource Area (MLRA):

43B – Central Rocky Mountains – This MLRA is extensive including Montana, Idaho, Wyoming and a small portion in Utah. MLRA 43B includes the Rocky Mountains. A revision of the MLRA's in 2006 lead to the inclusion of the foothills with the mountains for much of Wyoming. Cartographic standards limited the ability to capture the foothills as a separate MLRA .

Further information regarding MLRAs, refer to: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.
Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

Classification relationships

Major Land Resource Area (MLRA): 043B–Central Rocky Mountains
Land Resource Unit: E (Rocky Mountain Range and Forested)

EPA EcoRegion: Level III (Middle Rockies)

Ecological site concept

Site does not receive any additional water.
Soils are:
not saline or saline-sodic.
shallow, with >35% stone (10-25”) and boulder (>25”) cover. skeletal within 20” of soil surface, fragment percentage increasing with depth
not strongly or violently effervescent in surface mineral 10”.
textures usually range from very fine sandy loam to clay loam in surface mineral 4”.
Slope is > 30%.
Clay content is = <35% in surface mineral 4”.
Site does not have an argillic horizon with > 35% clay.

Associated sites

R043BY003ID	**Loamy 22+ PZ FEID-PSSPS**

R043BY004ID	**Shallow Fractured Stony Loam 16-22 PZ ARTRV/FEID**
R043BY009ID	**Loamy 16-22 PZ ARTRV/FEID**
R043BY018ID	**South Slope Stony 22+ PZ PSSP6-FEID**
R043BY019ID	**North Slope Loamy 16-22 PZ SYORU/FEID-PSSPS**
R043BY020ID	**South Slope Gravelly 16-22 PZ ARTRV/BRMA4-ELTRT**
R043BY022ID	**Windswept Mountain Ridge 22+ PZ FEID-CAREX**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on ridgetops and side slopes of mountains. Slopes range from 5 to 30 percent and elevations range from 4800 to 6000 feet (1450-1850 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Hill
Elevation	1,463–1,829 m
Slope	5–30%
Water table depth	152 cm
Aspect	S

Climatic features

The Central Rocky Mountains range in elevation from 6000 to 10000 feet above sea level with some peaks reaching over 12000 feet. The average annual precipitation, based on 10 long term climate stations located throughout the MLRA , is 21 inches. The annual average minimum is 18 and the annual average maximum recorded is 24 inches. The annual average temperature is 41.7 degrees Fahrenheit. The annual average low is 26.7 and the annual average high is 56.7 degrees F. The frost free period ranges from 58 to 80 days while the freeze free period ranges from 90 to 116 days.

Table 3. Representative climatic features

Frost-free period (average)	80 days
Freeze-free period (average)	116 days
Precipitation total (average)	610 mm

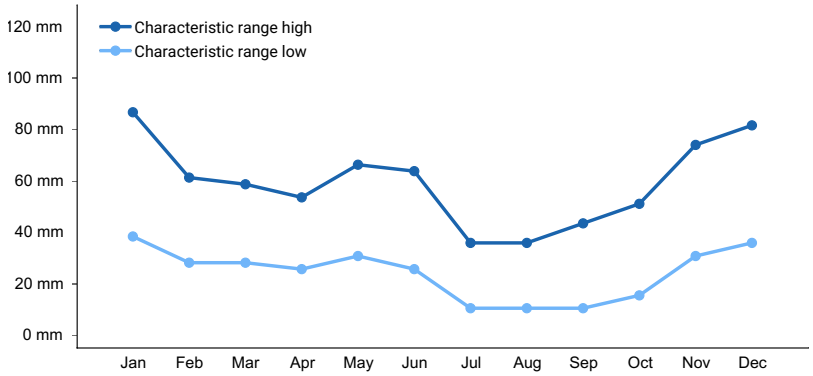


Figure 1. Monthly precipitation range

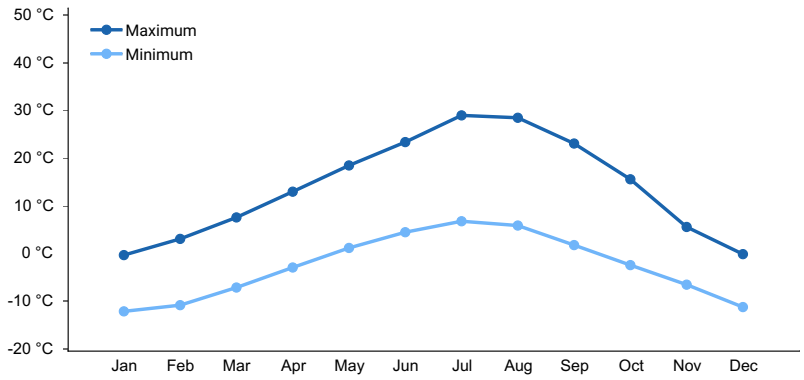


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils are generally well drained shallow, very cobbly loams formed in residuum from basalt. The surface layer is brown, neutral, very cobbly loam and very cobbly clay loam 13 inches thick. The subsoil is brown, slightly acidic, very cobbly clay 4 inches thick. It is underlain with fractured basalt bedrock. Permeability is moderate to slow. Available water capacity is very low. Runoff is medium to rapid and the hazard of erosion is moderate to severe. These soils are characterized by xeric moisture and frigid temperature regimes.

Soil Series Correlated to this Ecological Site

Tica Zaza

Table 4. Representative soil features

Surface texture	(1) Very cobbly loam (2) Very stony
Drainage class	Well drained
Permeability class	Moderate to slow
Soil depth	25–51 cm
Surface fragment cover <=3"	10–25%
Surface fragment cover >3"	15–35%

Available water capacity (0-101.6cm)	3.05–5.33 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	15–35%
Subsurface fragment volume >3" (Depth not specified)	25–50%

Ecological dynamics

The visual aspect of the plant community is grassland with bluebunch wheatgrass and Idaho fescue where the soils are approaching 20 inches deep. In areas where the soil is nearer 10 inches of depth, the dominant grass is Sandberg bluegrass. Composition by weight is approximately 70 to 90 percent grasses and 10 to 30 percent forbs. Shrubs are minor.

During the last few thousand years, this site has evolved in a montane climate characterized by dry summers and cold, moist winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, white-tailed deer, Rocky Mountain elk, and lagomorphs.

Fire has historically occurred on the site at intervals of 50-70 years.

The Historic Climax Plant Community (HCPC), the Reference State (State 1), moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The Reference Plant Community Phase is Phase A.

This site exhibits a wide variation in both production and composition. This variation is due to soil depths ranging from 10 to 20 inches. Deeper rooted large bunchgrasses such as bluebunch wheatgrass will be dominant near the 20 inch soil depth. When the soil is nearer the 10 inch depth, shallow rooted Sandberg bluegrass will dominate. Forbs are abundant throughout the soil depth range. Shrubs are a minor component of this plant community. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 500 pounds per acre (560 kilograms per hectare) in a normal year. Production in a favorable year is 700 pounds per acre (784 kilograms per hectare). Production in an unfavorable year is 300 pounds per acre (336 kilograms per hectare). Structurally, cool season deep- rooted perennial bunchgrasses are more dominant than shrubs followed by perennial forbs.

FUNCTION:

This site is suited for big game animals in the spring, summer, and fall. Livestock can use the site in the spring and fall. It has limited value for recreational use.

Due to shallow soils, the site is susceptible to degradation from improper grazing management. This site is one of the first to green up in the spring and animals often seek out the site for the nutritional value of the forage at this time. Runoff, when it does occur can be erosive particularly during high intensity convection storms and on slopes greater than 15 percent.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency and ungulate grazing, there is little change in the community.

When fires become more frequent than historic levels, Idaho fescue and bluebunch wheatgrass can be reduced in the plant community. Sandberg bluegrass will increase. With continued short fire frequency, Idaho fescue and bluebunch wheatgrass can be completely eliminated along with some forbs. These species may be replaced by bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. These fine fuels will increase the fire frequency. Some rabbitbrush and common snowberry may remain in the plant community if they were originally present.

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 Idaho fescue and bluebunch wheatgrass. With reduced vigor, recruitment of this species declines. As this species declines, an increase in Sandberg bluegrass will occur and noxious and invasive species will invade.

Continued improper grazing management influences fire frequency by increasing fine fuels. As annuals increase, 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.

Weather influences:

Above normal precipitation in 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.

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment, and production are usually reduced. Mortality can occur. An early, hard freeze can occasionally kill some plants. Prolonged drought can lead to reduction in fire frequency.

Influence of Insects and disease:

Outbreaks are rare on this site. Grasshoppers can affect individual plant health but infestations are rare.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency.
Annual and perennial 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. Their numbers are seldom high enough to adversely affect the plant community.

Watershed:

Decreased infiltration and increased runoff occur with a decrease in perennial bunchgrasses. 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 vegetative 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.

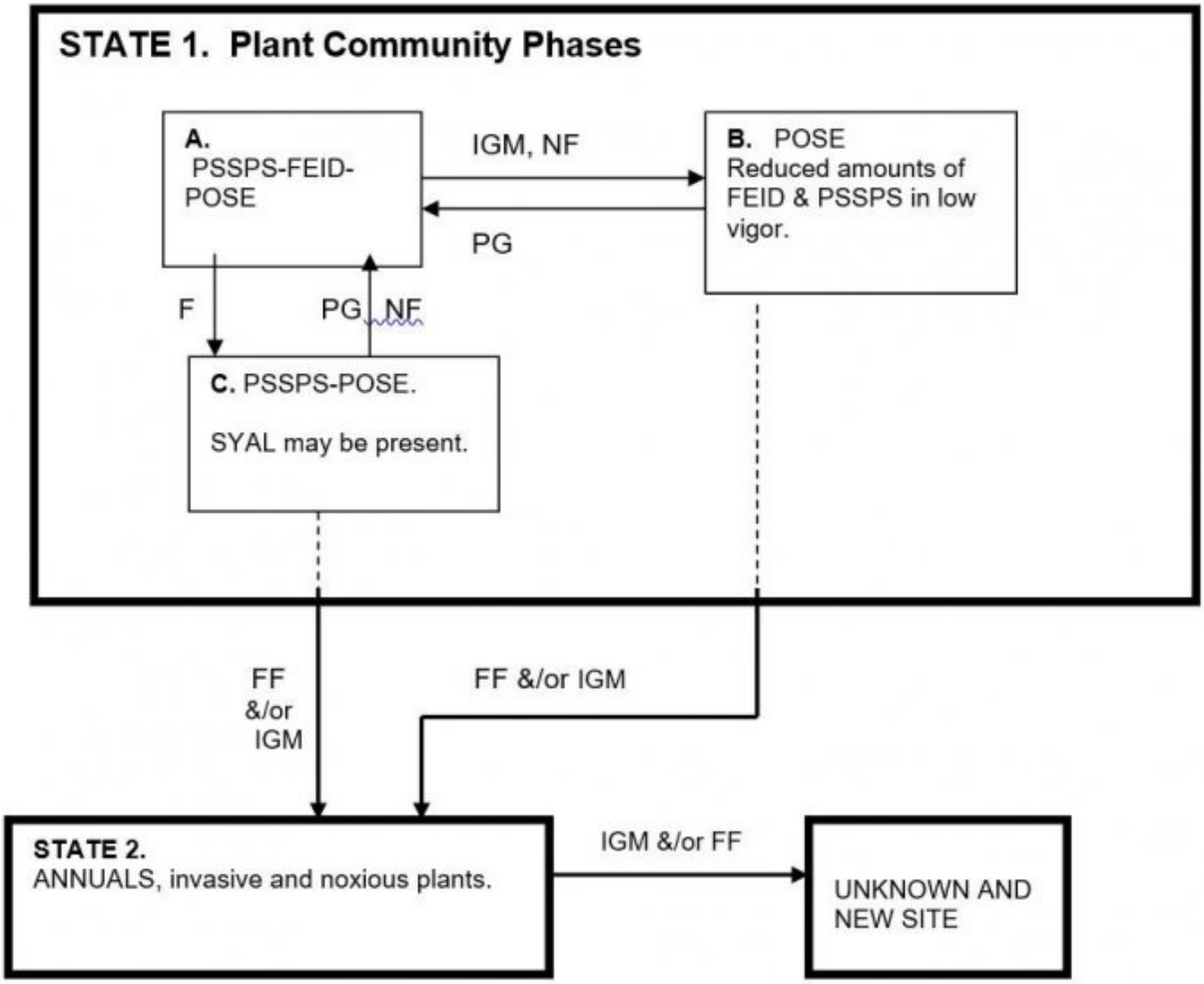
State 1, Phase B or C to State 2. Develops through frequent fire and/or improper grazing management. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

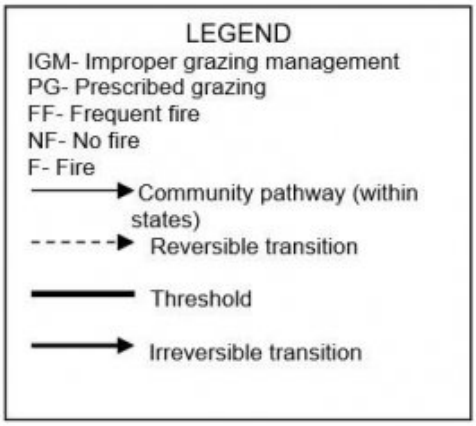
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is economically impractical to return this plant community to State 1 with accelerating practices.

Practice Limitations:

Severe limitations exist on this site for accelerating and facilitating practices due to cobbly surfaces and shallow soils. Moderate to severe limitations exist on this site for vegetative management practices due to cobbly soil surfaces.

State and transition model





PLANT SYMBOL LEGEND STATES 1 & 2

PSSPS	-	Bluebunch Wheatgrass
POSE	-	Sandberg Bluegrass
FEID	-	Idaho Fescue
SYAL	-	Common Snowberry

NOTE: This S and T diagram represents an RPC with soil depths that are approaching 20 inches of depth.

State 1
State 1 Phase A

Community 1.1
State 1 Phase A

Reference Plant Community Phase. This site exhibits a wide variation in both production and composition. This variation is due to soil depths ranging from 10 to 20 inches. The Reference Plant Community Phase depends on soil depth. Deeper rooted; large bunchgrasses such as bluebunch wheatgrass will be dominant near the 20 inch soil depth. When the soil is nearer the 10 inch depth, shallow rooted Sandberg bluegrass will dominate. Forbs are abundant throughout the soil depth range. Shrubs are a minor component of this plant community. Natural fire frequency is 50-70 years.

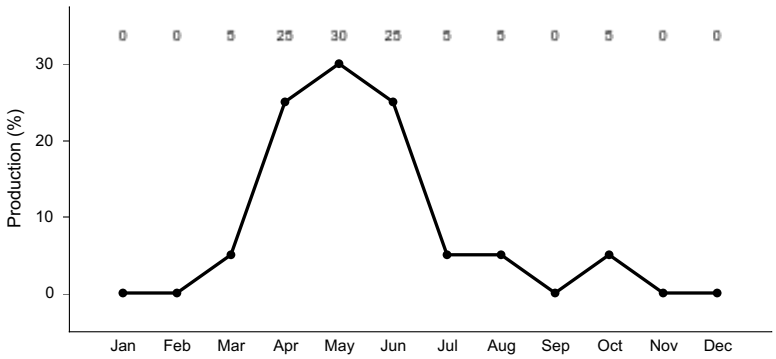


Figure 3. Plant community growth curve (percent production by month). ID1205, FEID-PSSPS. State 1.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

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

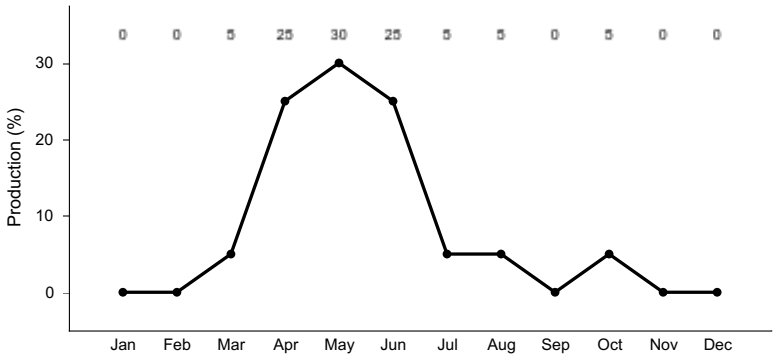


Figure 4. Plant community growth curve (percent production by month). ID1205, FEID-PSSPS. State 1.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by bluebunch wheatgrass with reduced amounts of Idaho fescue. All bunchgrasses may be in low vigor. Sandberg bluegrass has increased. Forbs remain about in the same proportion as Phase A. Some common snowberry may still be in the community. Some annuals have invaded the site. This plant community is the result of wildfire.

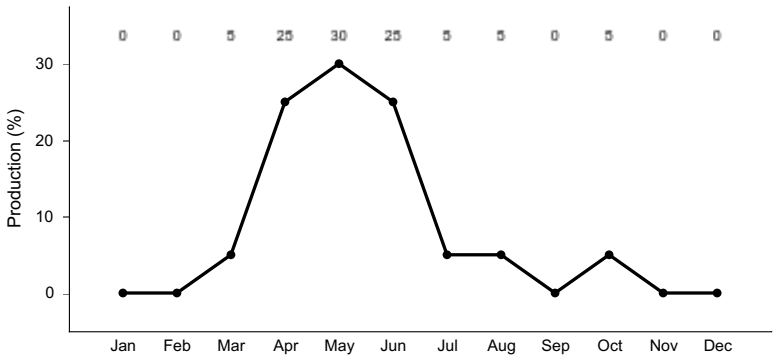


Figure 5. Plant community growth curve (percent production by month). ID1205, FEID-PSSPS. State 1.

State 4
State 2

Community 4.1
State 2

This plant community is dominated by annual grasses and forbs including invasive and noxious plants. Some soil loss has occurred. This state has developed due to frequent fires and improper grazing management. This site has historically been used as sheep bedding grounds and this State may have been reached through this historic use. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

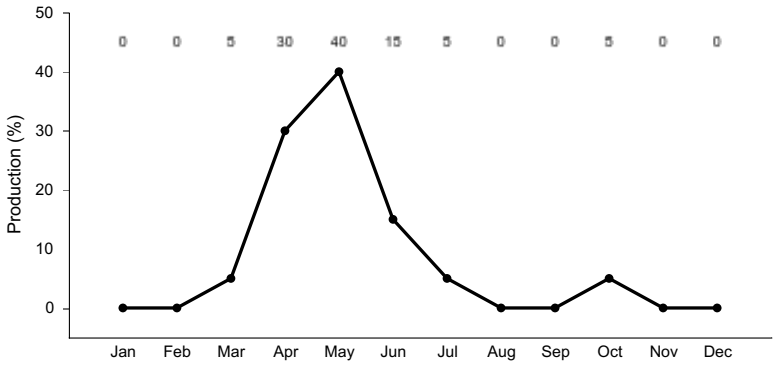


Figure 6. Plant community growth curve (percent production by month). ID1202, ANNUALS. State 2.

State 5
Unknown New Site

Community 5.1
Unknown New Site

This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This state has developed due to continued improper grazing management and/or frequent fires. It is economically impractical to return this plant community to State 1 with accelerating practices.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides habitat for native wildlife species. The plant community exhibits a diverse mixture of forbs throughout the growing season offering excellent habitat for invertebrates. Mule deer, white-tailed deer, and elk may utilize the site in the spring, summer, and fall. The rangeland provides seasonal habitat for resident and migratory animals including western toad, shrews, bats, ground squirrels, mice, coyote, red fox, badger, Ferruginous hawk, and prairie falcon. Area sensitive species include Merriam's shrew, Idaho pocket gopher, Wyoming ground squirrel, and Greater sage-grouse. Water features are sparse provided by seasonal runoff, artificial water catchments, and springs.

State 1 Phase 1.1 – Bluebunch Wheatgrass/ Idaho Fescue/ Sandberg Bluegrass Reference Plant Community (RPC): This sparse plant community provides a diversity of grasses and forbs 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. The reptile and amphibian community is represented by gopher snake, western rattlesnake, terrestrial garter snake, western toad, and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Development of spring sites that collect all available water would exclude amphibian use on these sites. Sage-grouse may utilize this site for brood rearing. Sharp-tailed grouse may also utilize this plant community. The plant community provides spring, summer, and fall forage for mule deer, white-tailed deer, and elk. A diverse small mammal population including golden-mantled ground squirrels, jackrabbits, Uinta ground squirrel, Idaho pocket gopher, and deer mice would utilize this plant community.

State 1 Phase 1.2 –Sandberg Bluegrass Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy cover of brush may occur with a decline in vigor and production of native deep rooted grasses and forbs. The reduced diversity of the herbaceous understory results in lower diversity of insects. The reptile community would be similar to the reptile community in State 1 Phase 1.1. The increase in the shrub component may increase quality of the habitat for bird species reliant on vertical structure not present in State 1 Phase 1.1. Shrub obligate bird species like sage sparrow and brewer's sparrow may begin to utilize the site. Quality of brood-rearing habitat for sage-grouse would be similar to that in State 1 Phase 1.1. Habitat quality for sharp-tailed grouse may increase as patches of shrubs become established. The reduced vigor and production of herbaceous vegetation provides a shorter grazing season for mule deer and elk. Kentucky bluegrass may be present and when managed properly can provide desirable forage for mule deer and elk. Small mammal diversity and populations would be similar to those in State 1 Phase 1.1.

State 1 Phase 1.3– Bluebunch Wheatgrass/ Sandberg Bluegrass/ Common Snowberry Plant Community: This plant community is a result of recent wildfire, prescribed burning, or brush management. Patches of root sprouting shrubs (common snowberry) may be present to provide limited vertical structure for wildlife. A native forb plant community similar to that in State 1 Phase 1.1 would still support select pollinators. Habitat quality for reptiles would be similar to State 1 Phase 1.1 habitat quality. Amphibian habitat would be tied to permanent spring sites in the area. Development of spring sites that collected all available water would exclude amphibians on these sites. Bird species that favor grassland habitat would include horned lark, savannah sparrow, vesper sparrow, and western meadowlark. Sage-grouse may use this site for brood-rearing habitat when sagebrush cover is nearby. Habitat quality for sharp-tailed grouse may increase as patches of shrubs become established. Mule deer and elk use would be seasonal (spring and fall). The diversity and populations of small mammals would be similar to those in State 1 Phase 1.1.

State 2 – Annuals/ Invasive/ Noxious Weeds Plant Community: This state has developed due to improper grazing management and frequent fire. The reduction of native forbs in the plant community would support a very limited population of pollinators. Season long pollinator habitat is not provided at the same level as it is in State 1 Phase 1.1. Habitat quality would decline for reptile species identified in State 1 due to poor cover and food habitat. Birds of prey including hawks and falcons may range throughout this area looking for prey species. Large herbivores may utilize the herbaceous vegetation in the early part of the year when it is more palatable. Kentucky bluegrass, when managed properly, can provide desirable forage in the spring and fall for mule deer and throughout the year for elk. The diversity and populations of small mammals would be dominated by open grassland species. Predator hunting success on small mammals would increase.

Grazing Interpretations.
This site has value for late spring and fall grazing for livestock. Avoid grazing when the soils are wet to minimize trampling damage.
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 has limited recreational value or aesthetic value due to very cobbly surface but can be located on ridgetops with scenic vistas.

Wood products

None.

Other products

None.

Other information

Field Offices

Grangeville, ID
Nezperce, ID
Cascade, ID
Weiser, ID
Emmett, ID
Mtn. Home, ID
Salmon, ID
Challis, ID
Shoshone, ID
Arco, ID
St. Anthony, ID
Lewiston, ID
Orofino, 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
Bruce Knapp, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

Other references

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

Scott Woodall, 2/03/2020

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	06/12/2009
Approved by	Scott Woodall
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills are rare on this site. If rills are present they are likely to occur immediately following wildfire on slopes greater than 15 percent. Rills are most likely to occur on soils with surface textures of silt loam. Cobbles on the surface reduce rill formation.

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2. **Presence of water flow patterns:** water-flow patterns are rare on this site. When they occur, they are short and disrupted by cool season grasses and are not extensive. Cobbles reduce water-flow patterns.

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3. **Number and height of erosional pedestals or terracettes:** neither is extensive. In areas where flow patterns and/or rills are present, a few pedestals may be expected. Terracettes occur on the site uphill from tall shrub bases and large bunchgrasses on slopes greater than 15 percent. Do not mistake frost-heaving for pedestals.

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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 30-40 percent.

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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:** these are rare. Immediately following wildfire some soil movement may occur on lighter textured soils.

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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 2 feet following a significant run-off event. Coarse litter generally does not move.

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

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The A or A1 horizon is typically 3 to 5 inches thick and brown moist. Structure ranges from moderate medium to fine granular. Soil organic matter (SOM) ranges from .5 to 4 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. Perennial grasses produce 70 to 90 percent of the total production and 10 to 30 percent forbs.

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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: forbs

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** there is little mortality or decadence on this site.

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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 500 pounds per acre (560 kilograms per hectare) in a year with normal temperatures and precipitation.

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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 bulbous bluegrass, musk and scotch thistle, diffuse and spotted knapweed, leafy spurge, and Kentucky bluegrass.

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