

Ecological site R043BY024ID Subalpine Loamy 22+ PZ BRMA4/POGR9-GEVI2

Last updated: 2/03/2020
Accessed: 05/11/2025

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

Artemisia vaseyana/ Festuca idahoensis 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".

Ecological site concept

Site does not receive any additional water.

Soils are:

not saline or saline-sodic.

moderately deep, deep, with < 3% stone (10-25") and boulder (>25") cover. not skeletal within 20" of soil surface.

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

R043BY002ID	Granitic 22+ PZ ARTRV/FEID
R043BY003ID	Loamy 22+ PZ FEID-PSSPS
R043BY009ID	Loamy 16-22 PZ ARTRV/FEID
R043BY016ID	Shallow Gravelly 16-22 PZ ARAR8/FEID

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on gentle side slopes, benches, and mountain ridges. Slopes range from 2 to 30 percent. Average annual precipitation is typically 22 inches (56 cm.) or greater. The elevation ranges from 6,800 to 10,000 feet (2050 to 3050 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountain
Elevation	6,800–10,000 ft
Slope	2–30%
Water table depth	20–60 in
Aspect	Aspect is not a significant factor

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)	24 in

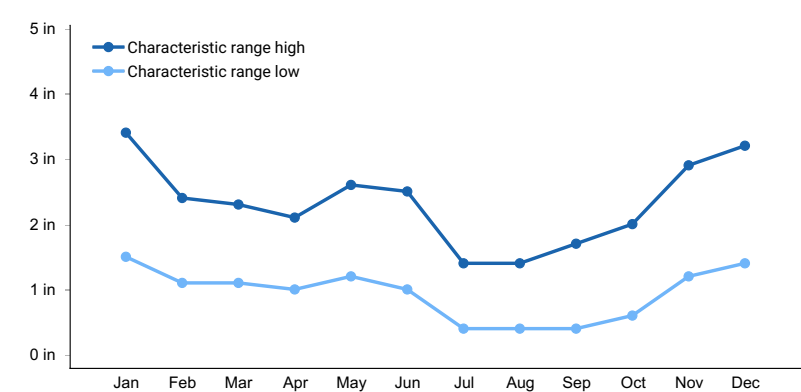


Figure 1. Monthly precipitation range

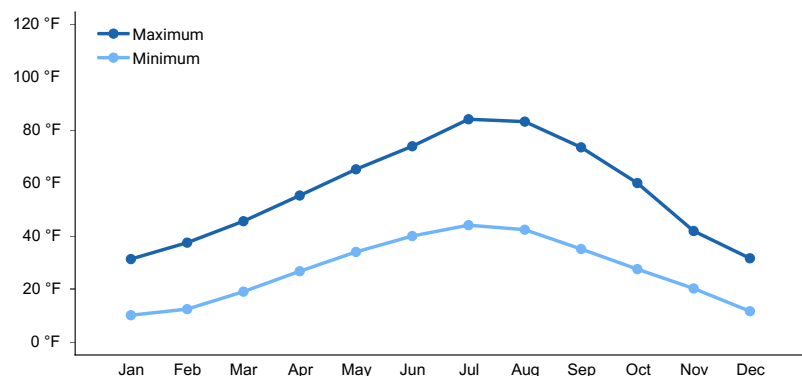


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site is not influenced by adjacent wetlands or streams. Run-on may influence this site on its periphery.

Soil features

The soils on this site are loams with subsoils of loams to gravelly loams derived from granite. They are moderately deep to deep. The soil surface is generally dark brown loam and high in organic matter. Subsoils are loams to gravelly loams. Soils are well drained with permeability ranging from moderately slow to slow. The soils are saturated early in the growing season (possibly from frozen subsoils). The soils have a moderate erosion hazard. These soils have a xeric or udic soil moisture regime and a cryic soil temperature regime.

Soil Series Correlated to this Ecological Site

Adel variant
 Buffmeyer variant
 Charcol variant
 Clayburn variant
 Dunlatop variant
 Hanks variant
 Keman variant
 Lanark variant
 Latigo variant
 Nordic variant
 Reck variant
 Snotown variant
 Splitbutte variant
 Tahquats variant

Table 4. Representative soil features

Surface texture	(1) Gravelly loam
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	20 in
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0–5%
Subsurface fragment volume <=3" (Depth not specified)	0–35%

Subsurface fragment volume >3" (Depth not specified)	0–5%
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Ecological dynamics

The dominant visual aspect of the site is mixed forbs. Grasses occur in minor amounts. This plant community has a significant amount of pocket gopher activity near the soil surface. Composition by weight is approximately 20-30 percent grasses and grass-like, 70-80 percent forbs, and 0-2 percent shrubs.

The ecology of this site is uncertain. This site may be a climax subalpine big sagebrush/Idaho fescue community. Due to historic heavy sheep grazing and frequent fire, the climax vegetation may have been removed. Annual and perennial may have replaced the climax plant community. With the abundance of forbs, the pocket gopher population may be abnormally high. With this high population of rodent activity, the possibility of this plant community returning to a more stable state (climax) is unlikely.

During the last few thousand years, this site has evolved in a montane climate characterized by cool, dry summers and cold, wet winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, Rocky Mountain elk, and small rodents, especially pocket gophers.

Fire has historically occurred on the site at intervals of 20-50 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 plant community is dominated by slender cinquefoil and sticky geranium. Mountain brome, purple oniongrass, slender wheatgrass, Columbia needlegrass, and Letterman's needlegrass are common in the plant community. Shrubs are rare on the site. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 2200 pounds per acre (1980 kilograms per hectare) in a normal year. Production in a favorable year is 2800 pounds per acre (2520 kilograms per hectare). Production in an unfavorable year is 1300 pounds per acre (1170 kilograms per hectare). Structurally, perennial forbs are greater than cool season perennial grasses which are greater than shrubs.

FUNCTION:

This site is suited for grazing by domestic livestock in summer and fall. This site provides fair to good habitat for various upland wildlife. This site offers good recreation value. Use by big game animals and summer-blooming forbs offers some aesthetic values and photographic opportunities.

Due to the relatively high precipitation and lack of surface stones on this site, it is susceptible to degradation from erosion. Early spring grazing should be avoided due to saturated soil conditions.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, subalpine big sagebrush can gradually increase on the site. Grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (20-50 years), subalpine big sagebrush is reduced significantly. After a fire, however, it generally will resprout. Mountain brome will decline and perennial forbs will increase. With continued short fire frequency, the fine-leaved perennial grasses can be completely eliminated along with many of the desirable understory species. These species may be replaced by a variety of annual and perennial forbs including noxious and invasive plants. 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 and sedges. With reduced vigor, recruitment of these species declines.

Continued improper grazing management and excessive utilization influences fire frequency by reducing fine fuels of perennial plants. The site then becomes susceptible to an invasion of noxious and invasive plants and/or soil erosion.

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 perennial forbs and mountain big sagebrush.

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.

Below normal temperatures in the spring can have an adverse impact on total production regardless of the precipitation. An early, hard freeze can occasionally kill some plants.

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment, and production are usually reduced. Mortality can occur. Prolonged drought can lead to a reduction in fire frequency.

Influence of insects and disease:

Insect and disease outbreaks can affect vegetation health. Grasshopper outbreaks occur periodically. Since defoliation usually happens once during the growing season, mortality is normally low. Snow mold can impact subalpine big sagebrush.

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 late spring, summer, and fall. Their numbers are seldom high enough to adversely affect the plant community. Pocket gopher numbers are significant on this site and they primarily eat the roots of the annual and perennial forbs. Their numbers may possibly be high enough to prevent improvement in ecological status, but more data is needed.

Watershed:

Decreased infiltration and increased runoff occur with an increase in forbs and mountain big sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same results, but to a lesser degree. The long-term effect is a transition to a different state.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with improper grazing management and 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.

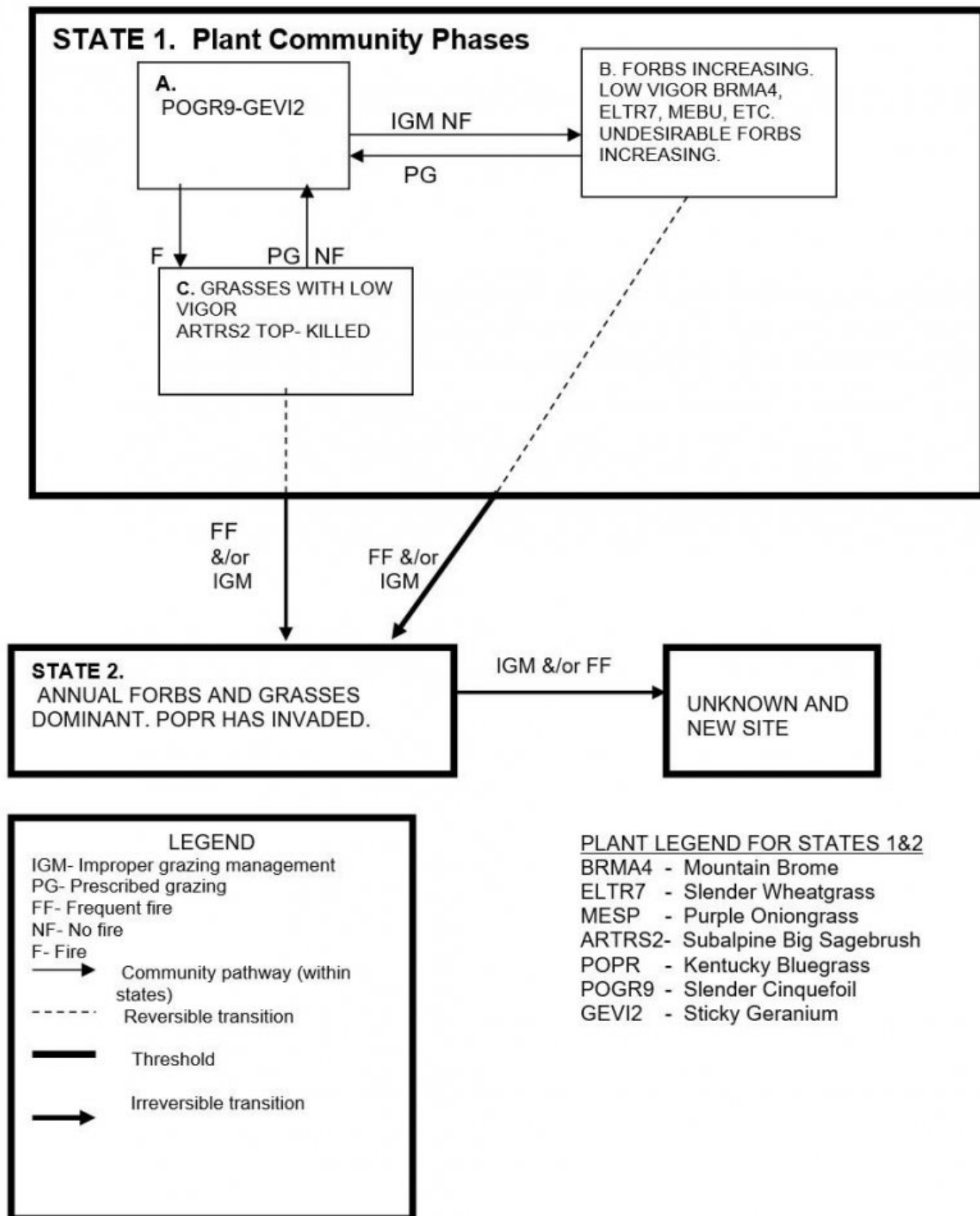
State 1, Phase B or C to State 2. Develops through frequent fire and/or continued improper grazing management. The site crosses the threshold. It is not economically feasible to move this state back to State 1 with accelerating practices.

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

Practice Limitations.

Only slight limitations exist on this site for accelerating, facilitating and vegetation management practices.

State and transition model



State 1
State 1 Phase A

Community 1.1
State 1 Phase A

This plant community is dominated by slender cinquefoil and sticky geranium. Mountain brome, purple oniongrass,

slender wheatgrass, Columbia needlegrass, and Letterman’s needlegrass are common in the plant community. Shrubs are rare on the site. There is a large variety of other forbs that can occur in minor amounts. Natural fire frequency is 20-50 years.

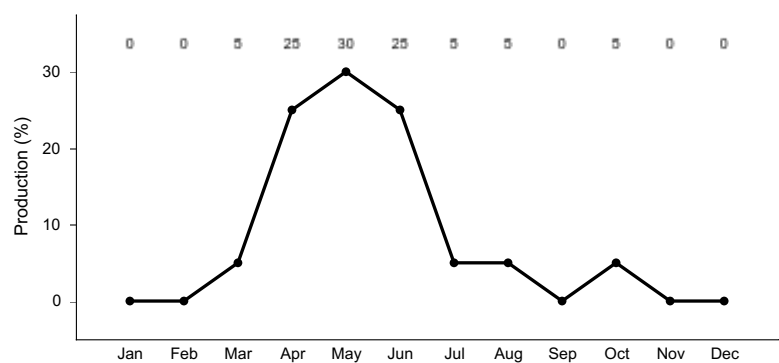


Figure 3. Plant community growth curve (percent production by month).
ID1205, FEID-PSSPS. State 1.

State 2

State 1 Phase B

Community 2.1

State 1 Phase B

This plant community is dominated by slender cinquefoil, sticky geranium, and a variety of other forbs with reduced amounts of mountain brome, Columbia needlegrass, Letterman’s needlegrass, slender wheatgrass, and oniongrass. Less palatable forbs such as western stickseed, tall larkspur, western coneflower, and tarweed are increasing. All deep-rooted bunchgrasses are typically in low vigor. This phase has developed due to improper grazing management and no fire.

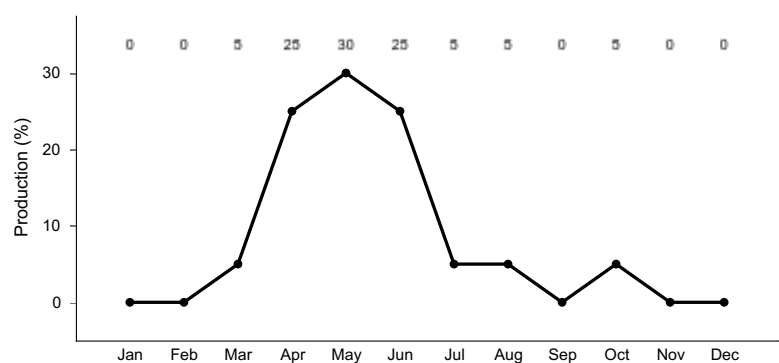


Figure 4. Plant community growth curve (percent production by month).
ID1205, FEID-PSSPS. State 1.

State 3

State 1 Phase C

Community 3.1

State 1 Phase C

Forbs remain about in the same proportion as Phase A. The grass and grass-like component consists of coarse leaved grasses such as mountain brome but have reduced vigor. Mountain big sagebrush has been top-killed but will likely re-sprout. This plant community is the result of wildfire.

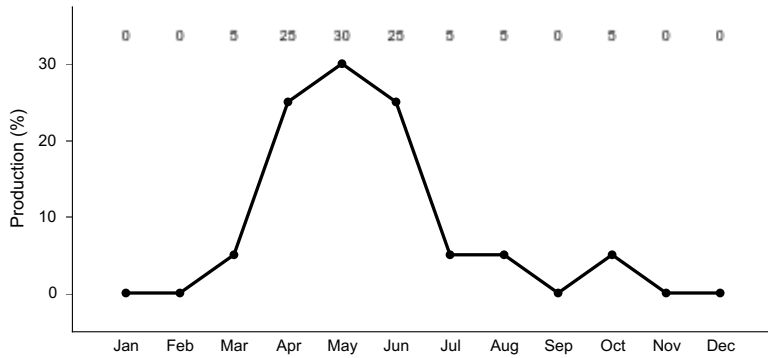


Figure 5. Plant community growth curve (percent production by month).
ID1205, FEID-PSSPS. State 1.

State 4
State 2

Community 4.1
State 2

This plant community is dominated by annual and perennial forbs. Kentucky bluegrass has invaded. Some soil loss has occurred. This state has developed due to frequent fires and/or improper grazing management from Phase B or C, State 1. The site has crossed the threshold. It is not economically feasible to move this state back to State 1 with accelerating practices.

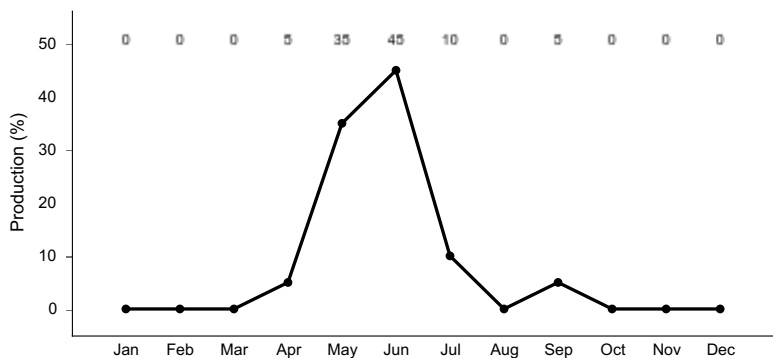


Figure 6. Plant community growth curve (percent production by month).
ID1211, ANNUAL FORBS AND GRASSES. State 2.

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 not economically feasible to move this state back to State 1 with accelerating practices.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This ecological site provides diverse habitat for upland wildlife species. Habitat is provided for resident and migratory animals including western toad, shrews, bats, jackrabbits, ground squirrels, pocket gophers, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, grasshopper sparrow, horned lark, and western meadowlark. Large herbivore use of the ecological site is dominated by mule deer and elk. Area sensitive species utilizing this site include western toad, Idaho pocket gopher, Greater sage-grouse, and sharp-tailed grouse. Open water is seasonal, being provided by seasonal runoff, ponding, and natural springs.

State 1 Phase 1.1 - Slender Cinquefoil/ Sticky Geranium Reference Plant Community (RPC): The RPC provides a diversity of grasses and forbs used by native insects who assist in pollination of the plant community. The high level of forb production supports insects that provide food for the many predator species utilizing the site. The reptile and amphibian community is represented by rubber boa, western toad, and northern leopard frog. Amphibians are associated with springs adjacent to this plant community. Development of spring sites that collect all available water would exclude amphibian use on these sites. Sage-grouse utilize the meadows as summer and fall brood-rearing habitat. The plant community provides spring, summer, and fall forage for elk and spring and fall forage for mule deer. A diverse small mammal population including deer mouse, northern pocket gopher, Idaho pocket gopher, Merriam's shrew, and yellow-bellied marmot may utilize the site. Pikas may be present at higher elevations when the site is adjacent to rocky and talus slopes.

State 1 Phase 1.2 - Slender Cinquefoil/ Sticky Geranium/ Mountain Brome/Slender Wheatgrass Plant Community: This phase has developed due to improper grazing management and no fire. Insect diversity and populations would be similar to those in the State 1 Phase 1.1 plant community. The reptile and amphibian community would be similar to the State 1 Phase 1.1 community. The plant community provides summer and fall brood-rearing habitat for sage-grouse. The plant community can provide forage for large herbivores but with continued improper grazing management the quality and quantity of forage would be reduced in the summer and fall. A small mammal population including deer mouse, northern pocket gopher, Idaho pocket gopher, Merriam's shrew, and yellow-bellied marmot may utilize the site. Pikas may be present at higher elevations when the site is adjacent to rocky and talus slopes.

State 1 Phase 1.3 - Slender Cinquefoil/ Sticky Geranium/ Mountain Brome/ Plant Community: This plant community is the result of wildfire. Under proper grazing management the plant community would develop to be similar to the State 1 Phase 1.1 plant community. Under proper grazing management the animal community would develop over time to be similar to the State 1 Phase 1.1 animal community.

State 2 –Annual Forbs/ Annual Grasses/ Kentucky Bluegrass Plant Community: This state has developed due to frequent fires and/or improper grazing management. Pollinator habitat may not be sustained throughout all seasons. Nesting habitat for grassland birds would be limited due to poor cover from annual grasses and forbs. Birds of prey may range throughout these areas looking for prey species. The mule deer and elk grazing season would be shortened due to poor vigor and production of the herbaceous vegetation. When properly managed, Kentucky bluegrass can provide desirable forage for deer and elk. Small mammal populations and diversity would be reduced due to reduced vertical structure and increased hunting success by predators.

Grazing Interpretations.

This site is suited for grazing by domestic livestock in summer and fall. Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use, and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

Soils on this site have a moderate erosion hazard.

Recreational uses

This site offers good recreation value. Use by big game and summer-blooming forbs offer some aesthetic value and photographic opportunities.

Wood products

None.

Other products

None.

Other information

Field Offices

St. Anthony, ID
Arco, ID
Cascade, ID
Challis, ID
Nezperce, ID
Emmett, ID
Grangeville, ID
Gooding, ID
Lewiston, ID
Mountain Home, ID
Orofino, ID
Salmon, ID
Shoshone, ID
St. Anthony, ID
Weiser, 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

Type locality

Location 1: Beaverhead County, MT

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

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.

Author(s)/participant(s)	Dave Franzen and Jacy Gibbs Intermountain Range Consultants 17700 Fargo Rd. Wilder, ID 83676
Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	06/26/2009
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.

2. **Presence of water flow patterns:** water-flow patterns do not occur on this site.

3. **Number and height of erosional pedestals or terracettes:** both are rare on the site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** data is not available. Rodent activity is common on this site. Where rodent activity is abundant, increased bare ground should be expected.

5. **Number of gullies and erosion associated with gullies:** gullies do not occur on this site.

6. **Extent of wind scoured, blowouts and/or depositional areas:** blowouts and depositional areas are 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 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 3 to 5 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):** structure ranges from weak fine granular to moderate fine and medium granular to weak fine subangular blocky. Soil organic matter (SOM) needs to be determined. The soil surface color is generally very dark grayish brown to dark grey to black to dark brown. The A or A1 horizon is typically 2 to 31 inches thick.
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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.
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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: perennial forbs
- Sub-dominant: cool season perennial grasses and grass-like
- Other: tall shrubs
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** little decadence is expected to occur on the site.
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14. **Average percent litter cover (%) and depth (in):** additional litter cover data is needed. Very little litter is expected to accumulate on the site.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 2200 pounds per acre (1980 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 20-30 percent of the total production, forbs 70-80 percent, and shrubs 0-2 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 Kentucky bluegrass, leafy spurge, curlycup gumweed, St. Johnswort, rush skeletonweed, musk and yellow star thistle, diffuse and spotted knapweed, tarweed, and orange hawkweed.

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