

Ecological site R043BY012ID Mountain Poorly Drained Bottom ARCAV3-DAFRF/FEID

Last updated: 2/03/2020
Accessed: 04/16/2024

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

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434 – Central Rocky Mountains and Foothills – In 2016, a revision to Agricultural Handbook 296 was drafted, changing the MLRA naming convention. In response to these noted changes, Region 4 proactively drafted changes to MLRA 43A, 43B, and 43C. In these changes, 43B has been divided into subsequent MLRA's, LRU's and Subsets. The Central Rocky Mountains within Wyoming (southern extent of 43B) was divided into MLRA 434. (03 correlates to LRU C as of date 9/2018).

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 receives additional water.
- Slope is <30%
- Soils are:
 - o Textures range from fine sandy loam to sandy loam in top 4" (10 cm) of mineral soil surface
 - o Clay content is or = 35% in top 4" (10 cm) of mineral soil surface
 - o Each following subsurface horizon has a clay content of <35% by weighted average in the particle size control section
 - o Deep to very deep
 - o <3% stone and boulder cover and >35% cobble and gravel cover
 - o skeletal (>35% rock fragments) within 20" (51 cm) of mineral soil surface
 - o None to Slightly effervescent throughout top 20" (51 cm) of mineral soil surface
 - o Non-saline, sodic, or saline-sodic

Associated sites

R043BY007ID	Meadow DECA18-CANE2
R043BY008ID	Dry Meadow PONE3-PHAL2
R043BY009ID	Loamy 16-22 PZ ARTRV/FEID
R043BY011ID	Riparian SALIX/CAREX
R043BY014ID	Wet Meadow (Muck) SALIX/CAREX
R043BY017ID	Shallow Stony 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
R043BY002ID	Granitic 22+ PZ ARTRV/FEID
R043BY004ID	Shallow Fractured Stony Loam 16-22 PZ ARTRV/FEID

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on level and nearly level valley floors between upland, well drained sites and meadow or riparian sites. Slopes are generally less than 5 percent. This site occurs on all aspects. Elevations range from 6000 to 7300 feet (1800-2250 meters).

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional
Elevation	6,000–7,300 ft
Slope	0–5%
Water table depth	12–36 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
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Freeze-free period (average)	116 days
Precipitation total (average)	24 in

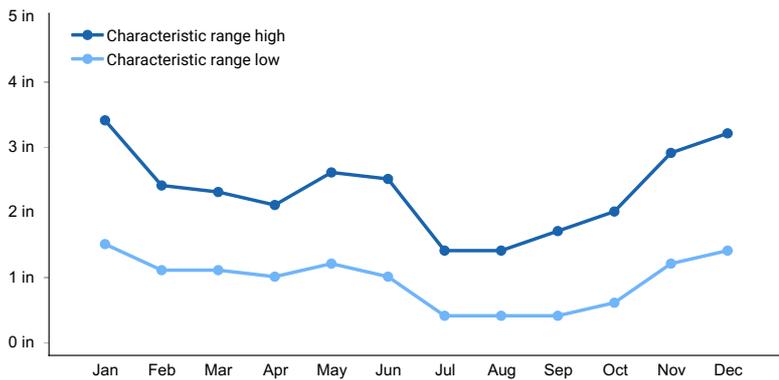


Figure 1. Monthly precipitation range

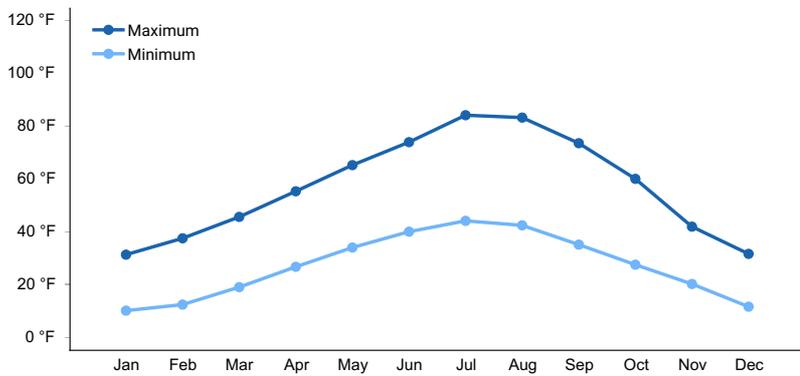


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site is influenced by adjacent wetlands, streams, run on, and water table.

Soil features

The soils on this site usually have thick dark-colored surface layers with 15 to 35 percent coarse fragments. The surface texture of the fine earth fraction is usually fine sandy loam or sandy loam. The underlying materials are sandy with more than 60 percent rock fragments. These soils are very deep and somewhat poorly drained. Permeability is moderately rapid over very rapid and available water capacity is very low. Runoff is very low and hazard of erosion by water is slight. These soils have permanent year-round water tables at depths of 1 to 3 feet. They are characterized by cryic temperature and xeric moisture regimes.

Soil Series Correlated to this Ecological Site

Copperbasin, cool

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam (2) Extremely gravelly fine sandy loam
Family particle size	(1) Sandy
Drainage class	Moderately well drained to somewhat poorly drained
Permeability class	Moderate to moderately rapid
Soil depth	60 in

Surface fragment cover <=3"	10–40%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	1.3–2.6 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)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	25–70%
Subsurface fragment volume >3" (Depth not specified)	10–60%

Ecological dynamics

The dominant visual aspect of this site is an overstory of silver sagebrush with Idaho fescue in the understory. Composition by weight is approximately 55 to 65 percent grass and grass-like species, 10 to 20 percent forbs, and 20 to 30 percent shrubs.

During the last few thousand years, this site has evolved in a cool 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, Rocky Mountain elk, and lagomorphs.

Fire has historically occurred on the site at intervals of 20 - 40 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 1.1. This plant community is dominated by silver sagebrush and Idaho fescue. Tufted hairgrass and some wetland sedges such as wooly sedge can occur in the plant community where the water table is within 12 inches of the surface. A variety of dryland sedges, grasses, and forbs occur in minor amounts. A few other shrubs are present that include Woods' rose and shrubby cinquefoil occur in minor amounts. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 2400 pounds per acre (2688 kilograms per hectare) in a normal year. Production in a favorable year is 3000 pounds per acre (3360 kilograms per hectare). Production in an unfavorable year is 1800 pounds per acre (2016 kilograms per hectare). Structurally, cool season deep-rooted perennial grasses and grass-like species are more dominant than shrubs followed by perennial forbs.

FUNCTION:

The site provides food, cover, and brood raising habitat for waterfowl and other birds. Big game animals use the site in the late spring, summer, and fall. Livestock use is best in the summer and fall when the soil surface is drier. The site has some aesthetic, picnicking, and hunting value.

The site is resistant to degradation due to high production and available soil moisture, but can be degraded with improper grazing management and the lowering of the water table.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency and ungulate grazing, Idaho fescue can become decadent. This is apparent by dead centers in the crowns. Silver sagebrush can also become decadent. Forbs will be maintained in the community.

When fires become more frequent than historic levels (20-40 years), Idaho fescue can be reduced in the plant community. With continued short fire frequency, these species can be completely eliminated along with some forbs. Silver sagebrush usually will increase under frequent fire intervals because it sprouts from the crown, lateral roots, and rhizomes. The understory species may be replaced by a variety of annual and perennial forbs including noxious and invasive species. These fine fuels can cause fires to become more frequent. Kentucky bluegrass may invade the site. Woods' rose will usually be maintained in the plant community due to sprouting. Shrubby cinquefoil will be maintained in the community with low intensity fires but can be killed with high intensity or hot fires.

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 grass and grass-like species. With reduced vigor, recruitment of these species declines. As these species decline, an increase in silver sagebrush can occur and noxious and invasive plants will invade. Kentucky bluegrass may invade the site Forbs will increase.

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. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Prescribed burns on this site, however, need extremely careful planning due to the elevation and the species involved.

Weather influences:

Above normal precipitation in May and June can increase total annual production of the plant community but a majority of the available soil moisture for plant growth is predominantly from the water table. Temperatures often drive forage and seed production more than precipitation, although precipitation can indirectly influence water tables. Overall plant composition is normally not affected when perennials have good vigor.

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

Influence of Insects and disease:

Outbreaks can affect vegetation health. 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. 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 will use this site in the late 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 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 and lowering of the water table. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

State 2 to State 3. Develops through rangeland seeding.

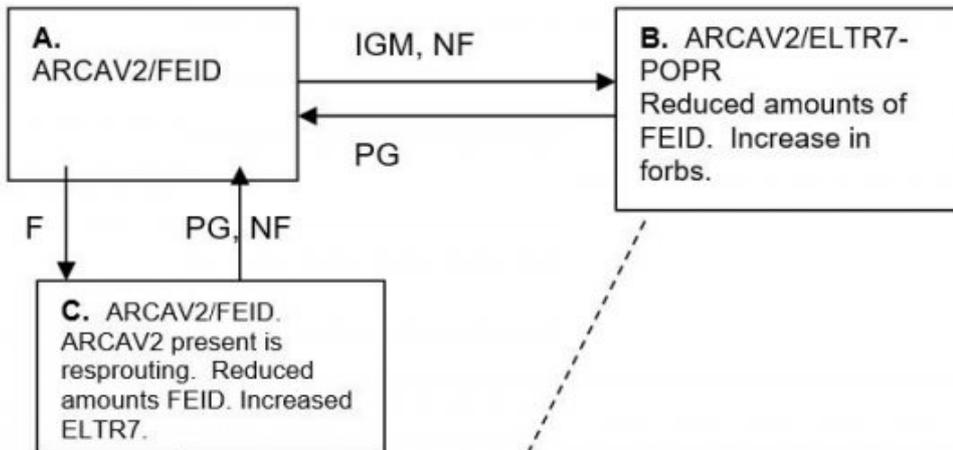
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is economically impractical to return this plant community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

Practice Limitations:

Slight to moderate limitations exist on this site for implementing vegetative management practices. Excessively wet periods may bring the water table at or near the soil surface. Grazing management should take into account this situation and should avoid grazing on wet soils. Slight to moderate limitations exist for implementing facilitating practices on this site. Fences, especially those having set wooden posts in the water table, may move around with winter freezing. There are moderate limitations for mechanical preparations of a seedbed for rangeland seeding due to wet soils.

State and transition model

STATE 1. Plant Community Phases



FF
&/or IGM
LWT

FF
&/or IGM
LWT

STATE 2.
ANNUALS, INVASIVE, & NOXIOUS
PLANTS.

IGM &/or FF

Loss of water table

UNKNOWN AND
NEW SITE

RS

STATE 3. Rangeland
Seeding.

LEGEND

- LWT- Lowered water table >5 feet
- IGM- Improper grazing management
- PG- Prescribed grazing
- FF- Frequent fire
- NF- No fire
- F- Fire
- RS- Rangeland seeding
- Community pathway (within states)
- - - - - Reversible transition
- Threshold
- Irreversible transition

PLANT LEGEND STATES 1 & 2

- ARCav2 - Mtn. Silver Sagebrush
- FEID - Idaho Fescue
- ELTR7 - Slender Wheatgrass
- POPR - Kentucky Bluegrass

State 1
State 1 Phase A

Community 1.1
State 1 Phase A

Reference Plant Community Phase. This plant community is dominated by mountain silver sagebrush and Idaho fescue. Tufted hairgrass and some wetland sedges such as wooly sedge can occur in the plant community where the water table is near 12 inches usually next to meadows or riparian areas. A variety of dry land sedges, grasses, and forbs occur in minor amounts. Natural fire frequency is 20-40 years.

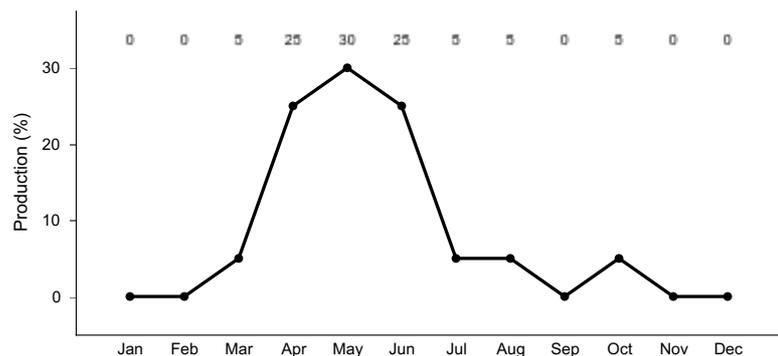


Figure 3. Plant community growth curve (percent production by month).
ID1205, FEID-PSSPS. State 1.

State 2
State 1 Phase B

Community 2.1
State 1 Phase B

This plant community is dominated by increased amounts mountain silver sagebrush. There are increased amounts of slender wheatgrass and dry land sedges such as swallowing sedge. Idaho fescue has been reduced in the stand and is in low vigor. Forbs have increased. Some Kentucky bluegrass has invaded the site along with some annuals. This state has developed due to improper grazing management and no fire.

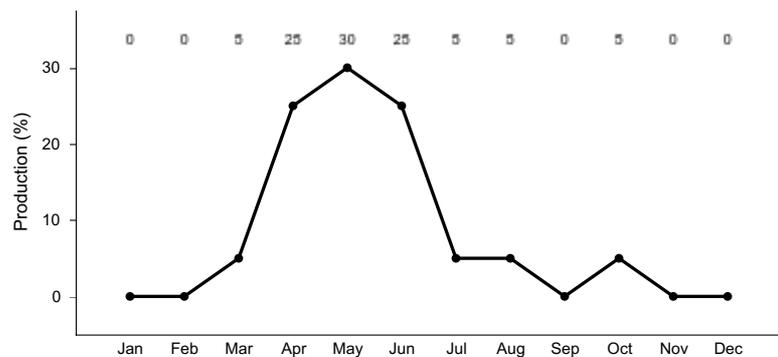


Figure 4. Plant community growth curve (percent production by month).
ID1205, FEID-PSSPS. State 1.

State 3
State 1 Phase C

Community 3.1
State 1 Phase C

This plant community is dominated by resprouting mountain silver sagebrush and Idaho fescue. Some fescue may have died due to fire, but the species is still the dominant understory plant. Slender wheatgrass and dry land sedges have increased slightly. Some annuals may have invaded the site. This plant community is the result of wildfire.

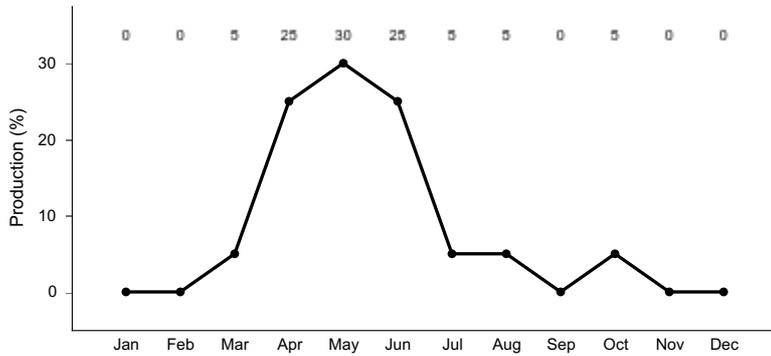


Figure 5. Plant community growth curve (percent production by month). ID1205, FEID-PSSPS. State 1.

**State 4
State 2**

**Community 4.1
State 2**

This plant community is dominated by annual grasses and forbs including invasive and noxious plants. Small amounts of root sprouting shrubs such as mountain silver sagebrush and Woods' rose may still be present in the plant community but annuals or Kentucky bluegrass are controlling the site. Some soil loss has occurred. This state has developed due to frequent fires and/or improper grazing management and the lowering of the water table below 5 feet. Usually, the water table is lowered by the adjacent water channel being incised. This may be caused by improper grazing management or changes in upstream watershed conditions increasing the intensity or duration of spring runoff. This site has crossed a threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

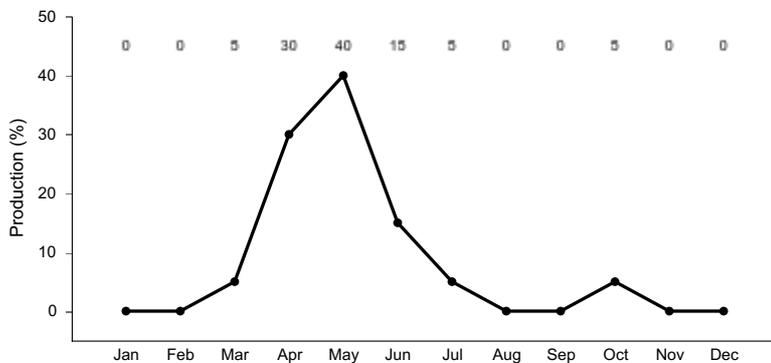


Figure 6. Plant community growth curve (percent production by month). ID1202, ANNUALS. State 2.

**State 5
State 3**

**Community 5.1
State 3**

Rangeland Seeding. This plant community is dominated by seeded species. Seeded species may be introduced or natives that mimic Phase A. Moderate limitations exist for seeding due to soil wetness.

**State 6
Unknown New Site**

**Community 6.1
Unknown New Site**

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 and total loss of the water table.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This ecological site provides diverse habitat for wetland and upland wildlife species. The seasonal hydrology results in abundant forage attracting invertebrate and vertebrate animals to this ecological site. Habitat is provided for resident and migratory animals including western toad, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, 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. Native reptiles and amphibians are reliant on these poorly drained sites on a seasonal basis during the year. Loss of site hydrology significantly reduces the habitat value of this site and also adjacent ecological sites. Area sensitive species include western toad, Greater sage-grouse, and sharp-tailed grouse. Open water is seasonal, only being provided by seasonal runoff, ponding, flooding, seasonal high water table, and natural springs.

State 1 Phase 1.1 – Mountain Silver Sagebrush/ Idaho Fescue Reference Plant Community (RPC): The RPC provides a diversity of grasses and forbs used by native insect communities who assist in pollination of the plant community. The insects are food for the many predator species utilizing the site. The reptile and amphibian community is represented by common sagebrush lizard, rubber boa, western rattlesnake, western toad, and northern leopard frog. A diverse amphibian population is a key indicator of good ecological health on this site. Loss of hydrology will limit or exclude amphibians from this ecological site. Sage-grouse utilize the meadows as summer and fall brood-rearing habitat. The plant community supports spring, summer, and fall forage for elk and spring and fall forage for mule deer. A diverse small mammal population including deer mouse, meadow vole, Merriam's shrew, and yellow-bellied marmot may utilize the site on a seasonal basis.

State 1 Phase 1.2 - Mountain Silver Sagebrush/ Slender wheatgrass/ Kentucky Bluegrass Plant Community: This phase has developed due to improper grazing management and no fire. An increase in mountain silver sagebrush has contributed to a decline in native understory vegetation. 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 quality and quantity would be reduced in the summer and fall. Kentucky bluegrass can provide desirable forage for large herbivores when managed properly. A diverse small mammal population including deer mouse, meadow vole, Merriam's shrew, and yellow-bellied marmot may utilize the habitat on a seasonal basis.

State 1 Phase 1.3 - Mountain Silver Sagebrush/ Idaho Fescue/ Slender Wheatgrass Plant Community: This plant community is the result of wildfire. Under proper grazing management the plant community would be developing to be similar to the State 1 Phase 1.1 plant community. When the sagebrush community develops, the animal community would develop over time to be similar to the State 1 Phase 1.1 animal community.

State 2 –Annuals, Invasive and Noxious Plant Community: This state has developed due to frequent fires and/or improper grazing management and the lowering of the water table. Pollinators may not be sustained throughout all seasons. The loss of historic hydrology will limit or exclude use of the site by amphibians and many reptiles. Suitable habitat for the northern leopard frog, a species of concern, would not be provided. Habitat for grassland bird species would increase if the plant community is managed properly. If the plant community is not managed properly, nesting for grassland birds would be limited. Birds of prey (northern harrier and Ferruginous hawk) may range throughout these areas looking for prey species. The grazing season for mule deer and elk would be shortened due to poor vigor and production of herbaceous vegetation. Kentucky bluegrass, when managed properly, can provide desirable forage for deer and elk. Small mammal populations and diversity would be reduced due to reduced vertical structure and vulnerability to predators.

Grazing Interpretations.

This site is suitable for summer and fall grazing by livestock. Grazing management needs to avoid wet soils to reduce 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

The soils in this site are in hydrologic group D. They have high runoff potential.

Recreational uses

This site is often associated with open water and provides fishing and picnicking opportunities. The site offers natural beauty for photography while the forbs are blooming. There are limited opportunities for hunting.

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

Type locality

Location 1: Custer County, ID	
Township/Range/Section	T10N R13E S36
General legal description	SE 1/4

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.

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	06/12/2009
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.
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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 shrubs and are not extensive.
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3. **Number and height of erosional pedestals or terracettes:** both are rare on the site. In areas where flow patterns and/or rills are present, a few pedestals may be expected.
-

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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.
-
5. **Number of gullies and erosion associated with gullies:** none.
-
6. **Extent of wind scoured, blowouts and/or depositional areas:** these are 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.
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 4 to 6 but needs to be tested.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The A or A1 horizon is typically 3 to 5 inches thick and very dark grayish brown moist. Structure ranges from weak fine to medium platy. Soil organic matter (SOM) ranges from 1 to 2 percent.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** perennial bunchgrass and sedges slow run-off and increase infiltration.
-
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.
-
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/grass-like
- Sub-dominant: medium shrubs
- Other: forbs
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** mountain silver sagebrush and Idaho fescue can become decadent in the absence of normal fire frequency and ungulate grazing. This is evident by dead centers in the crowns or dead branches.
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14. **Average percent litter cover (%) and depth (in):** additional litter cover data is needed but is expected to be 10-20 percent to a depth of 0.1 inches. Under mature shrubs litter is >0.5 inches deep and is 90-100 percent ground cover.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 2400 pounds per acre (2688 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses and grass-like species produce 55-65 percent of the total production, forbs 10-20 percent and shrubs 20-30 percent.

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 sixweeks fescue, bulbous bluegrass, Kentucky bluegrass, rush skeletonweed, musk and scotch thistle, diffuse and spotted knapweed, leafy spurge, dalmation toadflax, and yellow star thistle.

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