

## Ecological site R013XY020ID Loamy Tall Brush 16-22 PZ ACGL/BRMA4

Last updated: 2/13/2025  
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): 013X–Eastern Idaho Plateaus

013X–Eastern Idaho Plateaus

Precipitation or Climate Zone: 16-22" P.Z.

<https://soils.usda.gov/survey/geography/mlra/index.html>

### Classification relationships

Land Resource Unit: B (Northwestern Wheat and Range)

MLRA: 13 (Eastern Idaho Plateaus)

EPA EcoRegion: Level III (Middle Rockies)

### 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 = <32% in surface mineral 4".

Site does not have an argillic horizon with > 35% clay

### Associated sites

R013XY005ID	Loamy 16-22 PZ ARTRV/FEID-PSSPS
R013XY014ID	Shallow Stony 12-20 PZ ARAR8/PSSPS
R013XY016ID	Moist Mountain Loam 20+ PZ POTR
R013XY019ID	Stony Loam 16-22 PZ ARTRV/PSSPS
R013XY022ID	Subalpine Loamy 16-22 PZ ARTRS2/ELTR7-BRMA4
R013XY031ID	Steep Stony North 16-22 PZ ARTRV/FEID
R013XY020ID	Loamy Tall Brush 16-22 PZ ACGL/BRMA4

### Similar sites

R013XY005ID	Loamy 16-22 PZ ARTRV/FEID-PSSPS
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Acer glabrum</i>
Herbaceous	(1) <i>Bromus marginatus</i>

## Physiographic features

This site occurs on gentle to steep, concave mountain slopes and canyons slopes. Slopes vary from 4 to 60 percent, but are predominately 20 to 60 percent. It occurs on all aspects, but mostly north and east. Elevations range from 5000 to 7500 feet (1525 to 2300 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Mountain (2) Canyon
Flooding frequency	None
Ponding frequency	None
Elevation	5,000–7,500 ft
Slope	20–60%
Water table depth	60 in
Aspect	Aspect is not a significant factor

## Climatic features

MLRA 13, the Eastern Idaho Plateaus, is part of the Northwestern Wheat and Range Region. Its elevation ranges from 4209 to 9331 feet above sea level, with an average elevation of 5787 feet. The average annual precipitation is 16.41 inches, with a range of 13.56 to 18.75 inches, based on ten long term climate stations located throughout the MLRA. A spike in precipitation amount often occurs in late spring, usually in May.

Temperatures vary widely in the MLRA throughout the year. A maximum temperature of 103° Fahrenheit occurred at the McCammon climate station (# 105716; elevation 4770 feet), while a minimum of -41° was recorded at the Kilgore station (#104908). At all stations temperatures throughout the year are usually below the national average. Kilgore also recorded the greatest annual snowfall amount of 217 inches. The average temperature is 41.4 degrees F. with an average high of 55.3 degrees and an average low of 27.5 degrees.

The frost-free period ranges from 64 to 90 days, while the freeze-free period can be 98 to 123 days.

**Table 3. Representative climatic features**

Frost-free period (average)	90 days
Freeze-free period (average)	123 days
Precipitation total (average)	19 in

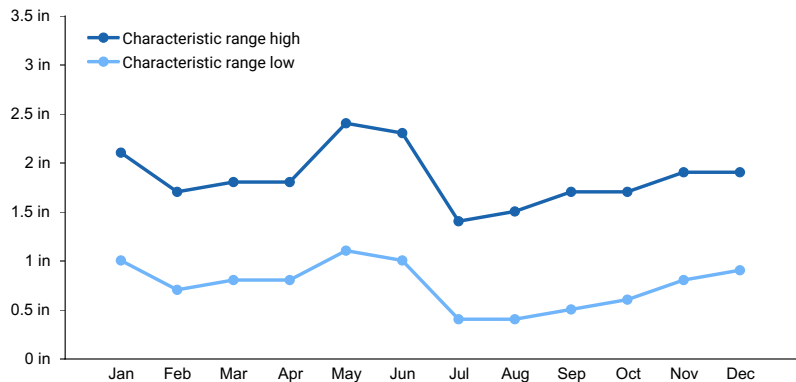


Figure 1. Monthly precipitation range

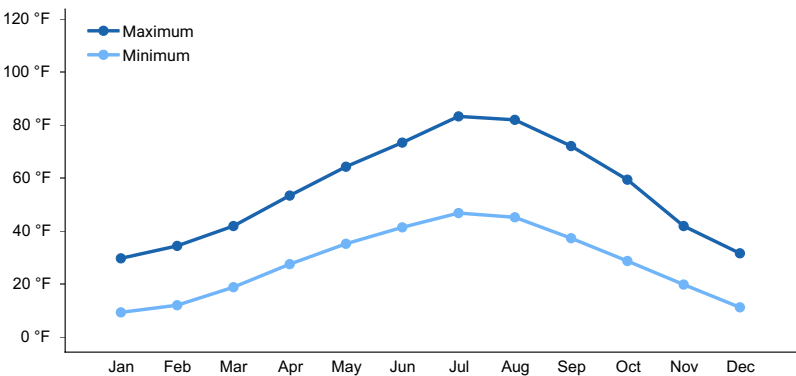


Figure 2. Monthly average minimum and maximum temperature

### Influencing water features

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

### Soil features

The soils of this site are very deep, well drained, silt loam and loam. The surface layer is a thick dark colored due to the high organic material. They are underlain by medium textured layers that may contain gravel and cobbles. Some soils may have lime horizons below 50 inches, but the overlying soil is usually non-calcareous. Intake rate is moderate and water movement through the soil is moderate. Roots readily penetrate the soil. These soils have a moderate available water holding capacity (AWC). Rock fragments are variable throughout the profile, but are less than 35 percent by volume. Under proper management, these soils have little surface runoff and slight to no erosion. The soils are characterized by a xeric soil moisture regime and a cryic soil temperature regime.

Soil Series Correlated to this Ecological Site

Dranburn  
Moonlight  
Robin

Table 4. Representative soil features

Surface texture	(1) Silt loam
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	60 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%

Available water capacity (0-40in)	6.1–9 in
Soil reaction (1:1 water) (0-40in)	4.5–5.5
Subsurface fragment volume <=3" (Depth not specified)	5–15%

## Ecological dynamics

### Ecological Dynamics of the Site:

The dominant visual aspect of this site is one of tall mountain shrubs, dominated by Rocky Mountain maple. The composition by weight is 15 to 25 percent grasses, 5 to 15 percent forbs, and 65 to 75 percent 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, moose, and lagomorphs.

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 Rocky Mountain maple with mountain brome in the understory. Subdominant species include blue wildrye, sedges, slender wheatgrass, sticky geranium, lupine, common chokecherry, and mountain snowberry. A wide variety of other grasses, forbs, and shrubs occur in small amounts. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 3000 pounds per acre (3360 kilograms per hectare) in a normal year. Production in a favorable year is 3500 pounds per acre (3920 kilograms per hectare). Production in an unfavorable year is 1800 pounds per acre (2016 kilograms per hectare). Structurally, tall shrubs are very dominant, followed by cool season deep rooted perennial bunchgrasses being more dominant than perennial forbs.

### FUNCTION:

This site is well suited for mule deer, Rocky Mountain elk, moose, raptors, forest grouse, snowshoe hare, coyote, quail, squirrels, bobcat, and other wildlife in spring, summer, and early fall. It is also well suited for livestock use in the summer and fall. The site has high value of hunting, hiking, photography, and some limited opportunities for camping and picnicking.

Due to the relatively high rainfall, elevation, and favorable cooler growing season, the site is fairly resistant to disturbances that can potentially degrade it.

Due to the relatively high production and deep soils, infiltration is normally high and runoff moderately low. Runoff, when it does occur is non-erosive except during high intensity convection storms. Snow accumulates on the site due to high elevation and presence of tall shrubs.

### Impacts on the Plant Community.

#### Influence of fire:

In the absence of normal fire frequency, shrubs can gradually increase. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, Rocky Mountain maple may displace most of the understory species. If fire is absent for a long period of time, Douglas fir can invade the site if a seed source is in the vicinity. Rocky Mountain juniper can also invade under these conditions if a seed source is in the vicinity but it will not become

dominant due to shade intolerance.

When fires become more frequent than historic levels (20-50 years), Rocky Mountain maple and other sprouting shrubs may gradually be reduced. With continued short fire frequency, most shrubs will be eliminated along with many of the desirable understory species such as mountain brome and pine reedgrass. These species may be replaced by cheatgrass (at lower elevations), slender wheatgrass, and Kentucky bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants.

Influence of improper grazing management:

Season-long grazing can be very detrimental to this site. Excessive utilization of the understory results in accelerating the increase of Rocky Mountain maple and many other tall shrubs. An increase in tall shrubs accelerates the reduction of the understory species. Excessive utilization of tall shrubs usually results in the twigs and leaves to grow above where the browsing is occurring and forage is reduced.

Continued improper grazing management influences fire frequency by increasing fine fuels. If this continues and cheatgrass or other annuals invade the site, fires will become more frequent.

Influence of Insects and disease:

Outbreaks can affect vegetation health. Rocky Mountain maple has good resistance to most insects and disease.

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. The site provides forage and cover for a wide variety of small animals and birds.

Watershed:

Decreased infiltration and increased runoff occur with the removal of most of the tall shrubs by either heavy improper grazing management or very frequent fire. The long-term effect is a transition to a different state.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops in the absence of fire and with improper grazing management.

Phase A to C. Results from a fire or prescribed burning.

Phase B to C. Results from fire.

Phase B to A. Occurs with prescribed grazing and brush management or prescribed burning.

Phase C to A. Results from prescribed grazing and no fire.

Phase A to D. Results from absence of fire for a long period and a Douglas fir seed source in the vicinity.

Phase D to A. Results from fire.

Phase C to B. Results from no fire and improper grazing management.

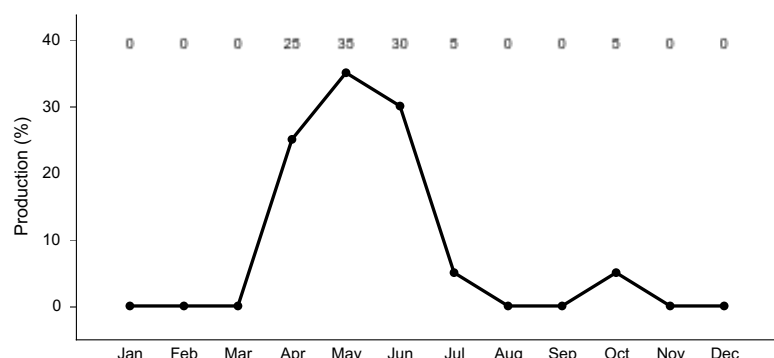
State 1 Phase B and C to State 2. Develops through improper grazing management and frequent fire. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices

State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by improper

## Community 1.1

## State 1 Phase A

Reference Plant Community Phase. This plant community is dominated by Rocky Mountain maple with mountain brome in the understory. Subdominant species include blue wildrye, sedges, slender wheatgrass, sticky geranium, lupine, common chokecherry, and mountain snowberry. A wide variety of other grasses, forbs, and shrubs occur in small amounts. Natural fire frequency is 20-50 years.



**Figure 3. Plant community growth curve (percent production by month).**  
ID0805, B13 ARTRV . State 1.

## Community 1.2 State 1, Phase B

This plant community is dominated in the overstory by increasing amounts of Rocky Mountain maple and common chokecherry. There are reduced amounts of most bunchgrasses including mountain brome. All bunchgrasses are in reduced amounts and in low vigor. Many forb species have increased and Kentucky bluegrass may have invaded the site. This state has developed due to fire frequency being much longer than normal and improper grazing management.

## Community 1.3 State 1, Phase C

This plant community is dominated by mountain brome with slender wheatgrass and blue wildrye. There is a wide variety of other grasses and forbs in small amounts. Some grasses have been killed due to fire. Most shrubs are absent from the site due to recent fire, except for resprouters such as Rocky Mountain maple, Scoulers willow, mountain snowberry, and rabbitbrush. Kentucky bluegrass may invade and increase. The community is a result of recent fire.

## Community 1.4 State 1, Phase D

This plant community is dominated by Rocky Mountain Douglas fir. There is a variety of grasses, forbs and shrubs in the understory in minor amounts. This plant community is the result of fire frequency being much longer than normal and a Rocky Mountain Douglas fir seed source in the vicinity.

## Pathway 1.1A Community 1.1 to 1.2

Develops in the absence of fire and with improper grazing management.

## Pathway 1.1B Community 1.1 to 1.3

Results from a fire or prescribed burning.

## Pathway 1.1C Community 1.1 to 1.4

Results from absence of fire for a long period and a Douglas fir seed source in the vicinity.

**Pathway 1.2A**  
**Community 1.2 to 1.1**

Occurs with prescribed grazing and brush management or prescribed burning.

**Pathway 1.2B**  
**Community 1.2 to 1.3**

Results from fire.

**Pathway 1.3A**  
**Community 1.3 to 1.1**

Results from prescribed grazing and no fire.

**Pathway 1.3B**  
**Community 1.3 to 1.2**

Results from no fire and improper grazing management.

**Pathway 1.4A**  
**Community 1.4 to 1.1**

Results from fire.

**State 2**  
**State 2**

This plant community is dominated by annuals and some perennial forbs. There may be a variety of invasive forbs and some noxious plants may have invaded the site. Some soil loss has occurred. The community has developed due to continued improper grazing management and frequent fire. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

**State 3**  
**State 3**

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 or frequent fires. It is economically impractical to return this state to State 1 with accelerated practices.

**Transition T1A**  
**State 1 to 2**

State 1 Phase B and C to State 2. Develops through improper grazing management and frequent fire. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices

**Transition T2A**  
**State 2 to 3**

Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management or frequent fires cause this state to cross the threshold and retrogress to a new site with reduced potential. It is economically impractical to return this state to State 1 with accelerated practices



## **Additional community tables**

### **Animal community**

Wildlife Interpretations.

#### **Animal Community – Wildlife Interpretations**

Mule deer and elk are large herbivores using this site. The rangeland provides seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, shrews, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, and mountain bluebirds. Encroachment of noxious and invasive plant species (cheatgrass and rush skeletonweed) in isolated areas can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water features are sparse provided by artificial water catchments and springs.

**State 1 Phase A –Rocky Mountain Maple/ Common Chokecherry/ Mountain Brome Reference Plant Community (RPC)** This plant community provides a diversity of grasses, forbs, shrubs, and trees used throughout the growing season by native insect communities that assist in pollination. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, Great Basin spadefoot toad, 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. The diverse vertical structure offers habitat for many bird species including mountain bluebird, rock wren, grouse, and flycatchers. The plant community provides important forage for mule deer and elk in the spring, fall, and winter. Chokecherry is a preferred browse for mule deer and elk. Chokecherry fruit is preferred food for many birds and small mammals. The site provides thermal cover and young of year cover for mule deer and elk. A small mammal population including golden-mantled ground squirrels, jackrabbits, deer mice, and Great Basin pocket mice would utilize this plant community.

**State 1 Phase 1.2 – Rocky Mountain Maple/ Common Chokecherry Plant Community:** This phase has developed due to fire return interval being much longer than normal and/or improper grazing management. An increase in forbs and shrubs to the plant community would result in a similar insect and reptile community as in State 1 Phase 1.1. Bird species utilizing the site would be similar to those in State 1 Phase 1.1. Mule deer, elk, and moose would frequent this site. The site would provide thermal cover and young of year cover for large mammals. A small mammal population including golden-mantled ground squirrels, jackrabbits, deer mice, and Great Basin pocket mice would utilize this plant community.

**State 1 Phase 1.3- Mountain Brome/ Slender Wheatgrass/ Blue Wildrye Plant Community:** This phase has developed due to fire. The plant community, dominated by herbaceous vegetation with sparse shrub and tree cover provides less vertical structure for animals. Insect diversity would be reduced with the loss of most shrubs, but a native forbs plant community similar to that of State 1 Phase 1.1 would still support select pollinators. An increase of mountain snowberry would add spring and summer pollinator habitat to the site. Until mountain maple and mountain snowberry are established, diversity and populations of reptiles would decline. This plant community provides limited brood-rearing habitat for sage-grouse if site is adjacent to sagebrush cover. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Mountain snowberry would provide good forage for mule deer and elk. Winter habitat for mule deer and elk would be reduced or eliminated with the loss of rocky mountain maple and common chokecherry. Small mammal diversity and populations would be similar to that in State 1 Phase 1.1 and 1.2. The fruit of mountain snowberry provides desirable food for ruffed grouse, magpies, and small mammals.

**State 1 Phase 1.4 – Douglas Fir Plant Community:** This plant community is the result of fire return intervals being much longer than normal. The reduced shrub and herbaceous understory results in lower diversity and numbers of insects. The reptile community will be similar to that in State 1 Phase 1.1, and includes sagebrush lizard and western rattlesnake. The reduced diversity of insects and understory cover may reduce quality of food and cover for reptile populations. As Douglas fir increases, habitat cover for shrub dependant birds will decline and the bird species dependant on forest habitat will increase. Over time bird species may include hairy woodpeckers, flickers, jays, forest grouse, and mountain chickadee. Quality of winter forage for mule deer and elk is reduced due to the loss of vigor and production of rocky mountain maple and common chokecherry. As Douglas fir encroachment occurs, the site will continue to provide thermal and young of year cover for large mammals. A small mammal

population including golden-mantled ground squirrels, jackrabbits, deer mice, and Great Basin pocket mice may utilize this plant community.

**State 2 – Annuals/ Forbs:** This plant community is the result frequent fire and/or improper grazing management. The site offers limited horizontal and vertical structure for habitat. Insects, birds, and mammals described in phases above would not be supported in this state. Big game animals may utilize the site in early spring when invasive annuals are more palatable. Hunting success of birds of prey would increase due to poor cover conditions provided for small mammals.

#### Grazing Interpretations.

It is also well suited for livestock use in the summer and fall. If brush becomes dense, it may limit livestock movement.

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 in this site are mostly grouped into hydrologic group B. They have moderately low runoff potential.

### Recreational uses

The site has high value of hunting, hiking, photography, and some limited opportunities for camping and picnicking.

### Wood products

none.

### Other products

none.

### Other information

Field Offices

American Falls, ID  
Blackfoot, ID  
Burley, ID  
Driggs, ID  
Idaho Falls, ID  
Malad, ID  
Pocatello, ID  
Rexburg, ID  
Soda Springs, ID  
St. Anthony, ID

Revision Notes: “Previously Approved” Provisional

This Provisional ecological site concept has passed Quality Control (QC) and Quality Assurance (QA) to ensure that the site meets the 2014 NESH standards for a Provisional ecological site description. This is an updated “Previously Approved” ESD that represents a first-generation tier of documentation that, prior to the release of the 2014 National Ecological Site Handbook (NESH), met all requirements as an “Approved” ESD as laid out in the 1997

(rev.1, 2003) National Range and Pasture Handbook (NRPH). The document fully described the Reference State and Community Phase in the State-and-Transition model. All other alternative states are at least described in narrative form. The “Previously Approved” ESD has been field-tested for a minimum of five years and is a proven functional document for conservation planning. The “Previously Approved” ESD does not contain all tabular and narrative entries as required in the current “Approved” level of documentation, but it is expected that the “Previously Approved” ESD will continue refinement toward an “Approved” status.

#### Site Development and Testing Plan:

Future work, as described in a Project Plan, is necessary to validate the information in this Provisional Ecological Site Description. This will include field activities to collect low-, medium-, and high-intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. The final field review, peer review, quality control, and quality assurance reviews of the ESD will be required to produce the final document.

### 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

Lee Brooks, Range Management Specialist, IASCD

Kristen May, Resource Soil Scientist, NRCS, Idaho

### Type locality

Location 1: Bannock County, ID	
Township/Range/Section	T6S R35E S23

### 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/feis](http://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

Kirt Walstad, 2/13/2025

### 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	05/02/2008
Approved by	Kirt Walstad
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. Rills are most likely to occur on soils with silt loam surface textures.

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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 tall shrubs and are not extensive.

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- 3. Number and height of erosional pedestals or terracettes:** both are rare on this site. In areas where flow patterns and/or rills are present, a few pedestals may be expected. When present, terracettes occur on the site uphill from tall shrub bases and large bunchgrasses. They are not extensive.

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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 5-15 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:** usually not present. 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. Stones on the surface help reduce fine litter movement.

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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):** structure ranges weak and moderate very fine, fine and medium granular to weak fine, medium and coarse subangular blocky. Soil organic matter (SOM) ranges from 60 to 95 percent. Surface color is generally very dark brown. The A or A1 horizon is typically 3 to 11 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. Tall shrubs catch blowing snow in the interspaces and significantly reduce raindrop impact.
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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** not present.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: tall shrubs
- Sub-dominant: cool season deep-rooted perennial bunchgrasses
- Other: perennial forbs
- 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):** Rocky Mountain maple will become decadent in the absence of normal fire frequency. Grass and forb mortality will occur as tall shrubs increase.
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14. **Average percent litter cover (%) and depth ( in):** additional litter cover data is needed but is expected to be 40 to 60 percent to a depth of 0.2 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 3000 pounds per acre (3360 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 15-25 percent of the total production, forbs 5-15 percent and shrubs 65-75 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 rush skeletonweed, tansymustard, Jim Hill tumbledustard, yellow salsify, musk and

scotch thistle, diffuse and spotted knapweed, peppergrass, broom snakeweed, Canada thistle, 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.
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