

# Ecological site R044BP810MT

## Shallow Grassland

Last updated: 8/26/2019  
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### 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): 044B—Central Rocky Mountain Valleys

44B Central Rocky Mountain Valleys Major Land Resource Area (MLRA) 44B, Central Rocky Mountain Valleys, is nearly 3.7 million acres of Southwest Montana. This MLRA borders 2 MLRAs: 43B Central Rocky Mountains and Foothills, and MLRA 46 Northern and Central Rocky Mountain Foothills. The major watersheds of this MLRA are the Missouri and Yellowstone Rivers along with their associated headwaters such as the Beaverhead, Big Hole, Jefferson, Ruby, Madison, Gallatin, and Shields Rivers. Limited portions of the MLRA are west of the Continental Divide along the Clark Fork River. These waters allow for extensive irrigation for crop production in an area that would generally be only compatible with rangeland and grazing. The Missouri River and its headwaters are contained behind several reservoirs used for irrigation water, hydroelectric power, and municipal water. The primary land use of this MLRA is production agriculture (grazing, small grain production, and hay) with limited mining. Urban Development is also high. MRLA 44B consists of 7 Climate based Land Resource Units (LRUs). Annual precipitation ranges from a low of 9" to a high near 24". The driest areas tend to be in the valley bottoms of southwest Montana in the rain shadow of the mountains. The wettest areas tend to be near the edges of the MLRA where it borders with MLRA 43B. Frost Free periods also vary greatly with from less than 30 days in the Big Hole Valley to approximately 110 days in the warm valleys along the Yellowstone River and Missouri River Headwaters. MLRA 44B's plant communities are highly variable however are dominated by a cool season grass and shrub steppe community on the rangeland and a mixed coniferous forest in the mountains. Warm season grasses occupy an extremely limited extent in this MLRA. Most subspecies of Big Sagebrush are present, to some extent, across the MLRA.

### Ecological site concept

- Site does not receive any additional water
- Soils are o Not saline or saline-sodic o Not strongly or violently effervescent ( $\text{CaCO}_3 > 14\%$ ) in surface mineral 18cm o Shallow depth (less than 50cm (20 in) to bedrock, lithic, or paralithic root restrictive layer o Less than 5% stone and boulder cover (15% max)
- Soil surface texture ranges from sandy loam to clay loam in surface mineral 4"
- An area of dissected mountain valleys. The valleys are typically bordered by mountains trending north to south.
- Site Landform: hillslopes, buttes, escarpment
- Parent material is typically colluvium and/or residuum
- Moisture Regime: ustic
- Temperature Regime: frigid to cryic
- Dominant Cover: rangeland (grass dominated)
- Elevation Range: 3800-6850 (Representative Range 4500-6000)
- Slope range: 0-60 (often less than 45%)

Table 1. Dominant plant species

|            |               |
|------------|---------------|
| Tree       | Not specified |
| Shrub      | Not specified |
| Herbaceous | Not specified |

### Physiographic features

Table 2. Representative physiographic features

|           |                                                     |
|-----------|-----------------------------------------------------|
| Landforms | (1) Valley > Fan remnant<br>(2) Valley > Escarpment |
| Elevation | 1,160 – 2,090 m                                     |
| Slope     | 0 – 50 %                                            |

## Climatic features

Table 3 Representative climatic features

|                                            |             |
|--------------------------------------------|-------------|
| Frost-free period (characteristic range)   | 20-80 days  |
| Freeze-free period (characteristic range)  | 60-110 days |
| Precipitation total (characteristic range) | 280-380 mm  |
| Frost-free period (actual range)           | 10-90 days  |
| Freeze-free period (actual range)          | 30-130 days |
| Precipitation total (actual range)         | 280-480 mm  |
| Frost-free period (average)                | 50 days     |
| Freeze-free period (average)               | 90 days     |
| Precipitation total (average)              | 360 mm      |

- (1) WHITE SULPHUR SPRNGS 2 [USC00248930], White Sulphur Springs, MT
- (2) WISDOM [USC00249067], Wisdom, MT
- (3) HELENA RGNL AP [USW00024144], Helena, MT
- (4) DEER LODGE 3 W [USC00242275], Deer Lodge, MT
- (5) DILLON AP [USW00024138], Dillon, MT
- (6) LIVINGSTON MISSION FLD [USW00024150], Livingston, MT
- (7) BOZEMAN MONTANA ST U [USC00241044], Bozeman, MT
- (8) ENNIS [USC00242793], Ennis, MT
- (9) BOULDER [USC00241008], Boulder, MT
- (10) LAKEVIEW [USC00244820], Lima, MT

## Influencing water features

## Soil features

**Table 4. Representative soil features**

|                            |                               |
|----------------------------|-------------------------------|
| Parent material            | (1) Alluvium<br>(2) Colluvium |
| Depth to restrictive layer | 50 cm                         |

## Ecological dynamics

1.1 Midstatured bunchgrasses dominant (bluebunch, rough fescue, and/or spike fescue), Shrubs are a relatively small component.

1.1a extended drought, improper grazing, climate change, catastrophic fire (limited on this site)

1.2 Midstatured bunchgrasses subdominant to increaser bunchgrasses such as needle-and-thread or Idaho fescue. Shrubs increasing, clubmoss possible (limited extent), mat forming forbs increasing

1.2a proper grazing management, favorable growing conditions, time

T1A poor post settlement grazing (late 1800's), drought with improper grazing, multiple spring grazing, fire suppression

T1B sodbusting, introduction of tame pasture species and other invasive plants, overgrazing, drought, heavy human disturbance, extreme fire (multiple years or very intense)

T1C poor post settlement grazing (late 1800's), drought with improper grazing, multiple spring grazing and/or long term overgrazing, fire suppression

T3A sodbusting, invasive plants, overgrazing, extended drought, adjacent to construction or disturbance event

2.1 Mixed grass dominated site (needle-and-thread and Idaho fescue), midstatured bunchgrasses existent under shrub canopy, possible conifer encroachment, forbs (scarlet globemallow, hoods phlox, mat forming forbs) and shrubs increase (broom snakeweed, big sagebrush)

2.1a improper grazing management, drought, fire, climate change

2.2 Needle-and-thread and Idaho fescue losing dominance to Sandberg bluegrass and Junegrass. Decreaser bunchgrasses very rare and limited under shrub canopy. Broom snakeweed and Fringed sagewort beginning to replace shrub component

2.2a proper grazing management, time, Integrated Pest Management, brush management

3.1 Shortgrass State lacks midstatured bunchgrasses, Sandberg bluegrass and Junegrass dominant grasses, increaser shrubs nearly replace larger shrub species. Remaining larger shrub species heavily hedged.

T2A overgrazing, introduction of weeds, drought, heavy human disturbance

R2A fire, range seeding, timely moisture, proper grazing management, IPM

R3B Possibly not feasible, range seeding, time, proper grazing management, IPM

T2B sodbusting, introduction of tame pasture species and other invasive plants, overgrazing, extended drought, adjacent to construction or disturbance event, extreme fire (multiple years or very intense)

4.1 Invaded State may resemble reference however contains noxious or invasive weeds such as cheatgrass or knapweed. Conifer encroachment common.

R3A range seeding, time, proper grazing management, IPM

R4A IPM, timely moisture, grazing management, brush management, range seeding

R4B IPM, range seeding, timely moisture, grazing management, brush management, range seeding

## State and transition model

## Additional community tables

## Approval

Scott Woodall, 8/26/2019

## 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)                    |                   |
| Contact for lead author                     |                   |
| Date                                        |                   |
| Approved by                                 |                   |
| Approval date                               |                   |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

**1. Number and extent of rills:**

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**2. Presence of water flow patterns:**

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**3. Number and height of erosional pedestals or terracettes:**

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**4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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**5. Number of gullies and erosion associated with gullies:**

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**6. Extent of wind scoured, blowouts and/or depositional areas:**

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**7. Amount of litter movement (describe size and distance expected to travel):**

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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):**

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**9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:

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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):

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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:

Sub-dominant:

Other:

Additional:

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13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

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14. Average percent litter cover (%) and depth ( in):

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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

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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:

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17. Perennial plant reproductive capability:

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