

# Ecological site R044BP819MT Upland Sagebrush Shrubland

Last updated: 8/26/2019  
Accessed: 05/06/2024

## 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.

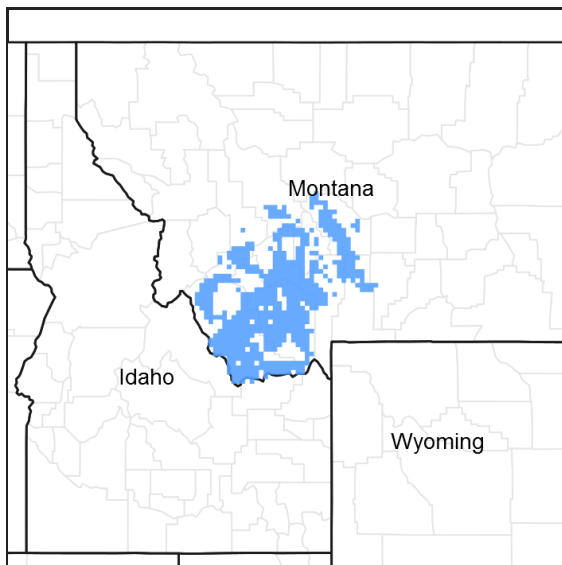


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

## 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.

MLRA 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 Generally not saline or saline-sodic (limited extent)
  - o Moderately deep, deep, or very deep
  - o Typically 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, fan remnants, terraces
- Parent material is tertiary valley fill and recent alluvium
- Moisture Regime: ustic
- Temperature Regime: frigid to cryic
- Dominant Cover: rangeland (grass dominated)
- Elevation Range: 3800-6850
- Slope: 0-60% (typically less than 25%)

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> (2) <i>Artemisia tripartita</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i> (2) <i>Festuca campestris</i>

## Physiographic features

**Table 2. Representative physiographic features**

Landforms	(1) Valley > Fan remnant (2) Valley > Fan piedmont (3) Valley > Eroded fan remnant
Elevation	1,158–2,088 m
Slope	4–25%

## Climatic features

**Table 3. Representative climatic features**

Frost-free period (characteristic range)	24-80 days
Freeze-free period (characteristic range)	60-114 days
Precipitation total (characteristic range)	279-381 mm
Frost-free period (actual range)	10-93 days
Freeze-free period (actual range)	26-129 days
Precipitation total (actual range)	279-483 mm

Frost-free period (average)	52 days
Freeze-free period (average)	91 days
Precipitation total (average)	356 mm

## Climate stations used

- (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 (2) Colluvium
-----------------	-------------------------------

## Ecological dynamics

1.1 Mid-statured bunchgrasses dominant plant type. Bluebunch tends to be the most common however Rough fescue or Spike fescue are possible as mid-statured bunchgrasses. Minor component of forbs growing between shortgrasses. Forbs will rarely exceed 10% composition by weight. Big sagebrush species dominant shrub (Wyoming, Bonneville, and Mountain big sagebrush subspecies may be present).

1.1a Plant community experiences long term drought, wildfire (low intensity), untimely grazing event

1.2 Mid-statured bunchgrasses share dominance with short bunchgrasses. Sagebrush increases as well as forbs likely to increase. Limited tree cover may exist where fire has been suppressed for extended periods. Bare ground is expected to increase slightly

1.2a Plant community receives timely moisture and has an opportunity to rest from disturbance

2.1 Shortgrasses take over dominance with Sagebrush and forbs as a subdominant plant groups. Mid-statured bunchgrasses rare. Tree presence likely rare though may include Rocky Mtn Juniper, Douglas Fir, and/or Ponderosa Pine. Cactus presence increases. Shrub canopy increases as larger bunchgrasses are removed.

T1A Catastrophic fire (extremely rare), multiple overgrazing events, long term drought, climate change  
R1A Time and timely moisture, proper grazing management, brush management, possibly reseeding

3.1 Site becomes invaded with invasive forbs and grasses. Tree encroachment also occurs particularly where fire has been excluded longterm. Bare ground typically high

T1B Overgrazing, Catastrophic fire, introduction of invasive species

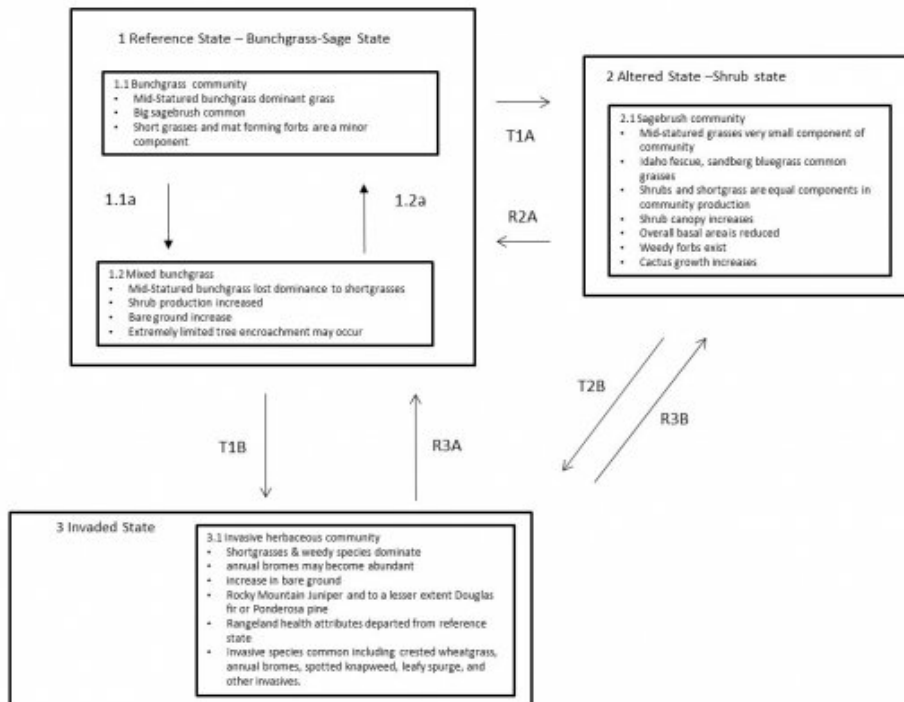
R3A Removal of invasive species (if possible), proper grazing management, time

T2B Overgrazing, Catastrophic fire, introduction of invasive species

R3B Removal of invasive species (if possible), proper grazing management, time

## State and transition model

## Upland Sagebrush Shrubland R044BP819MT



## MLRA 44B Upland Sagebrush Shrubland R044BP819MT

### Legend

- **1.1** Mid-statured bunchgrasses dominant plant type. Bluebunch tends to be the most common however Rough fescue or Spike fescue are possible as mid-statured bunchgrasses. Minor component of forbs growing between shortgrasses. Forbs will rarely exceed 10% composition by weight. Big sagebrush species dominant shrub (Wyoming, Bonneville, and Mountain big sagebrush subspecies may be present).
- **1.1a** Plant community experiences long term drought, wildfire (low intensity), untimely grazing event
- **1.2** Mid-statured bunchgrasses share dominance with short bunchgrasses. Sagebrush increases as well as forbs likely to increase. Limited tree cover may exist where fire has been suppressed for extended periods. Bare ground is expected to increase slightly
- **1.2a** Plant community receives timely moisture and has an opportunity to rest from disturbance
- **2.1** Shortgrasses take over dominance with Sagebrush and forbs as a subdominant plant groups. Mid-statured bunchgrasses rare. Tree presence likely rare though may include Rocky Mtn Juniper, Douglas Fir, and/or Ponderosa Pine. Cactus presence increases. Shrub canopy increases as larger bunchgrasses are removed.
- **T1A** Catastrophic fire (extremely rare), multiple overgrazing events, long term drought, climate change
- **R1A** Time and timely moisture, proper grazing management, brush management, possibly reseeding
- **3.1** Site becomes invaded with invasive forbs and grasses. Tree encroachment also occurs particularly where fire has been excluded longterm. Bare ground typically high
- **T1B** Overgrazing, Catastrophic fire, introduction of invasive species
- **R3A** Removal of invasive species (if possible), proper grazing management, time
- **T2B** Overgrazing, Catastrophic fire, introduction of invasive species
- **R3B** Removal of invasive species (if possible), proper grazing management, time

## 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:**  
\_\_\_\_\_
2. **Presence of water flow patterns:**  
\_\_\_\_\_
3. **Number and height of erosional pedestals or terracettes:**  
\_\_\_\_\_
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**  
\_\_\_\_\_
5. **Number of gullies and erosion associated with gullies:**  
\_\_\_\_\_
6. **Extent of wind scoured, blowouts and/or depositional areas:**  
\_\_\_\_\_
7. **Amount of litter movement (describe size and distance expected to travel):**  
\_\_\_\_\_
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**  
\_\_\_\_\_
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**  
\_\_\_\_\_
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**  
\_\_\_\_\_
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

---

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:

---

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

---

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

---

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

---

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:**

---

17. **Perennial plant reproductive capability:**

---