

Ecological site R044BP805MT Limy Sagebrush Shrubland

Last updated: 8/26/2019
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.

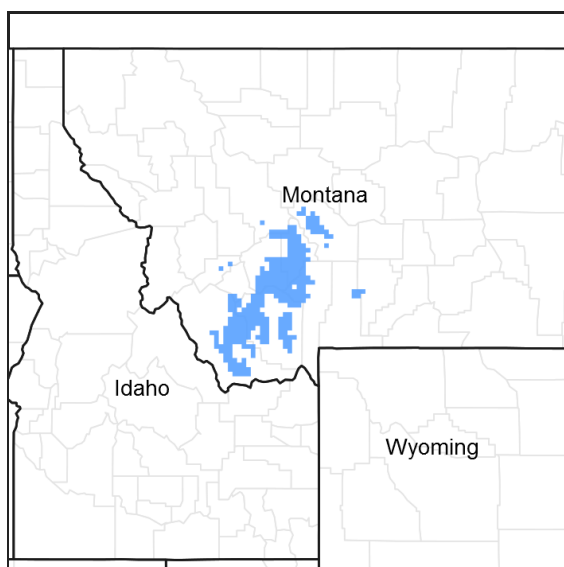


Figure 1. Mapped extent

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)
 - o Strongly or violently effervescent within surface mineral 4"; calcium carbonates increase with depth
- 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: fan remnants and hillslopes
- Parent material is tertiary valley fill and recent alluvium
- Moisture Regime: ustic
- Temperature Regime: frigid to frigid, cool
- Dominant Cover: rangeland - Sagebrush dominated
- Elevation Range: 3800-6850 (Representative Value 4500-6000)
- Slope Range: 1-60% (typically 4-10%)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. wyomingensis</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i>

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Valley > Fan remnant (2) Valley > Eroded fan remnant
Elevation	3,800–6,800 ft
Slope	0–10%

Climatic features

Table 3. Representative climatic features

Frost-free period (characteristic range)	23-79 days
Freeze-free period (characteristic range)	65-112 days
Precipitation total (characteristic range)	11-13 in
Frost-free period (actual range)	6-94 days
Freeze-free period (actual range)	27-130 days
Precipitation total (actual range)	11-14 in
Frost-free period (average)	54 days
Freeze-free period (average)	90 days

Precipitation total (average)	12 in
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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

Influencing water features

Soil features

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Valley side alluvium
Surface fragment cover >3"	0–5%

Ecological dynamics

The Limy Sagebrush Shrubland ecological site consists of 4 know States: Reference, Altered, Degraded, and Invaded.

The Reference State has 2 communities. Bluebunch Community (1.1) is the Reference community which is dominated by Bluebunch wheatgrass, needleandthread, and sagebrush. Site has very low bare ground. Community (1.2) is an at-risk community where bluebunch and needleandthread share dominance. This site sees an increase in shrub and forb components. A very small trace amount of Field Brome (aka Japanese brome) may exist in interspaces of bunchgrasses. The driver of changes within this State is primarily grazing management however fire and drought affect the communities as well.

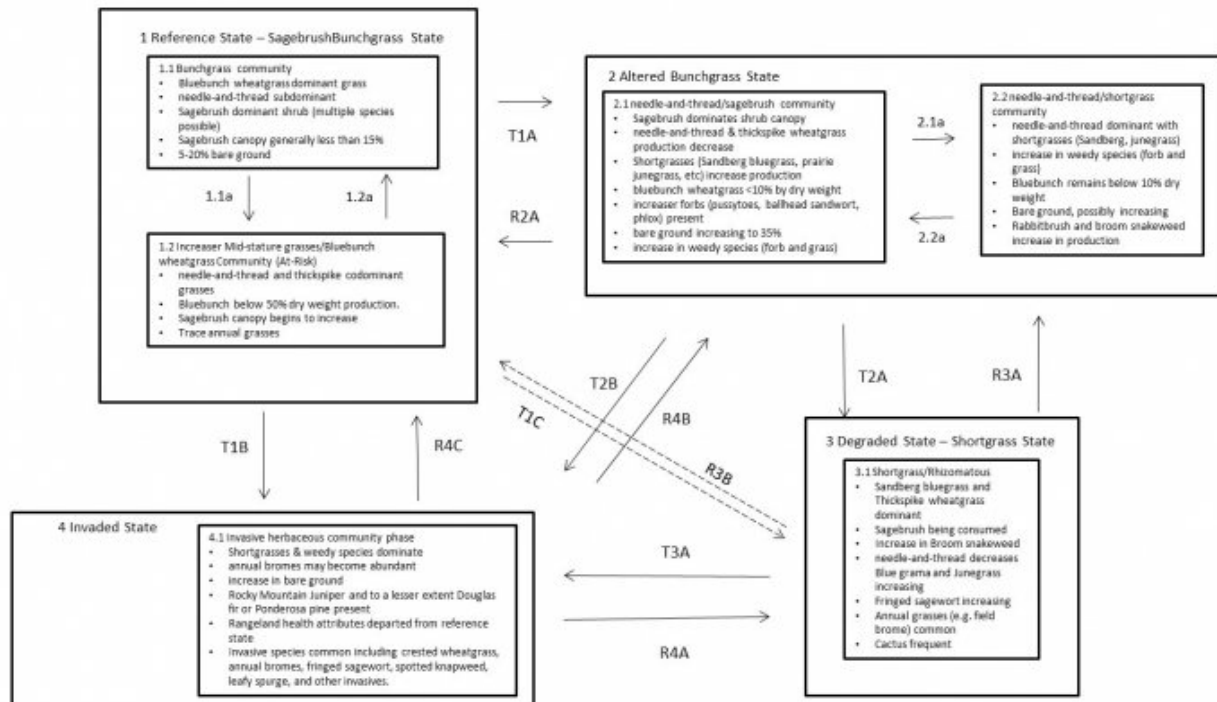
The Altered State consists of 2 communities: Needleandthread/Sagebrush (2.1) & Needleandthread/Shortgrass (2.2). The Needleandthread/Sagebrush community is defined by a reduction in deep rooted midgrasses, increased big sagebrush, and increased bare ground. Increaser forbs present. Community 2.2 contains similar bare ground and forbs however shortgrasses now share dominance with Needleandthread.

The Degraded State is a single community that is primarily shortgrasses like Sandberg bluegrass, blue grama, and Junegrass. Rabbitbrush, Broom snakeweed, and cactus are common also. This site has very high bare ground.

The Invaded State is a single community defined by a plant community that invaded by introduced species; primarily cheatgrass, knapweed, field brome, or yellow toadflax. Invader species occupy 10% or more of the plant community by weight. This community may also contain Rocky Mountain Juniper and/or Douglas fir.

State and transition model

Limy, Sagebrush Shrubland Bluebunch wheatgrass-Sagebrush R044BP805MT



MLRA 44B Limy Sagebrush Shrubland Bluebunch wheatgrass-Sagebrush R044BP805MT

Legend

- 1.1a extended drought, improper grazing, climate change
- 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
- 2.1a improper grazing management, drought, fire
- 2.2a proper grazing management, time, Integrated Pest Management (IPM)
- T2A overgrazing, introduction of weeds, drought, heavy human disturbance,
- R2A fire, range seeding, timely moisture, 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)
- T3A sodbusting, introduction of tame pasture species and other invasive plants, overgrazing, extended drought, (adjacent to construction or disturbance event)
- R3A range seeding, time, proper grazing management, IPM
- R3B Possibly not feasible, range seeding, time, proper grazing management, IPM
- R4A IPM, timely moisture, grazing management, brush management, range seeding
- R4B IPM, timely moisture, grazing management, brush management, range seeding
- R4C IPM, range seeding, timely moisture, grazing management, brush management, range seeding

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):**

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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:

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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