USDA Natural Resources Conservation Service

Ecological site F043BP911MT
Upland Warm Woodland Group

Last updated: 3/01/2024
Accessed: 05/18/2024

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

The Central Rocky Mountains (MLRA 43B) of Montana occupy some 28,850 square miles and exist primarily in Central and SW portions of the state. The climate is extremely variable with precipitation lows of 9 to 100 inches per year and frost free days of less than 30 to over 110 days. The geology of the region is also highly variable. The combination of variable climate and geology create a complex relationship of plant communities. MLRA 43B elevations typically exist between 6000 and 12,799ft at Granite Peak (the highest point in Montana).

The Continental Divide runs through this MLRA effectively splitting its watershed to contribute to either the Missouri River to the East and the Columbia River to the West.

Ecological site concept

• Site does not receive any additional water
• Dominant Cover: Ponderosa Pine Forest
• Soils are
o Generally not saline or saline-sodic
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”
• Site Landform: mountain slopes, ridges, escarpments
• Area of rugged mountain, hills, plateaus, and valleys of the Central Rocky Mountains in Southwest Montana.
• Parent material is colluvium, colluvium over residuum, residuum
• Moisture Regime: ustic
• Temperature Regime: frigid
• Elevation Range: 3000-5500ft
• Slope: 0-60% (typically less than 40%)

Site Development and Testing Plan
This Provisional Ecological Site Description was developed to meet the criteria as defined in Soil Survey National Instruction part 306 (430-306-NI, April 2015) as interpreted by Regional Ecological Site Specialist. Information in this description are first approximations based on broad groupings of soil properties and vegetation characteristics associated with those groupings. Although this description has been through the quality control and quality assurance review process it has not been certified for use in conservation planning.

Associated sites

F043BP904MT	**Shallow Warm Woodland Group** The Upland Warm Woodland site is adjacent to the Shallow Warm Woodland however tending to be lower on the landscape where soils tend to be deeper. These two sites share similar plant communities and state and transition models.

Similar sites

F043BP904MT	**Shallow Warm Woodland Group** The Upland Warm Woodland site is adjacent to the Shallow Warm Woodland however tending to be lower on the landscape where soils tend to be deeper. These two sites share similar plant communities and state and transition models.

Table 1. Dominant plant species

Tree	(1) *Pinus ponderosa* (2) *Pseudotsuga menziesii*
Shrub	(1) *Ribes* (2) *Artemisia tridentata*
Herbaceous	(1) *Pseudoroegneria spicata* (2) *Festuca campestris*

Physiographic features

This site tends to exist on the lower to middle third of the landform (mountain slopes, ridges, and escarpments). Slopes exist between nearly level to 60 percent; however, typically are below 40 percent. Elevation is 3000 to 5500 feet elevation.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Mountains > Escarpment (3) Mountains > Ridge
Runoff class	Negligible to low
Elevation	914–1,676 m
Slope	0–60%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

This site exists in the frigid, cool soil temperature regime in the typic ustic moisture regime. Relatively Effective Annual Precipitation varies from 12 to 24 inches. Frost-free days are 60 to 115 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	56-106 days
Freeze-free period (characteristic range)	104-140 days
Precipitation total (characteristic range)	330-483 mm
Frost-free period (actual range)	46-114 days
Freeze-free period (actual range)	102-144 days
Precipitation total (actual range)	305-508 mm
Frost-free period (average)	78 days
Freeze-free period (average)	121 days
Precipitation total (average)	406 mm

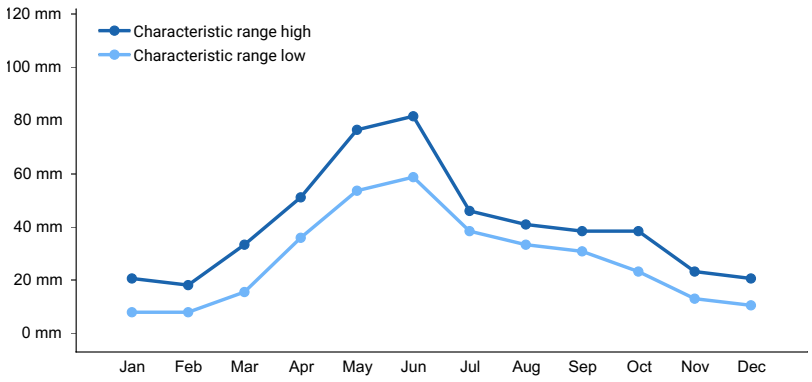


Figure 1. Monthly precipitation range

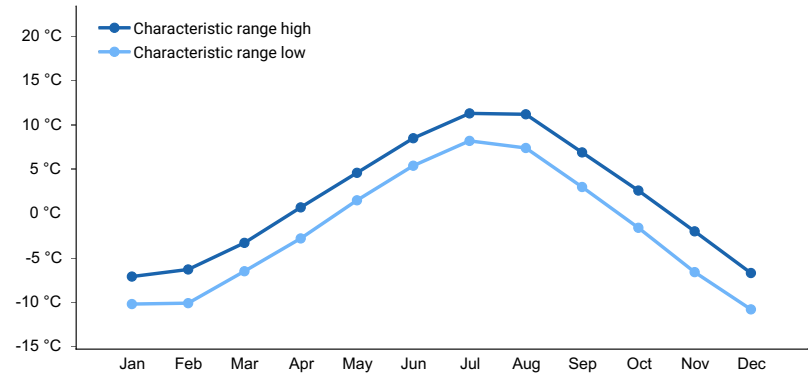


Figure 2. Monthly minimum temperature range

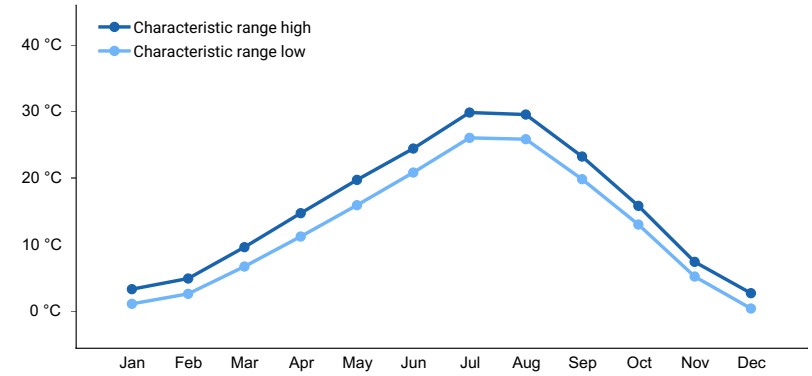


Figure 3. Monthly maximum temperature range

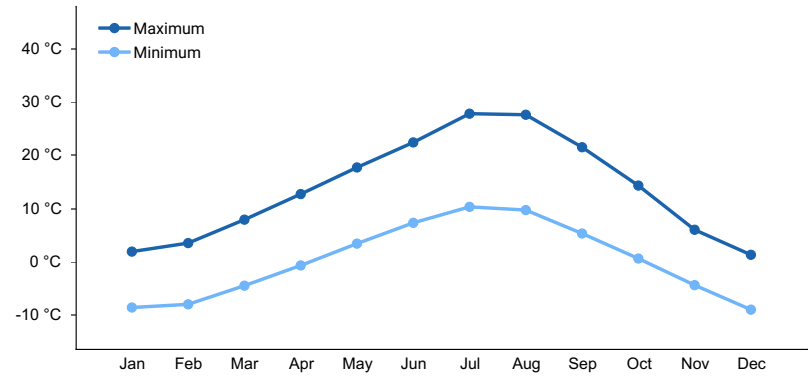


Figure 4. Monthly average minimum and maximum temperature

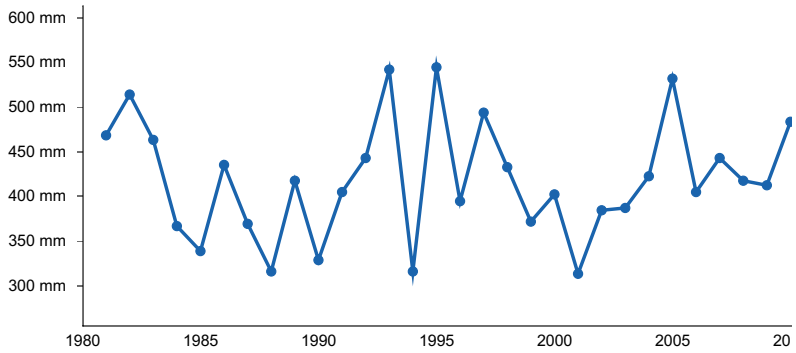


Figure 5. Annual precipitation pattern

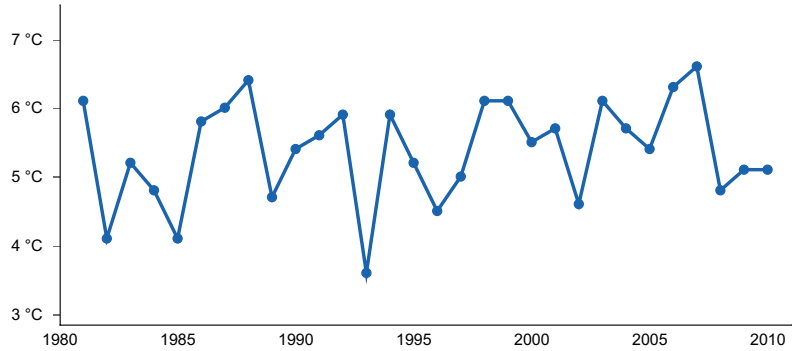


Figure 6. Annual average temperature pattern

Climate stations used

- (1) CANYON FERRY DAM [USC00241470], Helena, MT
- (2) HOLTER DAM [USC00244241], Wolf Creek, MT
- (3) MILLEGAN 14 SE [USC00245712], White Sulphur Springs, MT
- (4) PONY [USC00246655], Cardwell, MT
- (5) NORRIS MADISON PH [USC00246157], Ennis, MT
- (6) WILSALL 8 ENE [USC00249023], Wilsall, MT
- (7) WHITE SULPHUR SPRNGS 2 [USC00248930], White Sulphur Springs, MT

Influencing water features

no influencing water features

Wetland description

n/a

Soil features

Soils are well-drained and considered moderately deep to very deep with typically less than 5 percent stone or boulder cover (15 percent maximum). Textures vary based on local geology. Parent material is colluvium, colluvium over residuum, and residuum.

Table 4. Representative soil features

Parent material	(1) Colluvium–igneous, metamorphic and sedimentary rock (2) Residuum–igneous, metamorphic and sedimentary rock
Surface texture	(1) Gravelly loam (2) Silt loam (3) Gravelly sandy loam

Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Depth to restrictive layer	51–254 cm
Soil depth	51–254 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	8.13–17.02 cm
Soil reaction (1:1 water) (0-25.4cm)	5.3–7.3
Subsurface fragment volume <=3" (25.4-50.8cm)	0–35%
Subsurface fragment volume >3" (25.4-50.8cm)	0–20%

Ecological dynamics

1 - Reference State
1.1 Reference Community: ponderosa pine dominant overstory; mix of grasses and shrubs understory

1.1A low intensity understory fire

1.2 Recent low-intensity fire: ponderosa pine dominant overstory; grass and forb understory

1.2A Time allowing understory recovery
T1A Fire suppression causing a decrease in ponderosa pine and increase density of doghair stand of Douglas fir

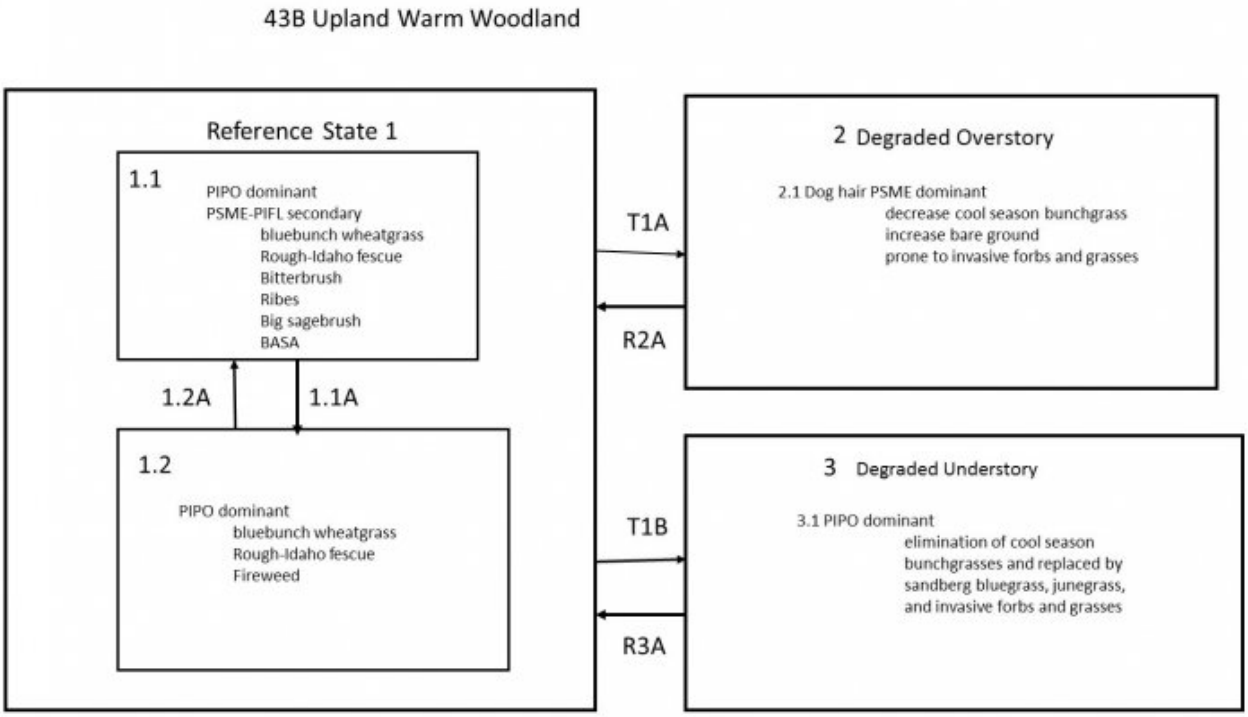
2 - Degraded Overstory
2.1 Doghair stand of Douglas fir dominant with degraded understory

T1B Improper grazing management
R2A Forest thinning and prescribed fire to thin out the doghair stand of Douglas fir

3 - Degraded Understory
3.1 Ponderosa pine dominant with heavily reduced cool-season bunchgrasses.

R3A Prescribed grazing management, time, integrated pest management

State and transition model



Upland Warm Woodland

1 Reference State
1.1 Reference Community: ponderosa pine dominant overstory; mix of grasses and shrubs understory
1.1A low intensity understory fire
1.2A Time allowing understory recovery

1.2 Recent low-intensity fire: ponderosa pine dominant overstory; grass/forb understory

2.1 Dog hair PSME dominant with degraded understory
T1A Fire suppression causing a decrease in ponderosa pine and increase density of dog hair douglas fir
R2A Forest thinning and prescribed fire to thin out the doghair douglas fir

3.1 Ponderosa pine dominant with heavily reduced cool season bunchgrasses.
T1B Improper grazing management
R3A Prescribed grazing management, time, integrated pest managment

Animal community

This ecological site is considered important habitat for large game animals such as deer, elk, and moose as well as upland birds such as ruffed, dusky, and spruce grouse.

Typically this site is considered good for livestock grazing. If the tree canopy is open it will often contain grazeable forage.

Recreational uses

Site frequently used by many outdoor recreationists such as bird watchers, campers, hikers, bikers, and hunters.

Wood products

The dominant forest type is typically not suited to forest products however small post and pole operations may exist. Harvest of this site may prove challenging due to slope.

Inventory data references

Information presented was derived from NRCS inventory data, literature, field observations, and personal contacts with range-trained personnel (i.e., used professional opinion of agency specialists, observations of land managers, and outside scientists).

Other references

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Contributors

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Approval

Kirt Walstad, 3/01/2024

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	05/18/2024
Approved by	Kirt Walstad
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:**