USDA Natural Resources
Conservation Service

Ecological site F043BP902MT
Shallow Cold Woodland Group

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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): 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 12,799 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

• Dominant Cover: Coniferous Forest
• Site does not receive any additional water
• Soils are
o Not saline or saline-sodic
o Not strongly or violently effervescent within surface mineral 4”
o Soil is shallow (less than 20in (50cm) to bedrock, lithic, or paralithic root restriction)
o Soil is not ashy or medial textural family
o Stones and boulders cover <15% surface area
• Soil surface texture variable (often loamy to sandy loam)
• Site Landform: mountain slope, ridges, cirques, escarpments
• Area of rugged mountain, hills, plateaus, and valleys of the Central Rocky Mountains in Southwest Montana.
• Parent material is variable
• Moisture Regime: udic
• Temperature Regime: cryic
• Elevation Range: 5800-10000 ft
• Slope: 2-30% (typically less than 15%)

Associated sites

F043BP909MT	**Upland Cold Woodland Group** The Upland Cold Woodland site is adjacent to the Shallow Cold 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.
F043BP916MT	**Ashy Cold Woodland Group** The Ashy Cold Woodland site is adjacent to the Shallow Cold 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

F043BP909MT	**Upland Cold Woodland Group** The Upland Cold Woodland site is adjacent to the Shallow Cold 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.
F043BP916MT	**Ashy Cold Woodland Group** The Ashy Cold Woodland site is adjacent to the Shallow Cold 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. The core species quantity is higher in the Ashy Cold Woodland.

Table 1. Dominant plant species

Tree	(1) *Abies lasiocarpa* (2) *Pinus albicaulis*
Shrub	(1) *Symphoricarpos* (2) *Vaccinium scoparium*
Herbaceous	(1) *Carex geyeri* (2) *Calamagrostis rubescens*

Physiographic features

Site is quite variable in slope from 2 to 30 percent; however, slope is rarely greater than 15 percent. The site exists on mountain slopes, ridges, cirques, and escarpments. The site has a root restrictive layer within 20 inches of the soil surface. Geology is mixed.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Ridge (2) Mountains > Mountain slope (3) Mountains > Cirque (4) Mountains > Escarpment
Runoff class	Low
Elevation	5,800–10,000 ft
Slope	2–30%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

This site exists in areas that do not have climate stations. Information is derived from plant indicators and computer model estimates. Effective precipitation is variable from 20 to 50 inches and is often in the form of winter snow with early summer rains. Frost free days varies from 30 to 70 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	30-70 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	20-50 in
Frost-free period (average)	45 days
Freeze-free period (average)	
Precipitation total (average)	30 in

Influencing water features

Site is not associated with water

Wetland description

Not present

Soil features

Soil is formed as colluvium or residuum from variable local geology. Soil textures are often loam or sandy loam texture with mixed amounts of rock fragments in the soil profile. A gravelly soil textural modifier is very common.

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) Gravelly clay loam (3) Gravelly sandy loam
Family particle size	(1) Fine-loamy (2) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Depth to restrictive layer	20 in
Soil depth	20 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–50%
Available water capacity (0-20in)	1.1–3.8 in
Soil reaction (1:1 water) (0-10in)	4.8–7.8
Subsurface fragment volume <=3" (0-20in)	0–50%
Subsurface fragment volume >3" (0-20in)	0–45%

Ecological dynamics

1 - Reference State
1.1 Subalpine fir and whitebark pine dominated forest with Douglas fir, lodgepole pine, and Englemann’s spruce as minor components. Grasses and sedges tend to be limited. Forbs and shrubs dominate understory canopy.

T1A Post Disturbance includes stand replacement fire, insect pestilence and disease. Fire frequency is long but fire is intense.

2 - Post-Disturbance State
2.1 Shrub dominant condition post disturbance. Saplings of multiple trees present. Forbs increase in composition particularly colonizing species like fireweed and coneflower. Grasses increase (Mountain brome, Richardson’s needlegrass, Purple oniongrass, and Rough fescue)

2.1A Time where trees start to re-establish

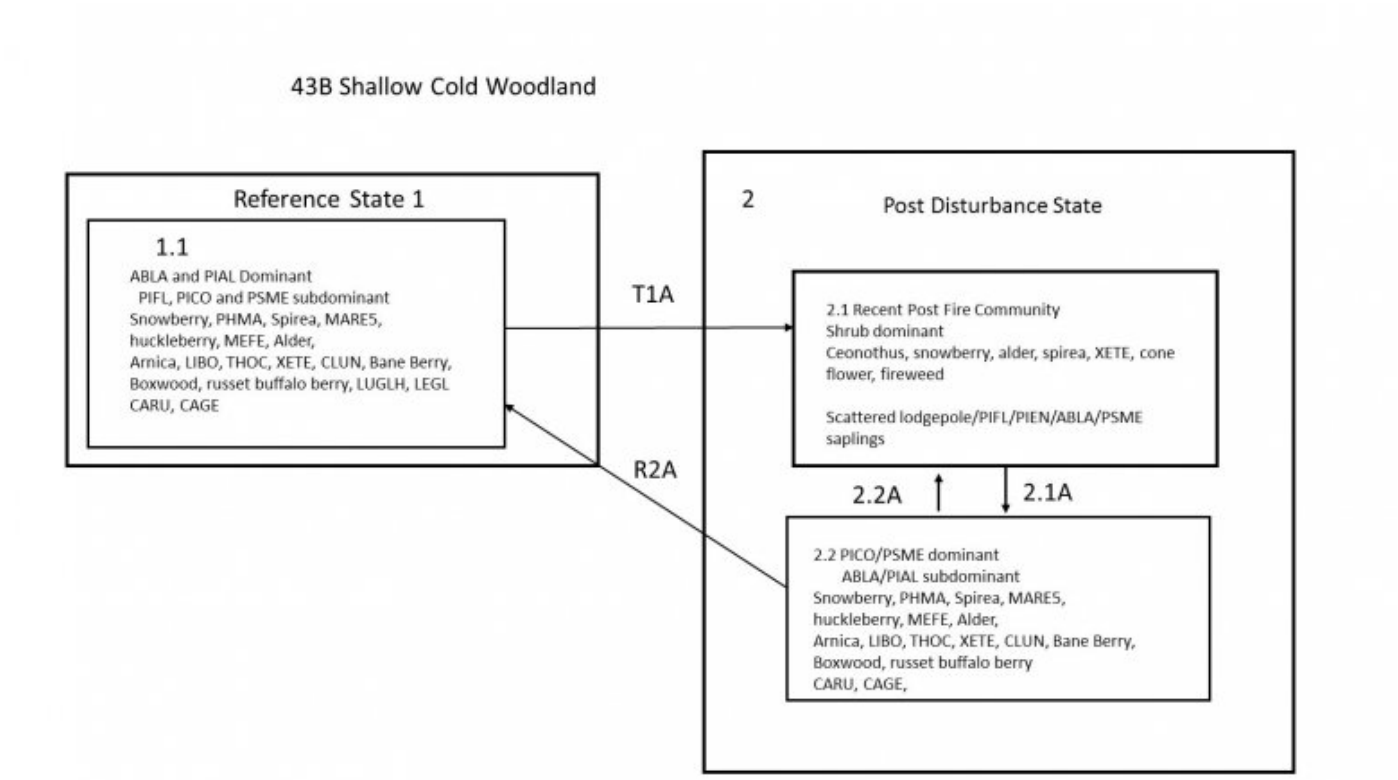
2.2 Lodgepole pine dominated community with saplings of Subalpine fir, whitebark pine, Douglas fir, and

Englemann's spruce. Grasses decreasing, shrubs and forbs reduced slightly as light interception is reduced.

2.2A Community phase shift is due to fire, insect pestilence and disease. Fire frequency is long but fire is intense.

R2A Restoration pathway where the site, over time, without fire, insect pestilence, or disease moves back to the Reference State. Subalpine fir comes back in and shades out the other tree species. Whitebark pine increases. This process can take over 150 years.

State and transition model



1.1 Subalpine fir and Whitebark pine dominated forest with Douglas fir, Lodgepole, Englemann's Spruce as minor component. Grasses and sedges tend to be limited. Forbs and shrubs dominate understory canopy.
T1A Post Disturbance includes stand replacement fire, insect pestilence and disease. Fire frequency is long but fire is intense.

2.1 Shrub dominant condition post disturbance. Saplings of multiple trees present. Forbs increase in composition particularly colonizing species like fireweed and coneflower. Grasses increase (Mountain brome, Richardson's needlegrass, Purple oniongrass, and Rough fescue)
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Animal community

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

Typically this site is considered margin for livestock grazing; however, if the tree canopy is open it is grazeable.

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, subordinate species such as Douglas fir and lodgepole pine have many uses. Harvest of this site will prove challenging as this site is typically located on the upper third of the landform.

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	04/19/2024
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:**

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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:**
