Ecological site F043BP908MT
Upland Aspen Woodland Group

Last updated: 3/01/2024
Accessed: 05/12/2025

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.

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 receives additional moisture
• Dominant Cover: Deciduous Forest
• 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”
• Site landforms: Hillslopes
• Moisture Regime: ustic to udic
• Temperature Regime: frigid to cryic
• Elevation Range: 4800-8200ft (typically less than 7000)
• Slope: 5-40% (typically less than 25%)

Associated sites

R043BP818MT	**Upland Grassland Group** Upland Grassland is often a neighboring site that can exist at the same landscape position. The Upland Grassland may be encroached by Aspen Woodland expansion.
R043BP819MT	**Upland Sagebrush Shrubland Group** Upland Sagebrush Shrubland is often a neighboring site that can exist at the same landscape position. The Upland Sagebrush Shrubland may be encroached by Aspen Woodland expansion.
R043BP820MT	**Upland Shrubland Group** Upland Shrubland is often a neighboring site that can exist at the same landscape position.. The Upland Shrubland may be encroached by Aspen Woodland expansion.

F043BP909MT	**Upland Cold Woodland Group** Upland Cold Woodland is often a neighboring site that can exist at the same landscape position though commonly exists slightly higher on the landscape. The Upland Cold Woodland typically exists on linear or convex sites while the Upland Aspen Woodland tends to exist on a slightly concave site and on toe slopes.
F043BP910MT	**Upland Cool Woodland Group** Upland Cool Woodland is often a neighboring site that can exist at the same landscape position though commonly exists slightly higher on the landscape. The Upland Cool Woodland typically exists on linear or convex sites while the Upland Aspen Woodland tends to exist on a slightly concave site and on toe slopes.
F043BP911MT	**Upland Warm Woodland Group** Upland Warm Woodland is often a neighboring site that can exist at the same landscape position though commonly exists slightly higher on the landscape. The Upland Warm Woodland typically exists on linear or convex sites while the Upland Aspen Woodland tends to exist on a slightly concave site and on toe slopes.

Similar sites

R043BP801MT	**Bottomland Group** Bottomland is the closest similar site within MLRA 43B. The two sites are both dominated by deciduous trees and may have overlapping understory vegetation however the two sites have distinctly different state and transition models and hydrologic processes.

Table 1. Dominant plant species

Tree	(1) *Populus tremuloides*
Shrub	(1) *Symphoricarpos albus* (2) *Rosa woodsii*
Herbaceous	(1) *Calamagrostis rubescens* (2) *Arnica*

Physiographic features

Site typically exists on rolling hillslopes and toe slopes from 5 to 40 percent; however, sites are usually under 25 percent slope. Site is often concave in shape.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Hillslope (2) Mountains > Toe
Runoff class	Low
Elevation	4,800–8,200 ft
Slope	5–65%
Water table depth	100 in
Aspect	Aspect is not a significant factor

Climatic features

This ecological site exists across a broad range of climatic zones with little change in the overall composition of the plant community. Relative Effective Annual Precipitation (REAP) is 15 to 40 inches with a 20 to 110 day frost-free period.

Table 3. Representative climatic features

Frost-free period (characteristic range)	4-58 days
Freeze-free period (characteristic range)	41-105 days

Precipitation total (characteristic range)	17-26 in
Frost-free period (actual range)	2-86 days
Freeze-free period (actual range)	31-124 days
Precipitation total (actual range)	15-29 in
Frost-free period (average)	34 days
Freeze-free period (average)	75 days
Precipitation total (average)	22 in

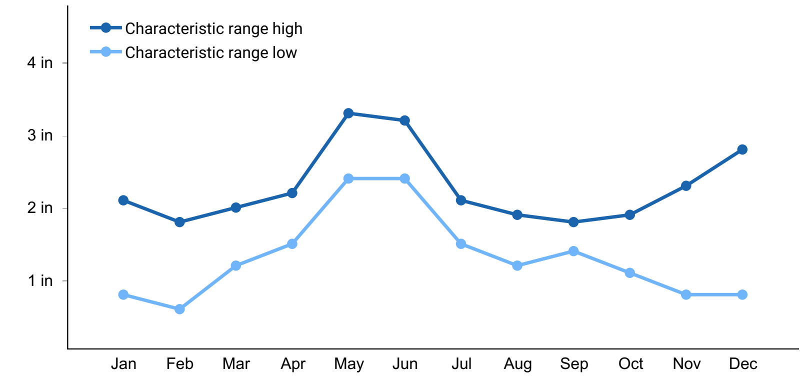


Figure 1. Monthly precipitation range

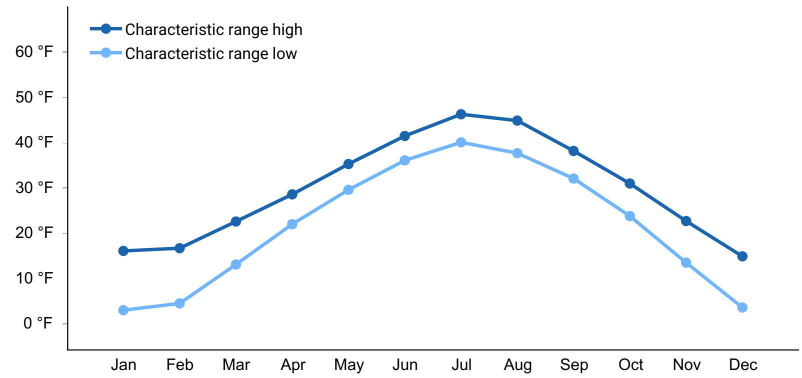


Figure 2. Monthly minimum temperature range

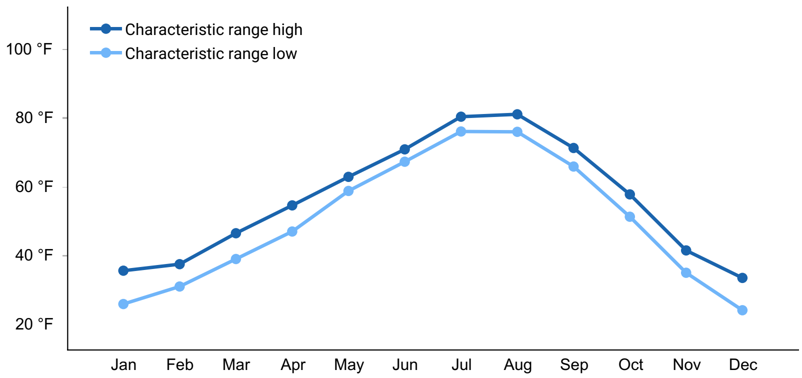


Figure 3. Monthly maximum temperature range

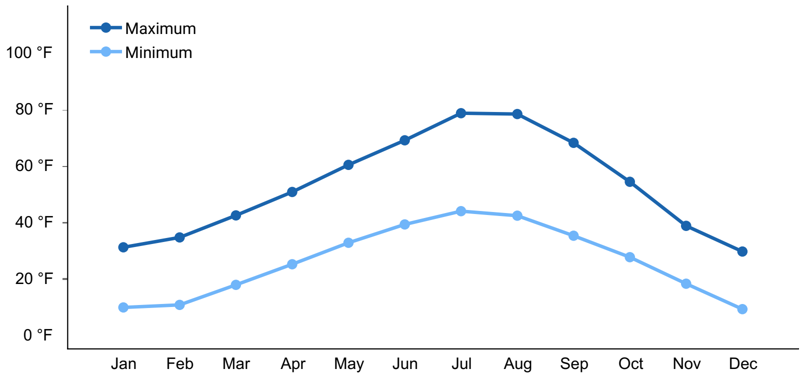


Figure 4. Monthly average minimum and maximum temperature

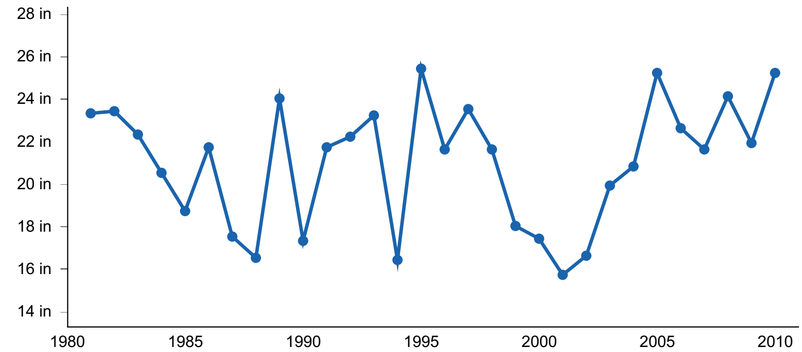


Figure 5. Annual precipitation pattern

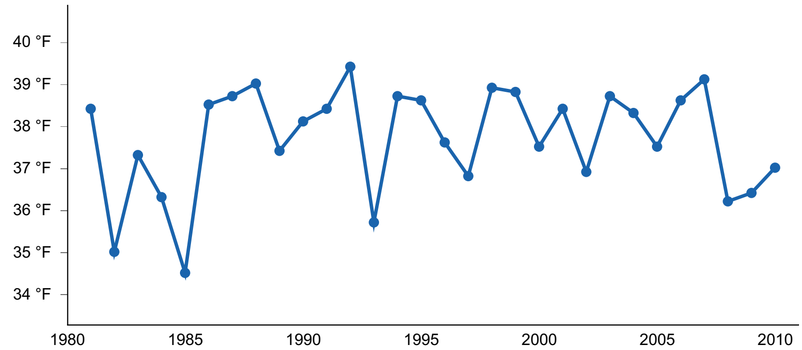


Figure 6. Annual average temperature pattern

Climate stations used

- (1) GIBSON DAM [USC00243489], Augusta, MT
- (2) PHILIPSBURG RS [USC00246472], Philipsburg, MT
- (3) NEIHART 8 NNW [USC00246008], Monarch, MT
- (4) WILSALL 8 ENE [USC00249023], Wilsall, MT
- (5) GIBBONSVILLE [USC00103554], Gibbonsville, ID
- (6) LAKEVIEW [USC00244820], Lima, MT
- (7) OLD FAITHFUL [USC00486845], Yellowstone National Park, WY
- (8) HOLTER DAM [USC00244241], Wolf Creek, MT
- (9) BOZEMAN 12 NE [USC00241050], Bozeman, MT
- (10) MYSTIC LAKE [USC00245961], Fishtail, MT
- (11) HEBGEN DAM [USC00244038], West Yellowstone, MT
- (12) BIG SKY 2WNW [USC00240775], Gallatin Gateway, MT
- (13) WEST YELLOWSTONE [USC00248857], West Yellowstone, MT
- (14) COOKE CITY 2 W [USC00241995], Gardiner, MT
- (15) ISLAND PARK [USC00104598], Island Park, ID

Influencing water features

Site typically is not associated with water sources such as a stream or spring; however, the site may receive additional soil moisture through run-in, may have an argillic horizon which may perch water seasonally, or as part of capillary fringe inherent to a landscape toe position. Free water in the profile is not always evident.

Wetland description

Site may not fully meet the definition of a wetland but some sites may express redoximorphic features.

Soil features

Soils on this site are typically alluvium and colluvium. Textures vary based on mixed geology, but tend to be loamy. Soils are moderately deep to very deep and dark in color. Soils are considered mollic or pachic. Argillic horizons are common within well-developed Aspen Woodland stands.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous, metamorphic and sedimentary rock (2) Colluvium–igneous, metamorphic and sedimentary rock
Surface texture	(1) Sandy loam (2) Silt loam (3) Clay loam
Drainage class	Somewhat poorly drained to well drained
Permeability class	Slow to moderate
Depth to restrictive layer	20 in
Soil depth	40 in
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–20%
Available water capacity (0-40in)	4.2–8.2 in
Soil reaction (1:1 water) (0-20in)	5–7.8
Subsurface fragment volume <=3" (10-20in)	0–20%
Subsurface fragment volume >3" (10-20in)	0–25%

Ecological dynamics

1 - Reference State
1.1 Aspen community mature. Shade-tolerant conifers may be present in understory. Herbaceous understory of Blue and Canada wildrye, multiple sedges, Pinegrass. THOC, Arnica, Sweet cicely, and Fleabanes common.

1.1a – Insects, disease and/or drought reduce Aspen canopy. The herbaceous understory, in Community Phase 1.1, increases in density. Aspen cloning may occur as a result of increased light accessing understory
1.1b – Stand reducing fire and timber harvesting removes most of the canopy. Aspen sprouting occurs. Forbs typically respond first to open canopy with grasses following.

1.2 Aspen canopy is reduced significantly due to disease or drought. Herbaceous component increases in productivity. Grasses tend to dominate. Some aspen cloning occurs due to increased light accessing lower canopies.

1.2a Time and proper grazing allow for aspen to increase in size

1.3 Young aspen clones increase dramatically as overstory is mostly gone. Some forbs may “colonize” quickly

1.3a Time and proper grazing allow for aspen to increase in size. Many of the smaller aspen clones fail with stronger individuals surviving beyond saplings.

1.4 Young aspens increase in size and canopy begins to close in overstory canopy. Herbaceous component reduces slightly

1.4a Time and proper grazing allow for aspen to increase in size

T1a – Fire suppression, improper grazing

2 - Conifer Encroachment State
2.1 Fire suppression and overgrazing (both wildlife and livestock) promote conifer encroachment. JUSC, PSME, PIEN, and limited PIAL present. Herbaceous production reduced. Aspen clones nonexistent.

R2 Grazing management including rest suggested. Removal of coniferous trees. Prescribed fire triggers aspen regeneration

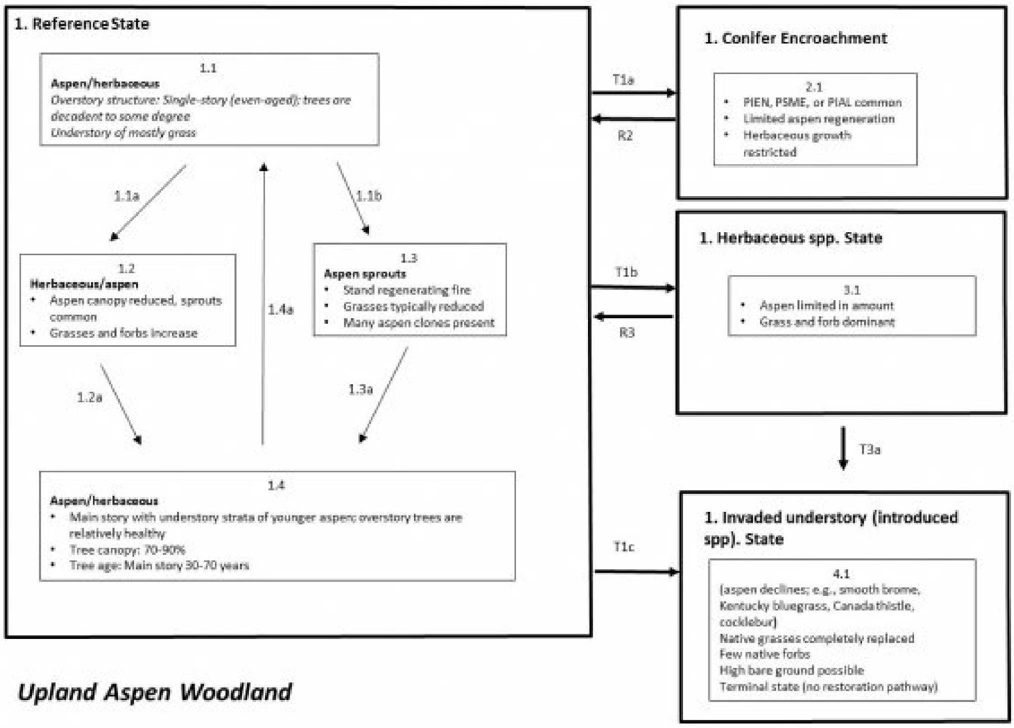
T1b Improper grazing management, Fire Suppression

3 - Herbaceous Species State
3.1 Long-term overgrazing by livestock and wildlife have reduced understory aspen and herbaceous diversity is typically reduced to few species.

R3 Prescribed grazing and time allow for aspen regeneration (temporary exclusion of herbivores may be necessary). Prescribed fire may reduce competitive herbaceous component and allow for aspen regeneration
T1c Improper grazing management, catastrophic fire
T3a Improper grazing management, catastrophic fire

4 - Invaded Understory (introduced species) State
4.1 Long-term overgrazing by livestock and wildlife have reduced understory aspen and herbaceous diversity is typically reduced to few species. Noxious and other invasive weeds take advantage of open spaces and invade the site. This is a terminal state as control measures normally do not exist. Aspen stand will likely stall in condition and regeneration fails.

State and transition model



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Animal community

The Upland Aspen Woodland is important habitat and browse for many upland birds, big game species, and grazing for livestock.

Recreational uses

Primarily hunting and birding exist on this site.

Wood products

Aspen wood is used for decorative furniture and firewood.

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	05/12/2025
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:**