

Ecological site F043AP906MT Shallow Warm 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): 043A–Northern Rocky Mountains

This MLRA is located in Montana (43 percent), Idaho (34 percent), and Washington (23 percent). It makes up about 31,435 square miles (81,460 square kilometers). It has no large cities or towns. It has many national forests, including the Okanogan, Colville, Kootenai, Lolo, Flathead, Coeur d'Alene, St. Joe, Clearwater, and Kaniksu National Forests.

This MLRA is in the Northern Rocky Mountains Province of the Rocky Mountain System. It is characterized by rugged, glaciated mountains; thrust- and block-faulted mountains; and hills and valleys. Steep-gradient rivers have cut deep canyons. Natural and manmade lakes are common.

The major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA are: Kootenai-Pend Oreille-Spokane (1701), 67 percent; Upper Columbia (1702), 18 percent; and Lower Snake (1706), 15 percent. Numerous rivers originate in or flow through this area, including, the Sanpoil, Columbia, Pend Oreille, Kootenai, St. Joe, Thompson, and Flathead Rivers.

This area is underlain primarily by stacked slabs of layered sedimentary or metasedimentary bedrock. The bedrock formations range from Precambrian to Cretaceous in age. The rocks consist of shale, sandstone, siltstone, limestone, argillite, quartzite, gneiss, schist, dolomite, basalt, and granite. The formations have been faulted and stacked into a series of imbricate slabs by regional tectonic activity. Pleistocene glaciers carved a rugged landscape that includes sculpted hills and narrow valleys filled with till and outwash. Continental glaciation overrode the landscape in the northern half of the MLRA while glaciation in the southern half was confined to montane settings.

The average annual precipitation is 25 to 60 inches (635 to 1,525 millimeters) in most of this area, but it is as much as 113 inches (2,870 millimeters) in the mountains and is 10 to 15 inches (255 to 380 millimeters) in the western part of the area. Summers are dry. Most of the precipitation during fall, winter, and spring is snow. The average annual temperature is 32 to 51 degrees F (0 to 11 degrees C) in most of the area, decreasing with elevation. In most of the area, the freeze-free period averages 140 days and ranges from 65 to 215 days. It is longest in the low valleys of Washington, and it decreases in length with elevation. Freezing temperatures occur every month of the year on high mountains, and some peaks have a continuous cover of snow and ice.

The dominant soil orders in this MLRA are Andisols, Inceptisols, and Alfisols. Many of the soils are influenced by Mount Mazama ash deposits. The soils in the area have a frigid or cryic soil temperature regime; have an ustic, xeric, or udic soil moisture regime; and dominantly have mixed mineralogy. They are shallow to very deep, are very poorly drained to well drained, and have most of the soil texture classes. The soils at the lower elevations include Udivitrands, Vitrixerands and Haplustalfs. The soils at the higher elevations include Dystrocrypts, Eutrocrypts, Vitricryands, and Haplocryalfs. Cryorthents, Cryepts, and areas of rock outcrop are on ridges and peaks above timberline

This area is in the northern part of the Northern Rocky Mountains. Grand fir, Douglas-fir, western red cedar, western hemlock, western larch, lodgepole pine, subalpine fir, ponderosa pine, whitebark pine, and western white pine are the dominant overstory species, depending on precipitation, temperature, elevation, and landform aspect. The understory vegetation varies, also depending on climatic and landform factors. Some of the major wildlife species in this area are whitetailed deer, mule deer, elk, moose, black bear, grizzly bear, coyote, fox, and grouse. Fish, mostly in the trout and salmon families, are abundant in streams, rivers, and lakes.

More than one-half of this area is federally owned and administered by the U.S. Department of Agriculture, Forest Service. Much of the privately-owned land is controlled by large commercial timber companies. The forested areas are used for wildlife habitat, recreation, watershed, livestock grazing, and timber production. Meadows provide summer grazing for livestock and big game animals. Less than 3 percent of the area is cropland.

Classification relationships

ASSOCIATED HABITAT TYPES:

Major association with:

ponderosa pine/bluebunch wheatgrass

Minor association with:

Douglas-fir/rough fescue

ponderosa pine/bitterbrush-Idaho fescue phase

Ecological site concept

- Site does not receive any additional water

Site has shallower soils than the closely related Upland Warm Woodland and therefore has less productivity, resistance and resilience to disturbance.

- Dominant Cover: Coniferous Forest

Reference community is an open forest of ponderosa pine or Douglas fir, or a combination of these species, with an understory of native bunchgrasses and commonly bitterbrush. The understory production averages 620 dry pounds per acre (200-1200). Understory species from most to least common include: Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), arrowleaf balsamroot (*Balsamorhiza sagittata*), common snowberry (*Symphoricarpos albus*), rough fescue (*Festuca campestris*), old mans whiskers (*Geum triflorum*), Lupine species, currant (*Ribes* species), Woods rose (*Rosa woodsia*), pinegrass (*Calamagrostis rubescens*), creeping barberry (*Mahonia repens*).

- Soils are

- o Generally not limy (limited extent)

- o Shallow (less than 50cm deep to bedrock, lithic, or paralithic root restrictive layer)

- o Not ashy or medial textural family

- o Typically less than 5% stone and boulder surface cover (<15% max)

- Soil surface texture gravelly loam or cobbly loam in surface mineral 4"

- Parent material is colluvium or residuum

- Drainage class is well drained; no flooding frequency

- Site Landform: glaciated mountain slopes; hills; mountains

- Moisture Regime: ustic/xeric

- Temperature Regime: frigid

- Elevation Range: 2900-5500 ft

- Slope: 15-60%

Associated sites

F043AP911MT	<p>Upland Warm Woodland Group Both sites reside in warm site condition areas that are in the xeric and frigid regimes (though F043AP906MT also includes ustic), in elevations of 2900 to 4600 feet (though F043AP906MT can go up to 5500 feet) and slopes of 15 to 35 percent (though F043AP906MT can have steeper slopes).</p>
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Similar sites

F043AP911MT	<p>Upland Warm Woodland Group</p> <p>These are similar sites in that they both reside in warm site conditions and have a reference community that is dominated by ponderosa pine in the overstory and the understory has warm adapted plants. The soils are differentiated by depth.</p>
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Table 1. Dominant plant species

Tree	(1) <i>Pinus ponderosa</i> (2) <i>Pseudotsuga menziesii var. glauca</i>
Shrub	(1) <i>Symphoricarpos albus</i> (2) <i>Purshia tridentata</i>
Herbaceous	(1) <i>Festuca campestris</i> (2) <i>Pseudoroegneria spicata</i>

Physiographic features

- Site Landform: glaciated mountain slopes; hills; mountains
- Elevation Range: 2900-5500 ft
- Slope: 15-60%

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Mountains > Hill
Elevation	884–1,676 m
Slope	15–60%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

- Representative Value (RV) of range of Mean Annual Precipitation: 17-25 inches
- Representative Value (RV) of range of Mean Average Annual Temperature: 43-45 degrees
- Representative Value (RV) of range of Frost Free Days: 70-95 days
- Moisture Regime: ustic/xeric
- Temperature Regime: frigid

SUMMARY TABLES ARE FOR AVAILABLE CLIMATE STATIONS WHICH ARE ALL LOCATED IN VALLEYS.

Table 3. Representative climatic features

Frost-free period (characteristic range)	79-86 days
Freeze-free period (characteristic range)	127-131 days
Precipitation total (characteristic range)	533-762 mm
Frost-free period (actual range)	73-88 days
Freeze-free period (actual range)	124-133 days
Precipitation total (actual range)	533-813 mm
Frost-free period (average)	82 days
Freeze-free period (average)	129 days
Precipitation total (average)	660 mm

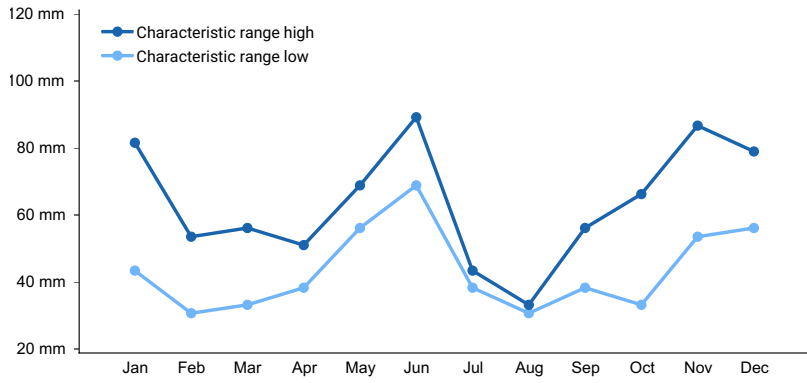


Figure 1. Monthly precipitation range

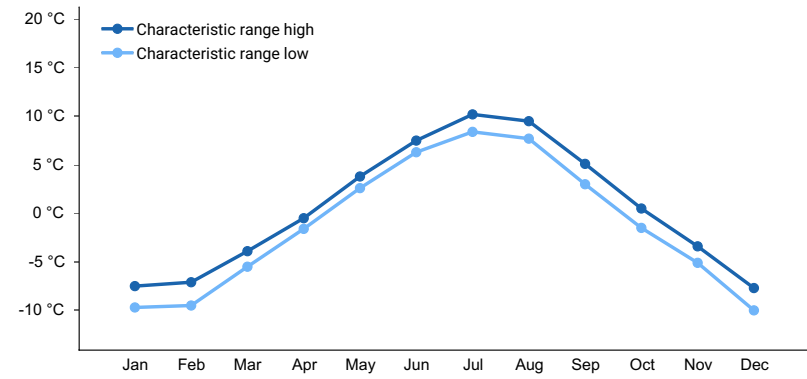


Figure 2. Monthly minimum temperature range

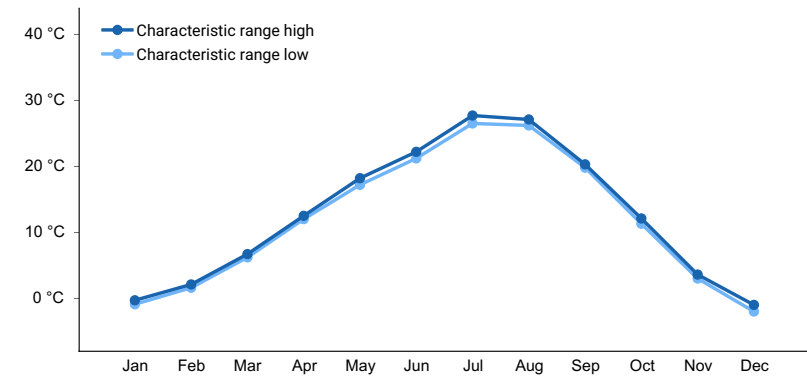


Figure 3. Monthly maximum temperature range

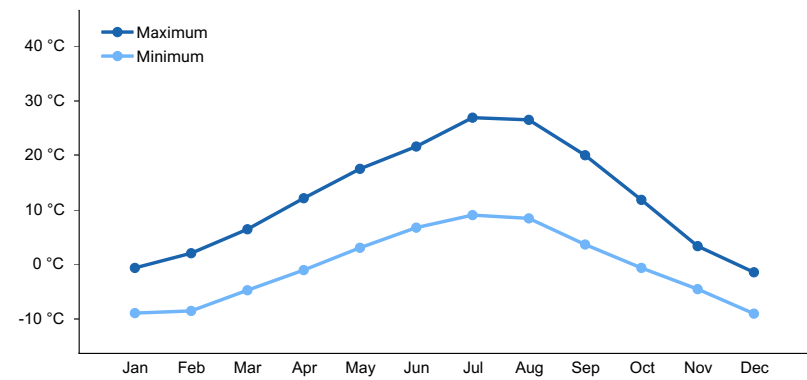


Figure 4. Monthly average minimum and maximum temperature

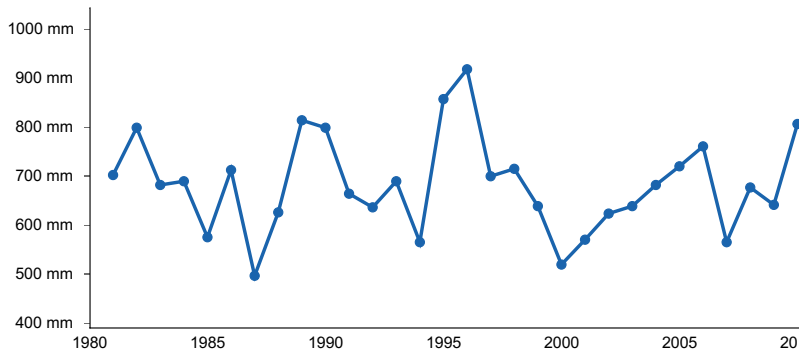


Figure 5. Annual precipitation pattern

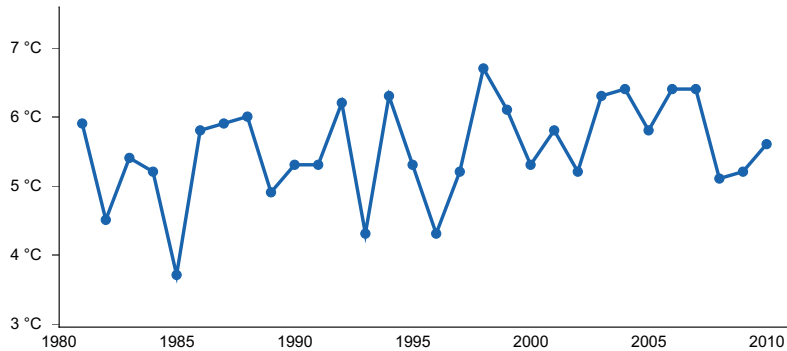


Figure 6. Annual average temperature pattern

Climate stations used

- (1) POLEBRIDGE 1 N [USC00246618], Essex, MT
- (2) WEST GLACIER [USC00248809], Kalispell, MT
- (3) WHITEFISH [USC00248902], Whitefish, MT
- (4) HUNGRY HORSE DAM [USC00244328], Kalispell, MT
- (5) LINDBERGH LAKE [USC00245043], Seeley Lake, MT

Influencing water features

NO WATER FEATURES

Wetland description

NOT APPLICABLE

Soil features

- Soils are
 - o Generally not limy (limited extent)
 - o Shallow (less than 50cm deep to bedrock, lithic, or paralithic root restrictive layer)
 - o Not ashy or medial textural family
 - o Typically less than 5% stone and boulder surface cover (<15% max)
- Soil surface texture gravelly loam or cobbly loam in surface mineral 4"
- Parent material is colluvium or residuum
- Drainage class is well drained; no flooding frequency

Table 4. Representative soil features

Parent material	(1) Colluvium (2) Residuum
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Surface texture	(1) Gravelly loam (2) Cobbly loam
Drainage class	Well drained
Soil depth	51 cm

Ecological dynamics

Legend

STATE 1. These sites may have a less productive understory due to shallow soils than the counterpart 43A Upland Warm Woodland.

STATE 2. These site may take longer to recover from Armillaria root rot disease than the counterpart 43A Upland Warm Woodland.

STATE 3. These site may not have as extensive conversion to crop or pastureland as the counterpart 43A Upland Warm Woodland.

1.1A – Moderate sized patches of tree mortality due to fire, insect, disease, windthrow.

1.1B – Stand replacement disturbance. Severe Fire or insect mortality killing large pine/fir.

1.2A – Time and infilling of moderate sized patches with trees to a reference stand of multistory stand.

1.2B – Stand replacement disturbance. Severe Fire or insect mortality killing large pine/fir, return to initiation phase.

1.3A – Time with fire return interval extended to allow natural tree regeneration to grow into dense pole stands

1.4A – Time without fire to allow vertical differentiation of stand through small gaps from death due to disease, insects, small fires, windthrow.

1.4B – Stand replacing severe fire that returns the stem exclusion phase forest to the initiation phase

1.5A – Time with no major disturbance to transition to the reference phase community

1.5B – Stand replacing severe fire that returns the vertical differentiation phase to the initiation community

T1A – Introduced grasses dominate the understory with overstory of Ponderosa pine

T1B - Fire exclusion over long periods allowing stands to grow into homogenous multi-storied stands

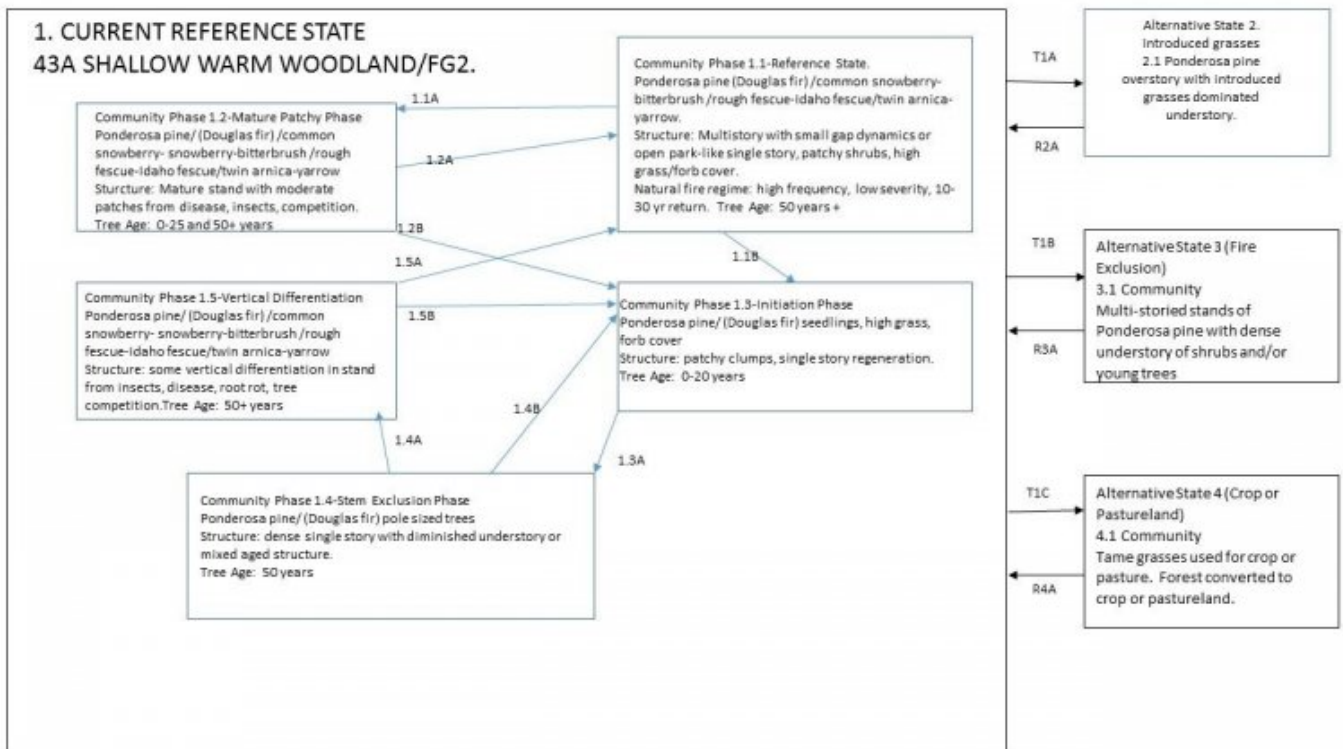
T1C – Forest stands converted to cropland or pastureland

R2A – Forest management practices to convert introduced grass understory to native perennial bunchgrasses

R3A – Forest stands restored by overstory thinning, ground and ladder fuels reduction, prescribed fire and seeding of native grasses and forbs.

R4A – Afforestation through planting of native trees /shrubs and seeding of native grasses and forbs, treatment of invasive plants and Time.

State and transition model



Animal community

WILDLIFE USES

This site has a high cover of bunchgrasses (rough fescue, Idaho fescue, bluebunch wheatgrass) in the understory, therefore the forage production for livestock is moderate, though steep slopes may limit their use.

Elk and mule deer use this site, especially during the winter for sun exposure even though browse is generally low. In areas with high cover of bitterbrush, there may be substantial deer and elk use.

Hydrological functions

The dominant tree, ponderosa pine and the native bunchgrasses of this site have some resistance and resilience to water stress of short duration, but prolonged drought will have negative consequences for the vegetation of this site.

Recreational uses

HIKING, BIKING, PHOTOGRAPHY

Wood products

Timber productivity is low to very low, since this site generally has open growing trees and lower tree regeneration potential with an understory dominated by bunchgrasses and commonly bitterbrush. Site preparation that is intensive and tree planting may be necessary.

Other references

Pfister, Robert D., et al. "Forest habitat types of Montana." Gen. Tech. Rep. INT-GTR-34. Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Forest & Range Experiment Station. 174 p. 34 (1977).

Contributors

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Approval

Kirt Walstad, 9/09/2023

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	12/18/2020
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:**
