Ecological site F043AP905MT
Shallow Cool 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 over road 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 Dystrocryepts, Eutrocryepts, 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: Douglas-fir/bluebunch wheatgrass Douglas-fir/pinegrass-kinnikinnick phase Minor association with: Douglas-fir/ninebark-ninebark phase Douglas-fir/pinegrass-ponderosa pine phase Douglas-fir/rough fescue

Ecological site concept

• Site does not receive any additional water This is a site with shallower soils than the closely related Upland Cool Woodland and therefore has less productivity, and resistance and resilience to disturbance. • Dominant Cover: Coniferous Forest The reference vegetation community is a forest dominated by Douglas fir with a grassy understory, either pinegrass with the low shrub kinnikinnick or a

bunchgrass dominated understory with bluebunch wheatgrass. Understory species species from most common to least include: common snowberry (Symphoricarpos albus), pinegrass (Calamagrostis rubescens), Geyer's sedge (Carex geyeri), arrowleaf balsamroot (Balsamorhiza sagittata), creeping barberry (Mahonia repens), bluebunch wheatgrass (Pseudoroegneria spicata) and ninebark (Physocarpus malvaceus). Understory production ranges from 200 to 300 and averages 274 dry pounds per acre. • 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 very gravelly ashy silt loam or gravelly loam in surface mineral 4" • Parent material is colluvium over residuum, loamy till • Drainage class is well drained; no flooding frequency • Site Landform: south aspect mountain slopes, glacially scoured ridges, south aspect ridges • Moisture Regime: ustic/udic • Temperature Regime: frigid • Elevation Range: 3100-5300 ft • Slope: 15-50%

Associated sites

F043AP909MT	**Upland Cool Woodland Group** The sites both reside in cool site conditions of higher elevations. Both are in the ustic/udic and frigid regimes and in elevations of 3000 to 5000 feet and moderate to steep slopes of 15 to 50%.

Similar sites

F043AP909MT	**Upland Cool Woodland Group** These sites are similar in that they both have reference communities dominated by Douglas fir and a diverse understory of cool adapted plants and reside in cool site conditions, though differ in depth of soil.

Table 1. Dominant plant species

Tree	(1) *Pseudotsuga menziesii var. glauca* (2) *Pinus ponderosa*
Shrub	(1) *Physocarpus malvaceus* (2) *Arctostaphylos uva-ursi*
Herbaceous	(1) *Calamagrostis rubescens* (2) *Pseudoroegneria spicata*

Physiographic features

• Site Landform: south aspect mountain slopes, glacially scoured ridges, south aspect ridges
• Elevation Range: 3100-5300 ft
• Slope: 15-50%

Table 2. Representative physiographic features

Landforms	(1) Mountains > Ridge (2) Mountains > Mountain slope
Elevation	950 – 1,620 m
Slope	20 – 50 %
Aspect	SE, S, SW

Climatic features

• Moisture Regime: ustic/udic
• Temperature Regime: frigid

• Representative Value (RV) of range of Mean Annual Precipitation: 22-28 inches
• Representative Value (RV) of range of Mean Average Annual Temperature: 39-45 degrees
• Representative Value (RV) of range of Frost Free Days: 70-90 days
SUMMARY TABLES ARE FOR AVAILABLE CLIMATE STATIONS WHICH ARE ALL LOCATED IN VALLEYS.

Table 3 Representative climatic features

Frost-free period (characteristic range)	70-90 days
Freeze-free period (characteristic range)	130-130 days
Precipitation total (characteristic range)	530-740 mm
Frost-free period (actual range)	70-90 days
Freeze-free period (actual range)	120-130 days
Precipitation total (actual range)	480-810 mm
Frost-free period (average)	80 days
Freeze-free period (average)	130 days
Precipitation total (average)	610 mm

- (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
- (6) LIBBY 1 NE RS [USC00245015], Libby, MT

Influencing water features

NO WATER FEATURES

Wetland description

DOES NOT APPLY

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 very gravelly ashy silt loam or gravelly loam in surface mineral 4”
• Parent material is colluvium over residuum, loamy till
• Drainage class is well drained; no flooding frequency

Table 4. Representative soil features

Parent material	(1) Till (2) Residuum (3) Colluvium
Surface texture	(1) Very gravelly, ashy silt loam (2) Gravelly loam
Drainage class	Well drained
Soil depth	50 cm

Ecological dynamics

Legend
STATE 1. These shallow sites may be less diverse in grass species, high shrub cover and less productive than the counterpart 43A Upland Cool Woodland.
STATE 2. Shallow soils may exacerbate recovery from Armillaria root rot.
STATE 3. There may be less conversion to crop or pastureland in this site compared to 43A Upland Cool Woodland.
1.1A – Moderate sized patches of tree mortality due to fire, insect, disease, wind throw.
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, wind throw.
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 – Armillaria Root Rot State in which the forest has been converted to a shrubland
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 shrubland back to forest including tree planting of less Armillaria Root Rot sensitive tree species
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

Additional community tables

Animal community

Forage production of palatable grass species is variable depending on site conditions, though pinegrass can dominate areas. Use by horses and cattle on gentler slopes. In areas with undergrowth dominated by bunchgrasses, bluebunch wheatgrass and rough fescue, the livestock grazing potential is moderate due to the palatability of these species. Moderate use by deer and elk in winter throughout this site.

Hydrological functions

In periods of drought, the lower elevation areas of this site can be stressed. The native bunchgrasses that occupy these areas of this site have some resistance and resilience to short durations of water stress, but not prolonged.

Recreational uses

hiking, photography, biking

Wood products

In the pinegrass dominated undergrowth areas of this site, timber production is low to moderate and site preparation and timber management must include scarification of thick sod-forming pinegrass in order to allow tree regeneration. In areas that are low elevation, on sunny exposures with open growth, low tree canopy cover and undergrowth dominated by bunchgrasses, timber production is very low to low, and tree regeneration can be impeded by thick cover of bunchgrasses.

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

jay skovlin
stephanie shoemaker

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	
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:

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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:**