Ecological site R043AP807MT
Subirrigated Grassland Group

Last updated: 9/08/2023
Accessed: 05/10/2025

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): 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.

Ecological site concept

• Site not located in a flood plain
• Seasonal high water table < 100cm from ground surface
• Dominant Cover: Grassland (specifically sedge dominated in wettest areas); small areas that are drier may have the shrubs bog blueberry, dwarf birch on the periphery. The production is generally very high due to the sedge component and averages 3827 dry pounds per acre (500-5000).
• Soils are
o Generally not saline or saline-sodic or limy (limited extent)
o Moderately deep, deep or very deep
o Not ashy or medial textural family
o Typically less than 5% stone and boulder cover (<15% max)
• Soil surface texture ashy silt loam, silt loam, or mucky peat in surface mineral 4”
• Parent material is alluvium, volcanic ash over alluvium and organic material over alluvium
• Drainage class is somewhat poorly to very poorly drained; no flooding frequency
• Site Landform: depressions, closed depressions, fens
• Moisture Regime: aquic
• Temperature Regime: frigid
• Elevation Range: 3280-4100 ft
• Slope: 0-2%

Associated sites

R043AP810MT	**Upland Grassland Group** These sites are associated in that they reside within the larger landforms of alluvial fans and stream terraces. Site R043AP807MT are depressions, closed depressions, fens within these larger landforms. Both sites are found in elevations ranging 3300 to 4100 feet on low slopes.

Similar sites

R043AX973MT	**Montane Fen woollyfruit sedge (Carex lasiocarpa)** These sites are similar in that they both describe fens with subirrigated water flow and organic material in the soil and reference communities dominated by sedge species.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Vaccinium uliginosum* (2) *Betula nana*
Herbaceous	(1) *Carex lasiocarpa* (2) *Carex buxbaumii*

Physiographic features

• Site Landform: depressions, closed depressions, fens
• Elevation Range: 3280-4100 ft

• Slope: 0-2%

Table 2. Representative physiographic features

Landforms	(1) Valley > Depression (2) Valley > Closed depression (3) Valley > Fen
Elevation	3,280–4,100 ft
Slope	0–2%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

• Moisture Regime: aquic
• Temperature Regime: frigid

• Representative Value (RV) of range of Mean Annual Precipitation: 20-30 inches
• Representative Value (RV) of range of Mean Average Annual Temperature: 41-45 degrees
• Representative Value (RV) of range of Frost Free Days: 75-95 days

Table 3. Representative climatic features

Frost-free period (characteristic range)	70-85 days
Freeze-free period (characteristic range)	123-130 days
Precipitation total (characteristic range)	20-28 in
Frost-free period (actual range)	20-87 days
Freeze-free period (actual range)	78-132 days
Precipitation total (actual range)	19-32 in
Frost-free period (average)	67 days
Freeze-free period (average)	117 days
Precipitation total (average)	24 in

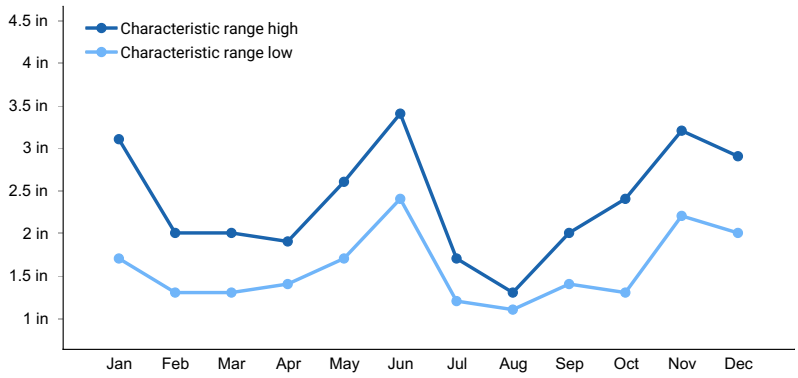


Figure 1. Monthly precipitation range

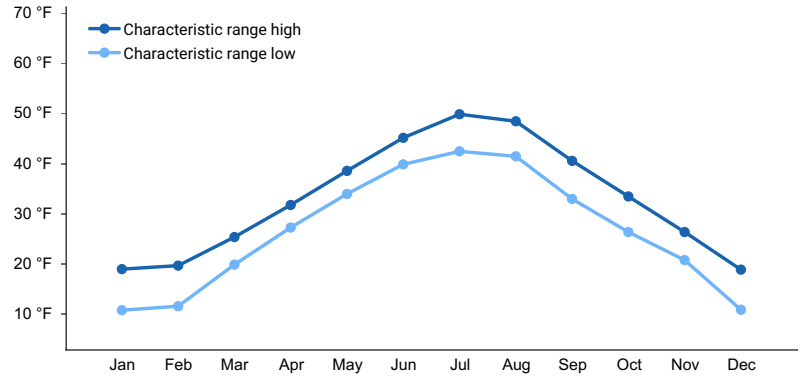


Figure 2. Monthly minimum temperature range

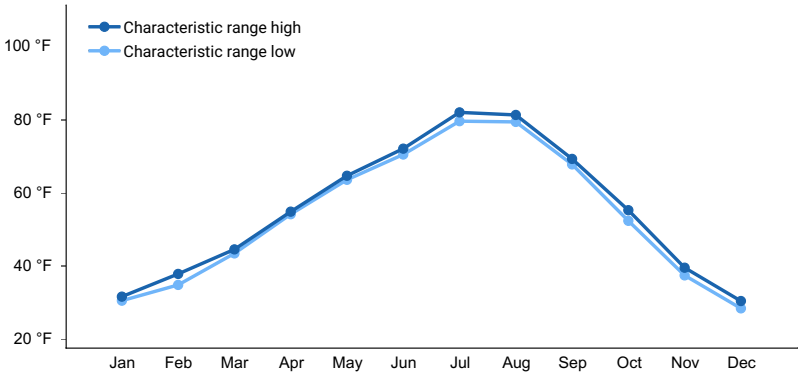


Figure 3. Monthly maximum temperature range

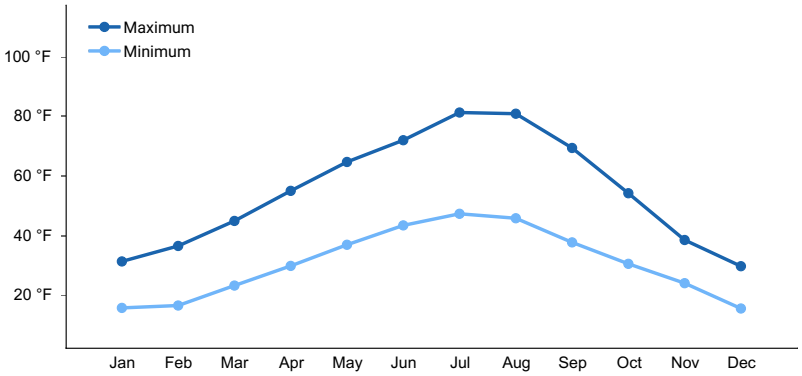


Figure 4. Monthly average minimum and maximum temperature

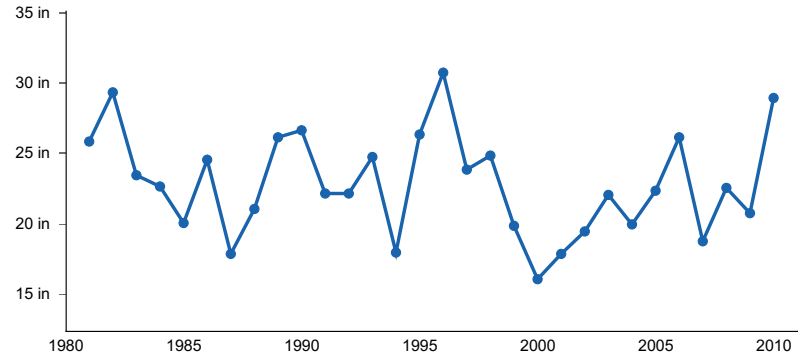


Figure 5. Annual precipitation pattern

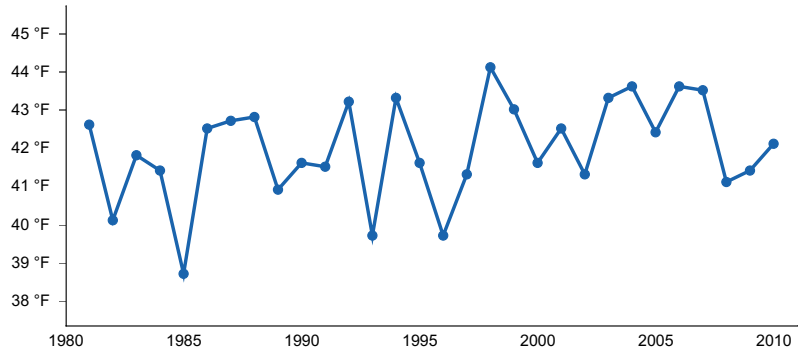


Figure 6. Annual average temperature pattern

Climate stations used

- (1) LIBBY 1 NE RS [USC00245015], Libby, MT
- (2) POLEBRIDGE 1 N [USC00246618], Essex, MT
- (3) POLEBRIDGE [USC00246615], Essex, MT
- (4) WHITEFISH [USC00248902], Whitefish, MT
- (5) WEST GLACIER [USC00248809], Kalispell, MT
- (6) HUNGRY HORSE DAM [USC00244328], Kalispell, MT
- (7) LINDBERGH LAKE [USC00245043], Seeley Lake, MT

Influencing water features

• Site not located in a flood plain
• Seasonal high water table < 100cm from ground surface
• Includes FENS with mucky peat

Wetland description

System = palustrine; Class = emergent wetland; Subclass = persistent; Water regime (nontidal) = semi-permanently flooded to seasonally flooded to saturated.

Soil features

• Soils are
o Generally not saline or saline-sodic or limy (limited extent)
o Moderately deep, deep or very deep
o Not ashy or medial textural family
o Typically less than 5% stone and boulder cover (<15% max)
• Soil surface texture ashy silt loam, silt loam, or mucky peat in surface mineral 4”
• Parent material is alluvium, volcanic ash over alluvium and organic material over alluvium
• Drainage class is somewhat poorly to very poorly drained; no flooding frequency

Table 4. Representative soil features

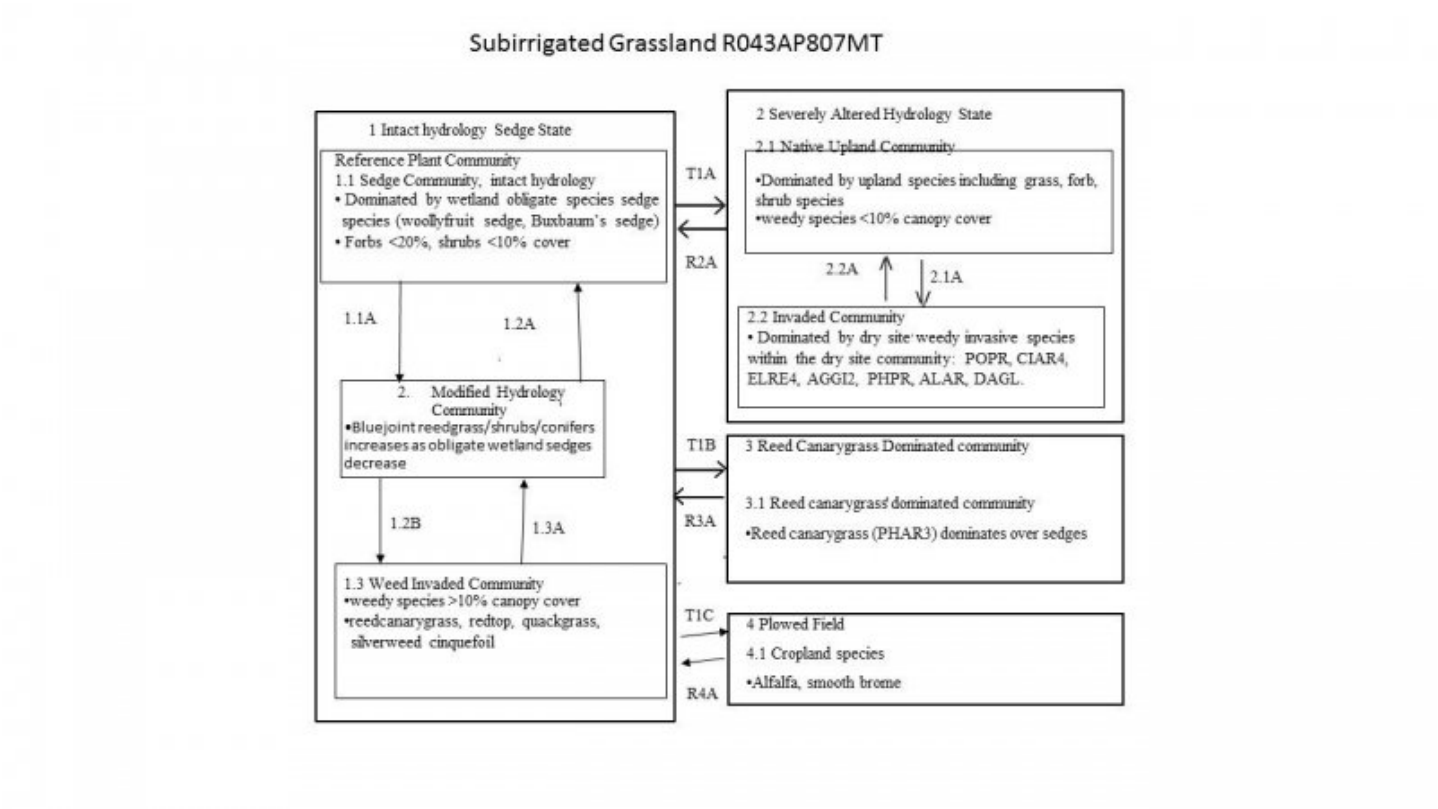
Surface texture	(1) Ashy silt loam (2) Silt loam (3) Mucky
Drainage class	Somewhat poorly drained to very poorly drained
Soil depth	20–100 in

Ecological dynamics

Legend
1.1A Hydrology altered via drought, improper grazing management, ditching/draining decreasing sedge community

and allowing Bluejoint reedgrass, shrub and conifer species to increase from periphery of fen to interior of fen
1.1B Introduction of weed propagules and weed canopy cover >10% in the reference community
1.2A Hydrology restored to allow sedge community to dominate and reduce Bluejoint reedgrass, shrub and conifer species to periphery
1.2B Introduction of weed propagules and weed canopy cover >10% in the modified hydrology community
1.3A weed management to reduce weed species bo below 10% canopy cover
1.3B Weed management to reduce weed species to below 10% canopy cover
2.1A Introduction of weed propagules into the severely altered hydrology community
2.2A Weed management practices, Proper Grazing Management
T1A Hydrology of ecological site severely altered via extended drought, ditching/draining, improper grazing management
T1B Reed Canary Grass propagules introduced and dominates any community within State 1
T1C Fen dewatered, plowed and planted with pasture or cropland grass species
R2A Hydrological function restored to reference conditions; weed management practices
R3A Extreme weed management practices
R4A Hydrologic function restored to reference conditions; seeding with native obligate wetland sedges

State and transition model



Animal community

Forage production is moderate to high ranging from 1000-3000 pounds per acres dry weight, although slender sedges has low palatability generally. Though other sedges and grasses have high palatability like woolly sedge and tufted hairgrass. Livestock tend to avoid these riparian areas until the surface is dry. Overuse during sensitive time periods (green-up) by livestock can lead to trailing and breaking apart of the rhizomatous sedges and grasses and eventually a dewatering of the site, which is highly detrimental to these native plant species. Prescribe grazing should be utilized in these areas. Light and rotational use that allows long rest periods, and use only during non-sensitive times of the year will allow the rhizomatous sedges and native grasses to recover adequately.
Wildlife uses include nesting for waterfowl, since this site is flooded enough to adequately meet their needs. Limited use by small mammals and songbirds due to flooding. Important for beaver, raptors, deer, elk and sometimes moose.

Hydrological functions

This site has high water table and flooding as well as subirrigated water sources. Therefore, actions disruptive to either overland or subirrigated water flood will cause a detrimental change to the soil and plant and wildlife species dependent on these water sources.

Recreational uses

photography use predominantly, trails and campsites should be located elsewhere due to the fragile nature of these organic wet soils.

Wood products

none

Other references

Hansen, Paul L. Classification and management of Montana's riparian and wetland sites. No. 54. Montana Forest and Conservation Experiment Station, School of Forestry, The University of Montana, 1995.

Contributors

jay skovlin
stephanie shoemaker

Approval

Kirt Walstad, 9/08/2023

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:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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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):**

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:**