

## **Ecological site R043AP802MT Bottomland Group**

Last updated: 9/08/2023  
Accessed: 05/12/2025

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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.

### Ecological site concept

- Site does receive additional water
  - Site located in a flood plain
  - Dominant Cover: Grassland, Shrubland, Deciduous and Coniferous Woodland
- This is a very diverse site that is on a flood plain, vegetation closest to the river is predominantly herbaceous, inland shrubs dominate and on the most stable level there are cottonwood trees, which are interspersed with coniferous trees at the periphery with the upland adjacent site. The production is low, 500 pounds per acre, except in areas with sedges, which have high production.
- 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 silt loam and gravelly silt loam or loam in surface mineral 4"
  - Parent material is alluvium
  - Drainage class is moderately well to very poorly drained; flooding frequency varies from rare to frequent
  - Site Landform: flood plains, stream terraces, alluvial fans
  - Moisture Regime: aquic
  - Temperature Regime: frigid
  - Elevation Range: 3200-4100 ft
  - Slope: 0-2%

### Associated sites

R043AP810MT	<b>Upland Grassland Group</b> These sites are associated in that they reside in lower elevations and interface where terraces that have black cottonwood meet with upland grasslands.
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### Similar sites

F043AX960MT	<b>Montane Deciduous Alluvial Flood Plain black cottonwood (paper birch)/redosier dogwood</b> <b>Populus balsamifera ssp. trichocarpa (Betula papyrifera)/Cornus sericea ssp. sericea</b> These sites are similar in that they reside in lower elevations on or near floodplains and have additional water to the site and experience flooding. Both sites have reference communities that are dominated by black cottonwood.
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Table 1. Dominant plant species

Tree	(1) <i>Populus balsamifera ssp. trichocarpa</i> (2) <i>Betula papyrifera</i>
Shrub	(1) <i>Cornus sericea ssp. sericea</i> (2) <i>Acer glabrum</i>
Herbaceous	(1) <i>Thalictrum occidentale</i>

## Physiographic features

- Site Landform: flood plains, stream terraces, alluvial fans
- Elevation Range: 3200-4100 ft
- Slope: 0-2%

**Table 2. Representative physiographic features**

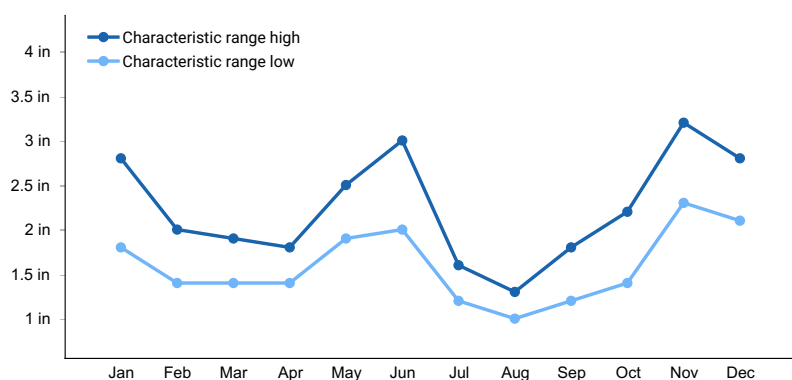
Landforms	(1) Valley > Flood plain (2) Valley > Stream terrace (3) Valley > Alluvial fan
Elevation	3,200–4,100 ft
Slope	0–2%
Aspect	W, NW, N, NE, E, SE, S, SW

## Climatic features

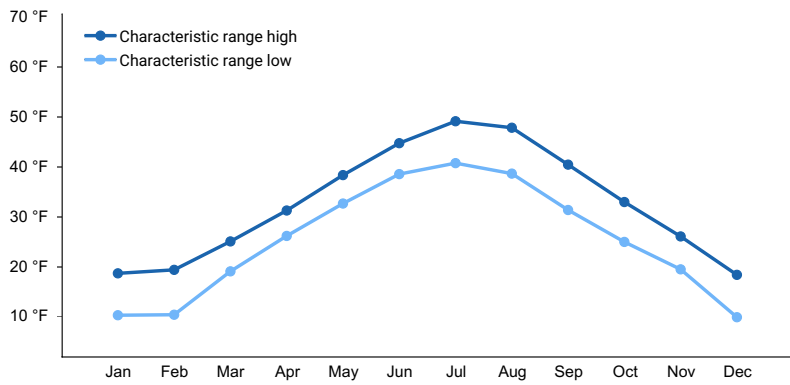
- Moisture Regime: aquic
- Temperature Regime: frigid
- Representative Value (RV) of range of Mean Annual Precipitation: 20-24 inches
- Representative Value (RV) of range of Mean Average Annual Temperature: 39-45 degrees
- Representative Value (RV) of range of Frost Free Days: 70-95 days

**Table 3. Representative climatic features**

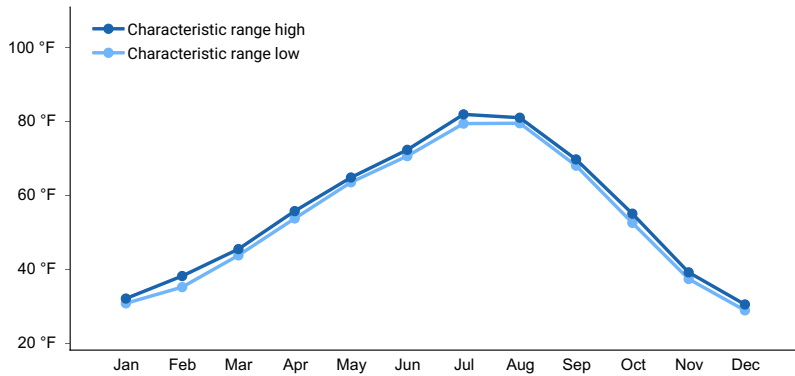
Frost-free period (characteristic range)	3-85 days
Freeze-free period (characteristic range)	63-130 days
Precipitation total (characteristic range)	19-26 in
Frost-free period (actual range)	1-87 days
Freeze-free period (actual range)	45-130 days
Precipitation total (actual range)	18-31 in
Frost-free period (average)	53 days
Freeze-free period (average)	102 days
Precipitation total (average)	23 in



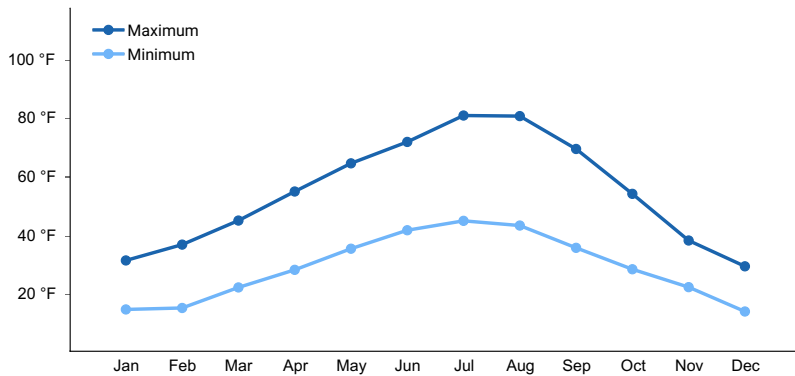
**Figure 1. Monthly precipitation range**



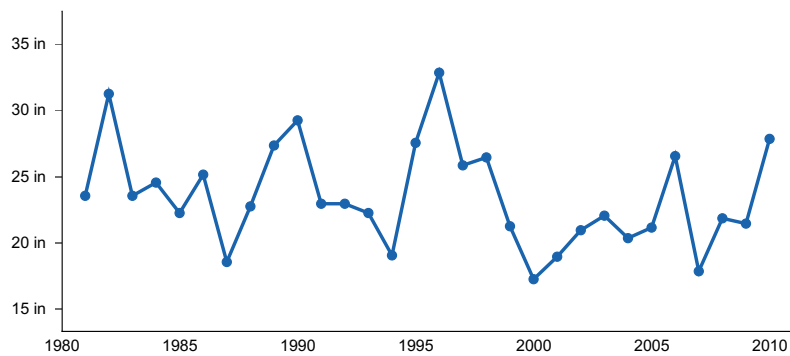
**Figure 2. Monthly minimum temperature range**



**Figure 3. Monthly maximum temperature range**



**Figure 4. Monthly average minimum and maximum temperature**



**Figure 5. Annual precipitation pattern**

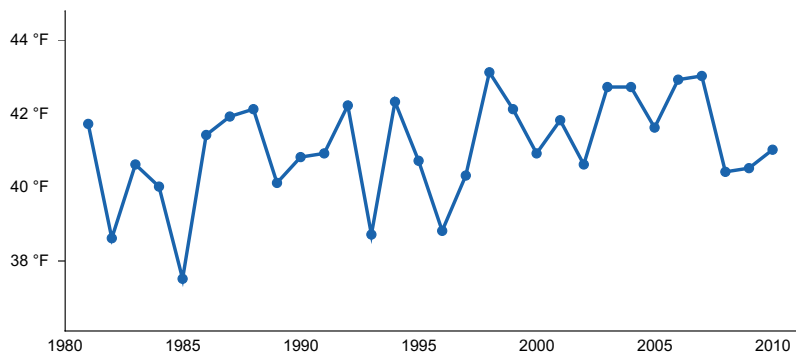


Figure 6. Annual average temperature pattern

### Climate stations used

- (1) POLEBRIDGE 1 N [USC00246618], Essex, MT
- (2) POLEBRIDGE [USC00246615], Essex, MT
- (3) WEST GLACIER [USC00248809], Kalispell, MT
- (4) HUNGRY HORSE DAM [USC00244328], Kalispell, MT
- (5) LINDBERGH LAKE [USC00245043], Seeley Lake, MT
- (6) YAAK 9NNE [USC00249187], Troy, MT
- (7) LIBBY 32 SSE [USC00245020], Libby, MT
- (8) PLEASANT VALLEY 5 SE [USC00246580], Marion, MT
- (9) LIBBY 1 NE RS [USC00245015], Libby, MT

### Influencing water features

- Site does receive additional water
- Site located in a flood plain

### Wetland description

Cowardin Classification: Paustrine: Class=forested wetland; subclass=broad-leaved deciduous; Water regime= temporarily flooded to intermittently flooded.

### 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 silt loam and gravelly silt loam or loam in surface mineral 4"
- Parent material is alluvium
- Drainage class is moderately well to very poorly drained; flooding frequency varies from rare to frequent

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam (2) Gravelly silt loam (3) Loam
Drainage class	Moderately well drained to very poorly drained
Soil depth	20–100 in

### Ecological dynamics

## Legend

State 1.0: This represents the historic state in which there are no weedy species present at the site. The community is the same composition as currently but without any weedy species.

Community Phase 1.1: This represents mature black cottonwood in the overstory with a significant presence of shorter statured paper birch present. The understory is multistoried with medium statured shrubs common snowberry and rose species and forbs and grasses. Cowardin Classification: Paustrine: Class=forested wetland; subclass=broad-leaved deciduous; Water regime= temporarily flooded to intermittently flooded.

State 2.0: This represents the current reference state in which the same dominant species exist as in State 1.0 but there is a low presence of weedy species.

Community Phase 2.1: This represents the reference state in which tall, mature black cottonwood dominate the overstory with a minor amount of paper birch. The understory has a mixture of shrubs including: redosier dogwood (*Cornus sericea* ssp. *sericea*), common snowberry (*Symphoricarpos albus*), and Rocky mountain maple (*Acer glabrum*). There is a mixture of herbaceous forbs. There can be small gap dynamics in which one or two trees die, opening the canopy and allowing sunlight into the forest floor. Cowardin Classification: Paustrine: Class=forested wetland; subclass=broad-leaved deciduous; Water regime= temporarily flooded to intermittently flooded.

Community Phase 2.2: This represents the community post disturbance from flooding or fire. It represents an early seral stage. If the flooding event or fire is substantial, than the site will not have trees. The mineral soil will allow for re-establishment by herbaceous forbs, grasses and resprouting shrubs. Tree species, especially black cottonwood, will become established on the mineral soil. Over time, the trees will over-top the shrubs and herbaceous species, and dominate. This phase is very susceptible to flooding and may be eliminated after just a year or two of growth. Ice can also damage this phase by mechanical damage (bending, shearing or pulling out of young stems or tilting or pushing over of mature trees) or flooding. Seedlings and sapling black cottonwoods are particularly susceptible to fire since their bark is thin and the root system shallow. Young black cottonwoods are very susceptible to defoliation by livestock, wildlife and beaver use, and can be eliminated. Cowardin: System=palustrine; Class=forested wetland; Subclass=broad-leaved deciduous; Water Regime (nontidal) = seasonally flooded.

Community Phase 2.3: This represents the community in competitive exclusion phase in which the tree seedlings have grown to sapling and pole sized trees and are competing with each other for resources. The canopy cover is very high, shading out the forest floor and limiting the understory to shade-tolerant species. Cowardin Classification: Paustrine: Class=forested wetland; subclass=broad-leaved deciduous; Water regime= temporarily flooded to intermittently flooded.

Community Phase 2.4: This site is directly adjacent to the active floodplain that is slightly higher and drier and sustains a ponderosa pine overstory with an understory of shrubs, forbs and perennial bunchgrasses. The mature trees are able to access the subsurface water and grow very large.

State 3.0: This community has sustained a long period of heavy utilization grazing in which the native community has been impacted and increaser species, such as baltic rush are dominant. There is increased hummocking and trailing throughout the site, which can impact roots of the native plant community and cause a decrease in productivity of the site.

State 4.0 Native with introduced annuals state:

4.1: This represents the community after heavy grazing resulting in a decrease of shrubs species except western snowberry and rose species and an introduction of weedy species such as timothy and Kentucky bluegrass. This represents a moderately disturbed secondary successional stage. Cowardin Classification: Paustrine: Class=forested wetland; subclass=broad-leaved deciduous; Water regime= temporarily flooded to intermittently flooded.

4.2: This represents the community after severe grazing in which all shrub species have been eliminated and the cover of weedy species has increased dramatically. Secondary successional state. This depauperate state has only an overstory of black cottonwood and an understory of wood's rose, common timothy and Kentucky bluegrass. Cowardin Classification: Paustrine: Class=forested wetland; subclass=broad-leaved deciduous; Water regime= temporarily flooded to intermittently flooded.

Community Phase Pathway 2.1.A: This pathway represents flooding disturbance intense enough to kill trees and

set the site back to mineral soil and colonizing herbaceous species, resprouting shrubs and tree seedlings.

Community Phase Pathway 2.2A: This pathway represents time without disturbance.

Community Phase Pathway 2.3A: This pathway represents time without disturbance.

Community Phase Pathway 2.3B: This pathway represents flooding disturbance intense enough to kill trees and set the site back to mineral soil and colonizing herbaceous species, resprouting shrubs and tree seedlings.

Community Phase Pathway 2.3C: This pathway represents time without disturbance.

Transition 1: This represents the pathway from the historic state 1.0 without any weedy species present in the vegetation community to State 2.0 in which there are very low covers of weedy species present in the vegetation community.

Transition 2: This represents the pathway from the current state to one in which increaser species such as baltic rush dominate the vegetation community due to sustained, heavy grazing.

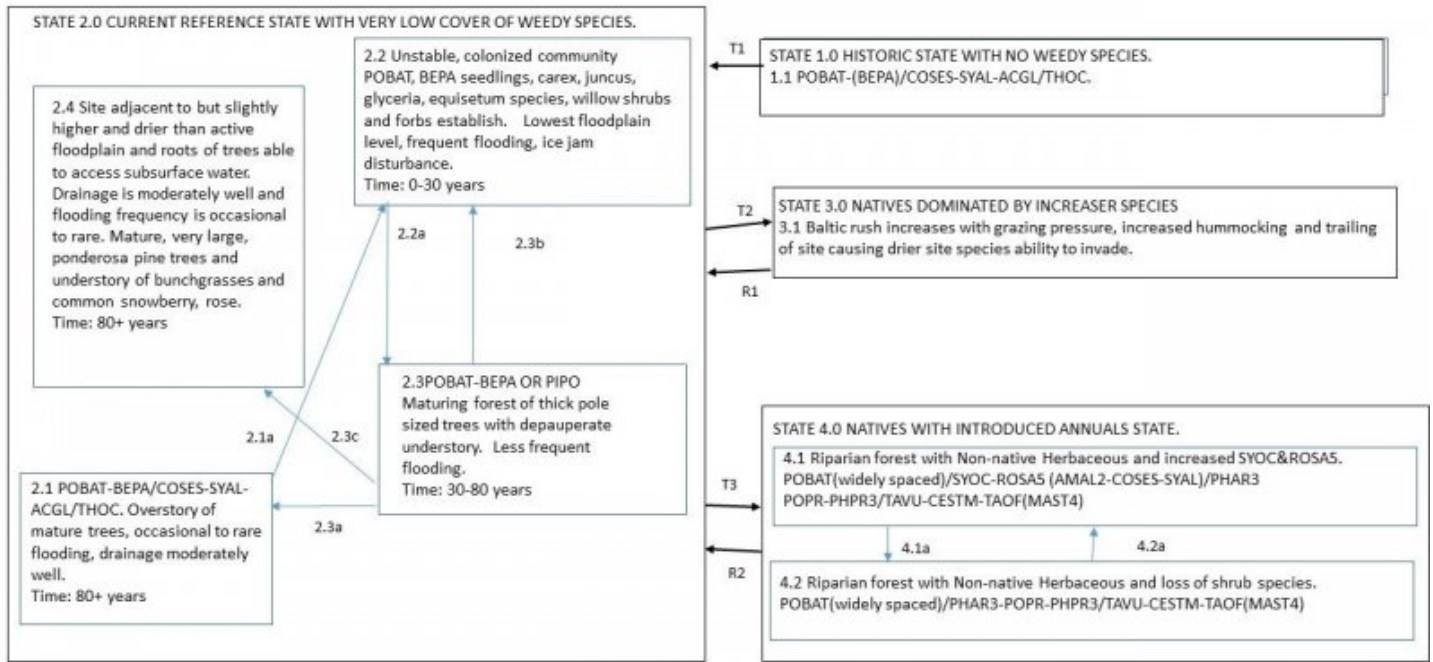
Transition 3: This represents the pathway from State 2.0 the current reference state in which the cover of weedy species is very low to State 4.0 in which there has been a dramatic increase of weedy species through heavy continuous livestock grazing.

Community Phase Pathway 4.1.A: This pathway represents the community after heavy grazing with a concomitant loss of shrub species except western snowberry and rose species.

Community Phase Pathway 4.2A: This pathway represents the community after cessation heavy grazing or establishment of prescribed grazing methods in which there is an increase of shrub species such as serviceberry, redosier dogwood and western snowberry and a decrease in shrub species such as western snowberry and rose species.

## **State and transition model**

## 43A Bottomland



## Animal community

Livestock use ranges from low to moderate depending on shrub density and its limiting effect on livestock. Red osier dogwood is very palatable to livestock and wildlife and therefore if animals are not impeded by thickets, this site could sustain moderate use. If use is heavy and sustained than there can be a reduction in shrubs with a concomitant increase in herbaceous plants with seeds in the seedbank or weedy species. In areas with common or western snowberry, the palatability of the forage decreases for cattle and sheep. In areas with Wood's rose, palatability is only fair for livestock.

Wildlife use is high and includes big games, bald eagles, ospreys, Canada geese, woodpeckers, great horned owls, wood ducks, raccoons, beaver, small birds and mammals.

This site is very important in providing thermal cover for fish.

## Hydrological functions

Cowardin Classification: Paustrine: Class=forested wetland; subclass=broad-leaved deciduous; Water regime=temporarily flooded to intermittently flooded.

This site functions in debris recruitment and streambank stability and therefore limits soil erosion.

## Recreational uses

Fishing, hunting and bird watching, campgrounds, trails.

## Wood products

Productivity of cottonwoods can be high, although conifers are not common on this site.

## 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.

Pfister, Robert D., et al. "Forest habitat types of Montana." Gen. Tech. Rep. INT-GTR-34. Ogden, UT: US



## Contributors

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## 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:**

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2. **Presence of water flow patterns:**

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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):**
- 
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:**
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17. **Perennial plant reproductive capability:**
-