

Ecological site F146XY031ME

Mucky Peat Bottom

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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.

Ecological site concept

This site typically occurs on relatively-flat areas (0-2 percent slopes) where water saturates organic peat and muck deposits for most of the growing season. Northern white cedar is the dominant overstory plant on this site, often with small diameter hardwoods and softwoods such as brown ash, balsam fir, black spruce, tamarack, and gray birch present but not dominant.

The surface soil surface consists of poorly-drained hummocks and very poorly-drained depressions. These soils receive significant extra water from the above watershed, often with ponding in the depressions during wet periods. Trees grow mostly on the hummocks, and diverse understory species occupy various niches associated with the complex microtopography.

The plant community is characterized by 50-75 percent overstory canopy cover, with diverse, productive, herbaceous understory species. Northern white cedar dominates the site, with small-diameter softwood and hardwood species often present, including balsam fir, brown ash, yellow birch, and red maple. Wind often blows down small patches or individual trees. Beaver activity or man-made structures (e.g. roads, dams) may inundate this site temporarily or permanently, killing trees and forming an open water pond. Following inundation, this site may succeed through a series of open marsh types before eventually returning to Northern White Cedar dominance. Beaver activity is expected to be limited by proximity to areas where poplar or aspen species are present.

This site is resistant to most other disturbances, including fire and insect damage. Drainage and cultivation are not typically present on this wet, mucky soil. However, winter logging is possible on these otherwise inaccessible stands, and can reduce tree density and increase herbaceous production. The cedar is resilient and expected to eventually recover dominance of the site following timber harvest.

Associated sites

F146XY021ME	Marsh The Marsh ecological site often grades into the Mucky Peat Bottom as wetness decreases. Both sites are very wet, but Marsh is too wet for tree persistence.
F146XY032ME	Loamy Till Bottom The Loamy Till Bottom site grades into the Mucky Peat Bottom as the depth of organic peat and muck increases.

Similar sites

F146XY032ME	Loamy Till Bottom The Loamy Till Bottom always has mineral soil within 16 inches of the organic soil surface, while the Mucky Peat Bottom has greater than 16 inches of organic material. The Loamy Till Bottom is overall drier than the Mucky Peat Bottom.
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Table 1. Dominant plant species

Tree	(1) <i>Thuja Occidentalis</i>
Shrub	(1) <i>Alnus incana</i>
Herbaceous	Not specified

Physiographic features

This site occurs mainly in swamps in glaciated uplands and lowlands. They can also occur on floodplains. It is characterized by pit and mound* topography, with frequent ponding of water in the pits and drier conditions on the mounds.

In the pits, the water table is typically near the soil surface (or above when ponded), while on the mounds, the water table may be a foot or more below the soil surface. Slopes are typically less than 1 percent for this site, but can be as high as 2 percent. This site occurs throughout MLRA 146 at elevations between 10 and 2,100 feet.

*Pit and mound topography is formed by the natural process of falling trees, which removes soil from the pit as they are uprooted, and deposit the soil in a mound next to the pit as the tree decays. When pit and mound topography is eliminated by land-leveling practices, it can take decades or centuries to develop naturally on this site. Much of the species diversity of this site results from the high variability in soil and plant growing conditions associated with pit and mound topography.

Table 2. Representative physiographic features

Landforms	(1) Swamp (2) Marsh
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	3–640 m
Slope	0–1%
Water table depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of this site is characterized by cold, snowy winters, and cool summers. Annual precipitation ranges from 34 to 51 inches. Precipitation is nearly equally distributed throughout the year, with slightly more moisture falling in June–October. During winter months, and sometimes fall and spring, cold winds from the north bring severe weather events. The effects of a relatively short growing season are somewhat mitigated by long summer days associated with the high latitudes of the region. Occasionally high winds, microbursts, or freezing rain events damage vegetation over small portions of the landscape.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	129 days
Precipitation total (average)	1,016 mm

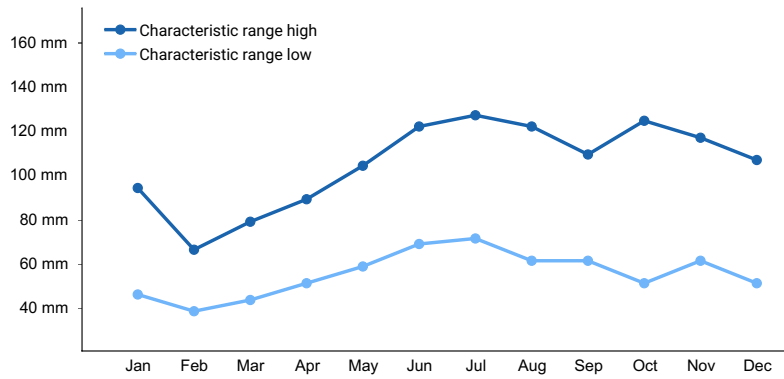


Figure 1. Monthly precipitation range

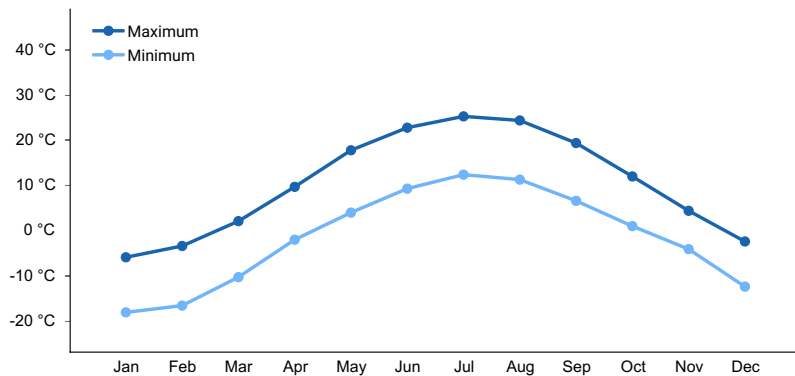


Figure 2. Monthly average minimum and maximum temperature

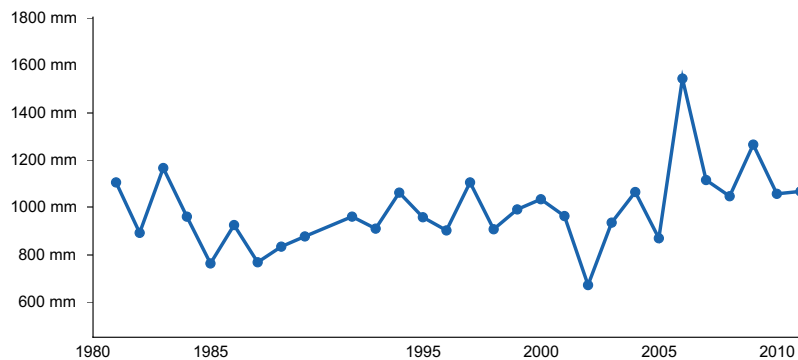


Figure 3. Annual precipitation pattern

Climate stations used

- (1) BRIDGEWATER [USC00170833], Bridgewater, ME
- (2) FT KENT [USC00172878], Fort Kent, ME
- (3) HOULTON 5N [USC00173944], Houlton, ME
- (4) PRESQUE ISLE [USC00176937], Presque Isle, ME
- (5) HOULTON INTL AP [USW00014609], Houlton, ME
- (6) ALLAGASH [USC00170200], Saint Francis, ME
- (7) CARIBOU MUNI AP [USW00014607], Caribou, ME

Influencing water features

This site receives extra moisture from neighboring watersheds which causes soil saturation for much of the growing season. The water table fluctuates throughout the year, often with ponding in depressions following spring runoff or large storm events. During dry periods, the water table may drop up to about 1 foot beneath the soil surface.

Soil features

Mucky peat bottom consists of very deep, very poorly-drained soils that formed in a mantle of well-decomposed organic soil material over loamy mineral deposits. Most often the muck layer is between 16 and 60 inches thick, and is often associated with even thicker patches of organic soil material. There are typically no rock fragments on the soil surface and throughout the muck layer. Soil pH ranges from strongly to slightly acidic, and water holding capacity is very high. The soil moisture regime is Aquic, and the soil temperature regime is Frigid.

Table 4. Representative soil features

Surface texture	(1) Muck
Family particle size	(1) Loamy
Drainage class	Very poorly drained
Soil depth	165 cm
Surface fragment cover <=3"	0–1%
Surface fragment cover >3"	0–1%
Available water capacity (0-101.6cm)	17.27–40.61 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Subsurface fragment volume <=3" (Depth not specified)	0–2%
Subsurface fragment volume >3" (Depth not specified)	0–12%

Ecological dynamics

The mucky peat bottom site is dominated by Northern white cedar, with small-diameter softwood and hardwood species often present, including balsam fir, brown ash, yellow birch, and red maple. Wind often blows down small patches or individual trees. Beaver activity or man-made structures (e.g. roads, dams) may inundate this site temporarily or permanently, killing trees and forming an open water pond. Following inundation, this site may succeed through a series of open marsh types before eventually returning to Northern White Cedar dominance. Beaver activity is expected to be limited by proximity to areas where poplar or aspen species are present. When these species are not present on or near this site, beavers are not expected to induce ponding.

This site is resistant to most other disturbances, including fire and insect damage. Drainage and cultivation are not typically present on this wet, mucky soil. However, winter logging is possible on these otherwise inaccessible stands, and can reduce tree density and increase herbaceous production. The cedar is resilient and expected to eventually recover dominance of the site following timber harvest.

State and transition model

Other references

Gawler, S. and A. Cutko. 2010. Natural Landscapes of Maine: A Guide to Natural Communities and Ecosystems. Maine Natural Areas Program, Maine Department of Conservation, Augusta, Maine.

Contributors

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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	
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):**
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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:

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:**
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