

Ecological site F146XY032ME

Loamy Till Bottom

Last updated: 5/20/2025
Accessed: 08/19/2026

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): 146X–Aroostook Area

This area is entirely in Maine and it makes up about 1,275 square miles (3,305 square kilometers). Presque Isle is the largest city in the area. Interstate 95 ends in the town of Houlton, at the border with New Brunswick, Canada. Aroostook State Park, Fort Kent Historic Site, and Loring Commerce Center are in this area. The Big Rock ski area is in the middle of this MLRA and is on the highest point, which is Mars Hill Mountain.

Ecological site concept

This site typically occurs on relatively-flat areas (1-2 percent slopes) where water saturates glacial till deposits for much of the growing season. Often it is found in valley bottoms, near open wetlands and drainageways, or in surface water discharge areas such as slope breaks. Northern white cedar is the dominant overstory plant on this site, often with small diameter hardwoods and softwoods such as brown ash, balsam fir, and yellow birch present but not dominant. The plant community is characterized by 50-75 percent overstory canopy cover, with diverse, productive, herbaceous understory and generally few shrubs. Soils formed in mineral glacial till deposits and consist of poorly-drained hummocks and very-poorly-drained depressions. Trees grow mostly on the hummocks, and diverse understory species occupy various niches associated with the complex microtopography. Dark organic materials are present on the soil surface, but the subsoil consists of lighter grey and brown mineral soils that are regularly saturated with water. These soils receive significant extra water from the above watershed, often with ponding in the depressions during wet periods.

Associated sites

F146XY051ME	Rockland The mucky beat bottom site often intergrades with the loamy till bottom site as soils get wetter and organic deposits get deeper.
F146XY021ME	Marsh The Marsh site may occur near this site as it grades into wetter soils with deeper organic deposits. Marsh sites are typically open herbaceous wetlands or red maple wetlands, rather than cedar woodlands found on loamy till bottoms.

Similar sites

F146XY051ME	Rockland This site has organic soil throughout the profile, rather than mineral soil under an organic surface layer. Both sites have abundant northern white cedar, but overstory canopy cover is usually less than 50 percent on the mucky peat bottom site, allowing for more herbaceous production in the understory than the loamy till bottom site.
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Table 1. Dominant plant species

Tree	(1) <i>Thuja occidentalis</i> (2) <i>Picea mariana</i>
Shrub	(1) <i>Alnus incana ssp. rugosa</i> (2) <i>Ilex verticillata</i>
Herbaceous	(1) <i>Carex trisperma</i> (2) <i>Gaultheria hispidula</i>

Physiographic features

This site occurs in valley bottoms, near open wetlands and drainageways, or in surface water discharge areas such as slope breaks. 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 5 percent for this site, but can be as high as 8 percent. This site occurs throughout MLRA 146 at elevations between 120 and 2,500 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) Ground moraine (2) Till plain
Runoff class	Negligible to low
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Frequent
Elevation	40 – 760 m
Slope	0 – 10 %
Ponding depth	0 – 10 cm
Water table depth	0 – 30 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of this site is characterized by cold, snowy winters, and cool summers. 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, microburst, or freezing rain events damage vegetation over small portions of the landscape.

Table 3 Representative climatic features

Frost-free period (characteristic range)	80-90 days
Freeze-free period (characteristic range)	130-130 days
Precipitation total (characteristic range)	940-1,070 mm
Frost-free period (actual range)	60-110 days
Freeze-free period (actual range)	100-140 days
Precipitation total (actual range)	910-1,070 mm
Frost-free period (average)	90 days
Freeze-free period (average)	130 days
Precipitation total (average)	990 mm

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

Soil features

The soils of this site are characterized by two soil types that occur together due to pit and mound topography. The pits are natural depressions consisting of very poorly-drained, frequently ponded soil with about one foot of muck on top of light grey (gleyed) mineral soil. The mounds are typically poorly-drained, not ponded, and may or may not have a thin layer of organic matter (less than 3 inches) above the mineral soil, which may range from light grey to brown in color.

Soil depth is variable on this site depending on the presence or absence of a dense layer of compacted subsoil that restricts water movement and plant roots. This dense layer is the result of compaction by the weight of glaciers and may or may not be present in all areas where this site occurs.

These soils formed in glacial till deposits of either acidic or calcareous parent material. Parent materials which are calcareous tend to produce more and larger hardwoods compared to those with acidic parent materials. The soil temperature regime is frigid, and the soil moisture regime is aquic.

Table 4. Representative soil features

Parent material	(1) Lodgment till – quartzite (2) Supraglacial meltout till – shale and siltstone
Surface texture	(1) Silt loam (2) Gravelly silt loam (3) Mucky
Family particle size	(1) Loamy
Drainage class	Poorly drained to very poorly drained
Permeability class	Slow to very slow
Soil depth	50 cm
Surface fragment cover <=3"	0 – 20 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	10.16 – 29.72 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified

Soil reaction (1:1 water) (0-101.6cm)	3.5 – 7.3
Subsurface fragment volume <=3" (Depth not specified)	0 – 20 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

Ecological dynamics

[Caveat: The vegetation information contained in this section and is only provisional, based on concepts, and future projects support validation through field work. *] The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe (Comer 2003) and localized associations provided by the Maine Natural Areas Program (Gawler and Cutko, 2010).

This ecological site is moderately to densely forested, often with little light penetrating to the forest floor. Northern white cedar is dominant (up to 95% cover), often forming a fairly uniform stand, but may be interspersed with various amounts of red maple (up to 25% cover), black spruce (up to 40% cover), or, less frequently, larch, yellow birch or balsam fir. The variable shrub and ground layers form a lush mosaic of vegetated hummocks interspersed with moist hollows. The herb layer is well developed (>30% cover), with herbs more abundant than dwarf shrubs. Understory consists of mostly herbaceous wetland species and sphagnum mosses, generally with few shrubs.

This community typically occupies level, poorly drained basins along stream flowages or the perimeter of ponds. The substrate is usually shallow peat (50 cm) over mineral soil; some sites are on deep peat accumulations. The characteristically alkaline conditions in this community type provide suitable habitat for a number of rare plant species.

In some areas, this site may be disturbed by ponding associated with beaver activity or road and other structures that impede runoff from the site. When ponded, cedar and other trees typically die, and only return following the removal of beaver dams or structures impeding runoff. Once ponding is removed, this site may transition through various open wetland phases and/or early seral forest communities prior to cedar re-establishment and dominance. Logging and wind may open up patches of tree canopy which result in increased herb production. In areas where this site is cleared, drained, and cultivated, it is used for mostly hay and pasture, or rarely as cropland.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Inventory data references

Future work is needed, as described in a future project plan, to validate the information presented in this provisional ecological site description. Future work includes field sampling, data collection and analysis by qualified vegetation ecologists and soil scientists. As warranted, annual reviews of the project plan can be conducted by the Ecological Site Technical Team. A final field review, peer review, quality control, and quality assurance reviews of the ESD are necessary to approve a final document.

Other references

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Contributors

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Approval

Greg Schmidt, 5/20/2025

Acknowledgments

Nels Barrett, Nick Butler, and Carl Bickford provided considerable review of this ecological site concept.

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	05/06/2025
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:

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:
