Ecological site F146XY071ME
Sandy

Last updated: 5/20/2025
Accessed: 09/16/2026

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 occurs on deep sandy and gravelly deposits associated with eskers, kames, outwash plains and outwash terraces. Soils range from excessively drained, which are sandy throughout, to well-drained which have a gravelly or sandy loam cap over a sandy subsoil. All of these soils formed in deposits of coarse sediment by fast-moving glacial meltwater. These landforms are dominated by softwoods, particularly red pine, white pine, hemlock and/or red spruce with sparse understory cover. However, hardwood and herbaceous species are more abundant where soils are loamier. Common hardwood species are red maple, white birch, bigtooth aspen, and black cherry. This site is subject to logging, wind, insects and disease, and other natural and human disturbances resulting in a variety of alternative states. Cultivated sites occur on flatter slopes, and are mostly pasture or hay land. Abandoned hay land may transition to pine, spruce-fir, or reference pine-dominated mixed-conifer forests. When managed for timber production, several different ecological states are possible. The pine forest state, reference mixed conifer state, and spruce-fir state are managed to maintain dominance of their respective conifer species, and to facilitate profitable harvests along predictable timelines. Hemlock forests may also result from logging practices, though these are typically less-desirable and may result from selective harvest of more valuable species, leaving the hemlock behind. As hemlock increases on the site, it inhibits the establishment of other species by shading, reducing soil moisture availability to other plants, and especially by acidifying the soil. With sufficient economic inputs, any of the states that occur on this site may transition from one to another, however, due to cost limitations, forests are typically managed for whatever timber species are currently present on the site.

Associated sites

F146XY072ME	**Loamy Over Sandy** This site may grade into the Loamy over Sandy site as soil textures become finer. This results in increased hardwoods and decreased conifers.

Similar sites

F146XY072ME	**Loamy Over Sandy** The Loamy over Sandy site occurs on similar landforms as the Sandy site, but has finer soil textures, wetter drainage classes, and greater hardwood abundance.

Table 1. Dominant plant species

Tree	(1) *Pinus resinosa* (2) *Pinus strobus*
Shrub	(1) *Gaylussacia baccata*
Herbaceous	(1) *Pteridium aquilinum* (2) *Maianthemum canadense*

Physiographic features

This site occurs on deep sandy deposits associated with eskers, kames, outwash plains and outwash terraces at elevations up to 2000 feet. Slopes are flat to very steep ranging from 0-45 percent. As glaciers receded, high-energy meltwater deposited coarse sediments, resulting in the sandy and gravelly landforms typical of this site.

Table 2. Representative physiographic features

Landforms	(1) Esker (2) Kame (3) Outwash terrace
Runoff class	Negligible to low
Flooding frequency	None
Ponding frequency	None
Elevation	0 – 610 m
Slope	0 – 50 %
Water table depth	180 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, microbursts, 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

Due to its landscape position, this site is not influenced by streams or wetlands.

Soil features

The soils of this site are deep and sandy, often with gravels that occur in patches or throughout the soil profile. This site includes both excessively drained soils which are sandy throughout, and well drained to somewhat excessively well drained soils which have a gravelly or sandy loam cap over a sandy subsoil. All of these soils formed in deposits of relatively coarse sediment deposited by fast-moving glacial meltwater. Water holding capacity is low and pH ranges from 3.6 to 6.5. The soil temperature regime is frigid and the soil moisture regime is udic.

Table 4. Representative soil features

Parent material	(1) Glaciofluvial deposits – granite
Surface texture	(1) Gravelly sandy loam (2) Gravelly loam (3) Extremely gravelly coarse sand

Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Moderately slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	3.56 – 20 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)	3.6 – 6.5
Subsurface fragment volume <=3" (Depth not specified)	30 – 60 %
Subsurface fragment volume >3" (Depth not specified)	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).

The reference plant communities on this site are red pine, white pine, hemlock and/or red spruce with sparse understory cover. However, hardwood and herbaceous species are more abundant where soils become finer. Common hardwood species are red maple, white birch, bigtooth aspen, and black cherry.

This site is subject to logging, wind, insects and disease, and other natural and human disturbances resulting in a variety of alternative states. Cultivated sites occur on flatter slopes, and are mostly pasture or hay land. Abandoned hay land may transition to pine, spruce-fir, or reference pine-dominated mixed-conifer forests.

When managed for timber production, several different ecological states are possible. The pine forest state, reference mixed conifer state, and spruce-fir state are managed to maintain dominance of their respective conifer species, and to facilitate profitable harvests along predictable timelines. Hemlock forests may also result from logging practices, though these are typically less-desirable and may result from selective harvest of more valuable species, leaving the hemlock behind. As hemlock increases on the site, it inhibits the establishment of other species by shading, reducing soil moisture availability to other plants, and especially by acidifying the soil.

With sufficient economic inputs, any of the states that occur on this site may transition from one to another, however, due to cost limitations, forests are typically managed for whatever timber species are currently present on the site.

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 (%)

Table 6. Community 2.1 plant community composition

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

Table 7. Community 3.1 plant community composition

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

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

Comer, P., D. Faber-Langendoen, R. Evans, S. Grawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schultz, K. Snow, and J. Teague. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia

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.

NatureServe. 2018. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. NatureServe Explorer (accessed 10 July. 2021).

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. Agricultural Handbook 296

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions. Available online. (accessed 11 Aug. 2021).

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Climate Research Station Data. Available online. (accessed 23 June. 2021).

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for [MLRA 146, Maine]. Available online. (accessed 14 Oct. 2021).

USNVC [United States National Vegetation Classification]. 2017. United States National Vegetation Classification Database V2.01. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. Available The U.S. National Vegetation Classification (usnvc.org) (accessed 2 March. 2021).

Contributors

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Approval

Greg Schmidt, 5/20/2025

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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:**

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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):**

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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:**
