USDA Natural Resources Conservation Service

# Ecological site F144BY401ME
# Clay Flat

Last updated: 9/27/2024
Accessed: 11/21/2024

## 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): 144B–New England and Eastern New York Upland, Northern Part

This major land resource area (MLRA) is in Maine (56 percent), New Hampshire (22 percent), Vermont (14 percent), Massachusetts (6 percent), Connecticut (1 percent), and New York (1 percent). It makes up about 22,728 square miles (58,864 square kilometers). The MLRA consists of a relatively young landscape shaped by the Laurentide Ice Sheet, which covered the region from 35,000 to 10,000 years ago. Rolling hills of dense basal till converge on ridges of shallow bedrock that were scoured by glacial ice. River valleys that were flooded by melting glacial water or seawater house large expanses of glacial outwash and stratified drift in inland areas and, to a lesser extent, glaciomarine and glaciolacustrine sediment deposits in coastal areas. Organic bogs, ablation till, and alluvial flood plains make up the remaining portions of the MLRA.

The soils in this region are dominantly Entisols, Spodosols, and Inceptisols. They commonly have a fragipan. The dominant suborders are Ochrepts, Orthods, Aquepts, Fluvents, and Saprists. The soils in the region dominantly have a frigid soil temperature regime with some cryic areas at higher elevation, a udic soil moisture regime, and mixed mineralogy. Most of the land is forested, and 98 percent is privately owned. Significant amounts of forest products are produced including lumber, pulpwood, Christmas trees, and maple syrup. Principal agricultural crops include forage and grains for dairy cattle, potatoes, apples, and blueberries. Wildlife habitat and recreation are important land uses. Stoniness, steep slopes, and poor drainage limit the use of many of the soils.

## Classification relationships

NRCS:
Land Resource Region: R—Northeastern Forage and Forest Region
MLRA: 144B—New England and Eastern New York Upland, Northern PartMLRA resources
Major Land Resource Area (MLRA): 144B–New England and Eastern New York Upland, Northern Part

## Ecological site concept

This ecological site is found on the frigid, poorly- and somewhat poorly- drained, non-acidic, glaciomarine or glaciolacustrine deposits in coastal and central interior flat lowland terraces within the major river valleys, or on valley floors behind glacial moraines. This site does not flood or pond, but occurs adjacent to seasonally ponded, very poorly drained sites. The seasonally high “perched” water table is within 18 inches of the surface from October through June. The perched water table with moderate and moderately slow permeability and linear slope shape, typically provides for up to 4 inches of organic matter to accumulate on the surface in forested areas. Some of these areas may have up to eight inches of accumulated organic matter. Non-forested areas typically do not have recognizable organic horizons at the surface due to surface mixing during clearing for agricultural practices.

The reference state is considered a Palustrine forested wetland in the Cowardin Wetland Classification System (Cowardin et al. 1979) and a Mineral Soil Flat in the Hydrogeomorphic (HGM) Wetland Classification System (Brinson, M.M. 1993). At some higher slopes in its range, it may correlate more closely to a slope wetland in the

HGM classification system. Due to some micro-relief, pit and mound mostly, this site may occur as a major component of associations and complexes of wetter and drier soils on the landscape, but extensive areas are in consociations as well. The reference plant community is dominantly hydrophytic vegetation; it is transitional to the vegetation of the very poorly drained positions below it and the upland positions above it. Large white pine and quaking aspen, common on abandoned farmland in river valleys, are often found on this site and are upland species considered relics of a previously cleared state.

## Associated sites

| | |
|---|---|
| F144BY402ME | **Clay Hills**<br>The somewhat poorly- and poorly-drained Clay Flat site often occurs downslope of the moderately well- and well-drained Clay Hills site |
| F144BY304ME | **Wet Clay Flat**<br>The very poorly- and poorly-drained Wet Clay Flat site may occur downslope of the poorly- and somewhate poorly- Clay Flat site |

## Similar sites

| | |
|---|---|
| F144BY304ME | **Wet Clay Flat**<br>The very poorly- and poorly-drained Wet Clay Flat site may occur downslope of the poorly- and somewhate poorly- Clay Flat site. |
| F144BY402ME | **Clay Hills**<br>The somewhat poorly- and poorly-drained Clay Flat site often occurs downslope of the moderately well- and well-drained Clay Hills site |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | (1) *Pinus strobus*<br>(2) *Acer rubrum* |
| Shrub | Not specified |
| Herbaceous | Not specified |

## Physiographic features

This site is typically located on forested flats in MLRA 144B in Maine. Slope is typically from 0 to 8 percent, with some sites ranging up to a high of 15 percent slope, and depth to a seasonal high water table is usually less than 18 inches. These soils are not subject to flooding or ponding, but can occur adjacent to seasonally ponded, very poorly drained sites. These sites are found from 0 to 1500 feet in elevation.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Lake plain > Lakebed<br>(2) Plains > Marine terrace<br>(3) Upland > Ridge<br>(4) Upland > Hill<br>(5) Coastal plain<br>(6) Lake plain<br>(7) Outwash plain |
| Runoff class | Very high |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 0–457 m |
| Slope | 0–8% |
| Water table depth | 0–33 cm |
| Aspect | Aspect is not a significant factor |

## Climatic features

The climate is humid and temperate and is characterized by warm summers and cold winters. Precipitation generally is evenly distributed throughout the year. Near the coast, it is slightly lower in summer. In inland areas, it is slightly higher in spring and fall. Rainfall occurs during high-intensity, convective thunderstorms in summer. In winter, most of the precipitation occurs as moderate-intensity storms (northeasters) that produce large amounts of rain or snow. Heavy snowfalls commonly occur late in winter. Temperatures and the length of the freeze-free period increase from north to south and closer to the coast.

This major land resource area (MLRA) covers four states and may have substantial climate variability among locations: Maine (56 percent), New Hampshire (22 percent), Vermont (14 percent), Massachusetts (6 percent), Connecticut (1 percent), and New York (1 percent).

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (characteristic range) | 117-140 days |
| Freeze-free period (characteristic range) | 144-170 days |
| Precipitation total (characteristic range) | 1,067-1,219 mm |
| Frost-free period (actual range) | 98-146 days |
| Freeze-free period (actual range) | 133-180 days |
| Precipitation total (actual range) | 1,016-1,372 mm |
| Frost-free period (average) | 126 days |
| Freeze-free period (average) | 159 days |
| Precipitation total (average) | 1,168 mm |

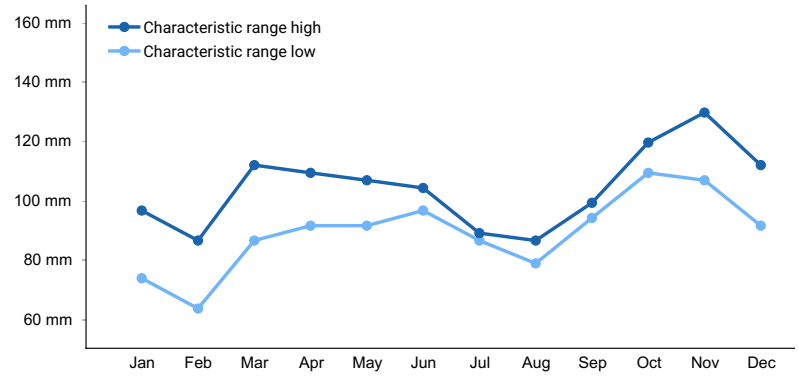



**Figure 1. Monthly precipitation range**

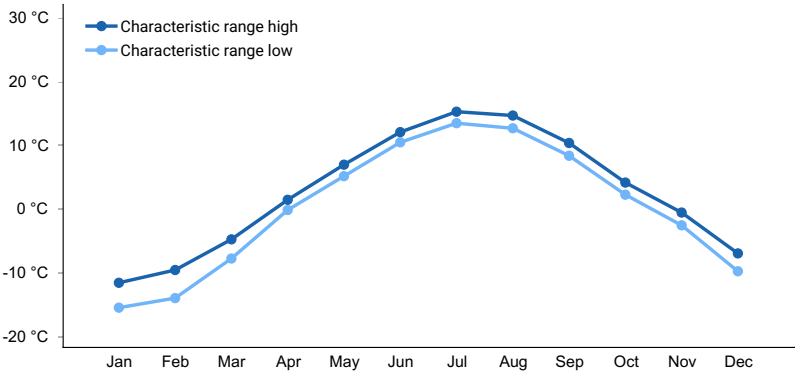



**Figure 2. Monthly minimum temperature range**

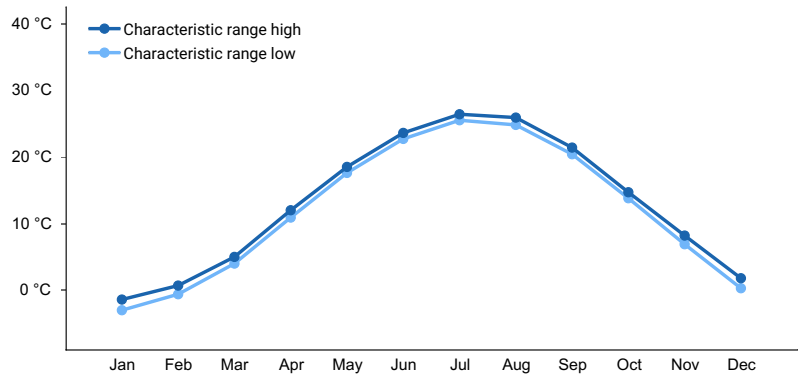



**Figure 3. Monthly maximum temperature range**

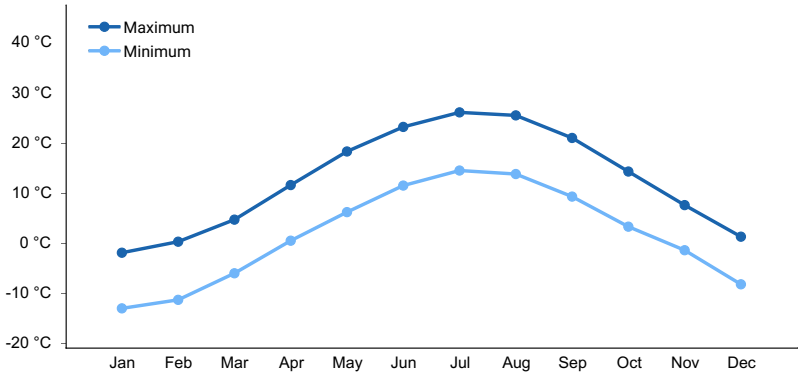



**Figure 4. Monthly average minimum and maximum temperature**

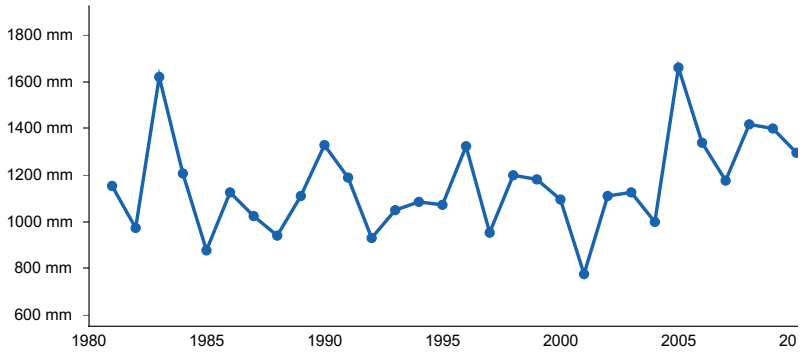



**Figure 5. Annual precipitation pattern**

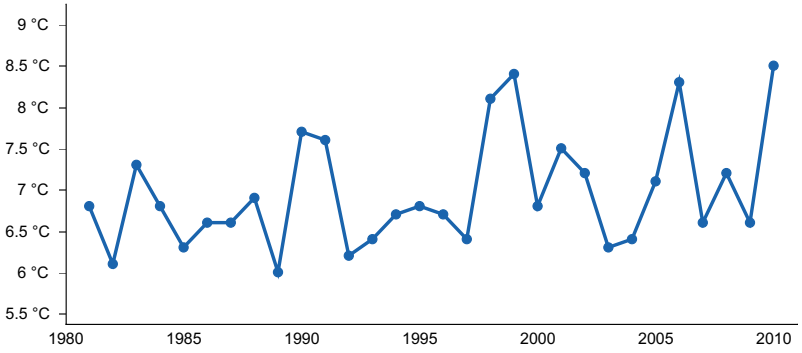



**Figure 6. Annual average temperature pattern**

## Climate stations used

- (1) BELFAST [USC00170480], Belfast, ME
- (2) ACADIA NP [USC00170100], Bar Harbor, ME
- (3) CORINNA [USC00171628], Corinna, ME

- (4) DOVER-FOXCROFT WWTP [USC00171975], Dover Foxcroft, ME
- (5) FARMINGTON [USC00172765], Farmington, ME
- (6) GARDINER [USC00173046], Gardiner, ME
- (7) JONESBORO [USC00174183], Addison, ME
- (8) LEWISTON [USC00174566], Auburn, ME
- (9) MADISON [USC00174927], Anson, ME
- (10) NEWCASTLE [USC00175675], Newcastle, ME
- (11) ORONO [USC00176430], Old Town, ME
- (12) WATERVILLE TRTMT PLT [USC00179151], Waterville, ME
- (13) WEST ROCKPORT 1 NNW [USC00179593], Rockport, ME
- (14) AUGUSTA STATE AP [USW00014605], Augusta, ME
- (15) BANGOR INTL AP [USW00014606], Bangor, ME
- (16) PORTLAND INTL JETPORT [USW00014764], Portland, ME

## Influencing water features

This site is influenced mainly by seasonal perched subsurface water. The dominant source of water is precipitation and inflow from surrounding landscapes. Water drains from these wetlands through overland flow, evapotranspiration, and seepage to ground water. This site is considered a “wetland” by USDA National Food Security Act and Corps of Engineers wetland delineation standards, as it meets all the hydric (seasonally water-saturated) soil, hydric plants, and wetland hydrology criteria. This site is typically considered a “mineral soil flat” wetland under the Hydrogeomorphic (HGM) Wetland Classification System, but may be a "slope" wetland on higher slopes in its range.

## Wetland description

Wetland Description - Cowardin Classification
System: Palustrine
Subsystem: N/A
Class: Forested wetland

## Soil features

The soils of this site are characterized by high percentages of silt and clay and low or non-existent volumes of rock fragments, which are confined to the A, Eg, and Bg soil profile or on the surface. The soils are poorly drained, and forested sites have thin (less than 20 cm thick) surfaces of highly decomposed organic matter derived primarily from woody fragments. Parent material is silty and clayey glaciomarine, or glaciolacustrine deposits.
Though the soil is commonly free of rock fragments, a few pedons contain up to 3 percent gravel. Stones are usually absent from the surface, but in some areas stone cover can be as high as 3 percent.

The soils of this site are olive gray, very deep silt loams, or silty clay loams, with silty clay loam, silty clay, or clay in the deeper horizons. The minimum relative value of clay in the surface mineral horizon is 25 percent and the maximum is 28 percent. The minimum relative value of clay in the top 20 inches is 25 percent and the maximum is 40 percent. Stone fragments sometime occur in the profile in the A, Eg, and Bg horizons. Bedrock sometimes occurs in the lower part of the soil profile, or as outcrops on the soil surface, but not to the extent that they impede the production of native vegetation. On unaltered sites, pit and mound topography may be present, with drier or wetter soils present as minor components.

The poor drainage class and the silty and clayey soil textures have the most influence on plant community composition.

The major soil component that represents the soil features for this ecological site description is Scantic silt loam, a Fine, illitic, nonacid, frigid Typic Epiaquepts.

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Glaciomarine deposits–metasedimentary rock<br>(2) Glaciolacustrine deposits–metasedimentary rock<br>(3) Marine deposits<br>(4) Supraglacial till–granite and gneiss |
| Surface texture | (1) Silt loam<br>(2) Fine sandy loam<br>(3) Silt loam<br>(4) Loam |
| Drainage class | Poorly drained |
| Permeability class | Very slow |
| Soil depth | 0–152 cm |
| Surface fragment cover <=3" | 0% |
| Surface fragment cover >3" | 0–2% |
| Available water capacity (7.6-20.3cm) | Not specified |
| Soil reaction (1:1 water) (8.9-21.3cm) | Not specified |
| Subsurface fragment volume <=3" (0-25.4cm) | Not specified |
| Subsurface fragment volume >3" (10.2-38.1cm) | Not specified |

## 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 et al., 2003) and localized associations provided by the New York Natural Heritage Program (Edinger et al., 2014), Maine Natural Areas Program (Gawler and Cutko, 2010), New Hampshire Natural Heritage Program (Sperduto and Nichols, 2011), and Massachusetts Division of Fisheries and Wildlife (Swain, 2020).

The historic reference plant community phase of this site is perceived to be an uneven-aged mixing of temperate deciduous and northern boreal species, called the “Acadian Forest.” This forest consisted of long-lived, shade-tolerant species with small gaps and relatively infrequent severe disturbances. Due to the multiple (8) biophysical regions involved and the history of land use and management, which involved over 95 percent of the MLRA land area, a least disturbed, mature, plant community phase will be considered the reference state for this ecological site description. The least disturbed, mature community phase is a mixed conifer-hardwood forest that has grown up from cleared open fields and pastures that were abandoned approximately 70 or more years ago.

Before European settlement, which occurred in the early 1600s, the plant community phase on this site consisted of an uneven-aged mixing of southern temperate deciduous and northern boreal species. This forest consisted of long-lived, shade-tolerant species with small gaps and relatively infrequent severe disturbances, from 0.6 to 1.0 percent of the land area per year. Three forested areas of similar composition occurred at the broad scale with even more variation at the local scale within each area. In the southern area of the state, forests contained more oak and pine. In the central area of the state, the dominant forest type was mixed hardwoods with some conifers. In the coastal areas, there were higher numbers of spruce in forest stands (Barton et al. 2012). Dominant tree species were hemlock and spruce with a scattering of pines and cedar with some ash and oak according to early settlement survey records (Barton et al. 2012). In forested wetlands along the mid- and eastern coast, dominant tree species included spruce, birches, and alder with smaller amounts of pine, fir, maple, oak, beech, and hemlock, which is similar to present-day vegetation composition (Barton et al. 2012). These forest stands were not especially filled with old trees either, being almost entirely less than 400 years old, and generally between 104 to 203 years old in the oldest stands.

Presettlement natural disturbances were usually small, single-tree mortality events caused by wind or insect damage, rather than stand replacing events. Stand replacing events include extensive fires on average every 1,461

years and major windstorms, such as hurricanes, on average every 3,289 years. Extensive insect outbreaks, such as the spruce budworm infestation, were recorded as occurring every 60 to 70 years (Barton et al. 2012). During present day times, these natural disturbances still occur within these intervals of time.

There appears to be only one plant community phase in the reference state. Because of the continual harvesting of the forest and the composition of the data collected from representative sites, it was not possible to differentiate between a possible more mature and a younger phase. The reference plant community phase has many of the same attributes, including species composition and structure, as the historic reference plant community phase. The site has a dense canopy cover, 85 to 99 percent, of a stratified mixture of even-aged conifer and northern hardwood tree species. Large eastern white pine (*Pinus strobus*) or quaking aspen (*Populus tremuloides*) or a mixture of both, form a super-canopy over other co-dominant or intermediate softwood and hardwood species which form the main canopy.

Even though white pine and quaking aspen are upland (Facultative Upland wetland status or FACU), shade-intolerant species, they have taken advantage of wetter cleared areas that provide drier spots where they can out-compete other species for light and space. Thus, they are a relic of a previously cleared state. The actual reference state can be described predominantly as a mixture of either spruce-fir-red maple in the eastern part or red maple-hemlock in more southern parts of the MLRA. Hemlock and red spruce occurred on drier spots in plots as they both have a wetland status of FACU, similar to white pine and quaking aspen.

The understory is very sparse due to the dense overstory cover except for very small open areas, less than 0.1 of an acre, where a wide variety of forbs, grasses, sedges, ferns, shrubs, and tree regeneration grow. Under the dense overstory, only small, scattered shade-tolerant and moisture-loving plants grow, especially mosses, liverworts, and hornworts. In addition, trees have several different types of lichen growing on them, including Lungwort (*Lobaria pulmonaria*), which occur on older hardwood trees. Tall shrubs are virtually non-existent in this dense, shady, understory.

White pine and quaking aspen regeneration is conspicuously absent from the understory because of their shade intolerance.

Natural disturbances include ice and windstorms, and insect infestations that cause small gaps in the canopy. These small open areas in the forest provide an abundance of small herbs, grasses, sedges, and shrubs as well as tree regeneration for a brief period of time. Many species of medium and small-sized mammals, birds, and insects may have an influence on the plant community composition in terms of pollination, herbivory, seed dispersal, and creation of local disturbance patches, all of which contribute to plant species diversity.

Human disturbances include timber harvesting and land clearing. Harvesting of this reference state has been continuous over the years since European settlement, with most harvesting occurring in the winter months due to the poorly drained nature of the soil. Spruce and pine were the desirable species to harvest, mainly for timber up until about 10 years ago. Presently, all types of trees, including standing dead trees, are harvested for their best use depending on their size and grade. Best use includes timber, pulp, cordwood, firewood, and biomass. A typical harvested alternative state consists of young red maple and gray birch with some fir, hemlock, poplar, and ash. Any larger trees remaining are of poor grade and some younger looking trees are actually older suppressed trees that may not respond to release.

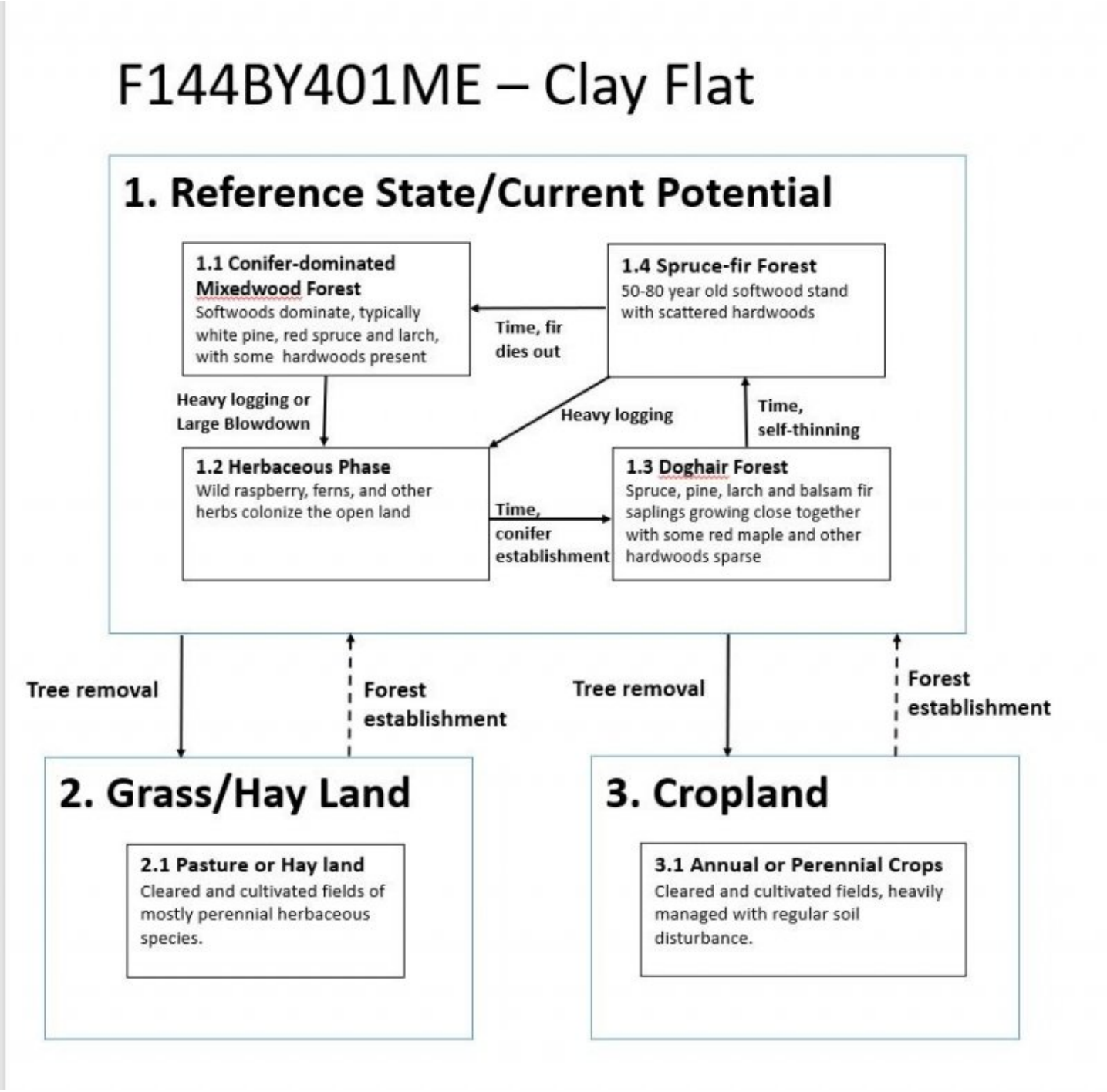
Some sites in agricultural areas have been cleared and maintained as pasture, hayland, and cropland. Small areas are cleared for silage corn or other row crops in order to “square off the field,” as part of a larger cleared upland cropped field. A cropland state may be drained or undrained. Larger cleared areas are used mainly for hay and pasture. In these hay fields, harvest is delayed or not completed if wet weather prevents access and pastures can become quite compacted from livestock.

Timber harvest areas and/or cleared areas may become infested with invasive plants such as European buckthorn in the overstory and bush honeysuckle and Japanese barberry in the understory.

A state-and-transition model diagram for the Marine Terrace Flat Ecological Site (F144BY001ME) follows this narrative. Thorough descriptions of each state, transition, plant community, and pathway follow the model. Experts base this model on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.

Plant communities will differ across the MLRA because of the naturally occurring variability in local weather events, small inclusions of other soils, and microrelief. The reference plant community is not necessarily the management goal. The biological processes on this site are complex. Therefore, representative values are presented in a land management context. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

**State and transition model**




**State 1**
**Reference State/Current Potential**

**Community 1.1**
**Conifer-dominated Mixedwood Forest**

Softwoods predominate, typically white pine, red spruce, and larch, with some hardwoods present

### Community 1.2
### Herbaceous Phase

Wild raspberry, ferns, and other herbs colonize the open land

### Community 1.3
### Doghair Forest

Spruce and balsam fir saplings growing close together with sparse amounts of red maple and other hardwoods.

### Community 1.4
### Spruce-fir Forest

50-80 year old stand of spruce and balsam fir, sphagnum understory

### Pathway 1.1a
### Community 1.1 to 1.2

Logging or blowdown opens space and light in large or small patch

**Conservation practices**

| |
|---|
| Early Successional Habitat Development/Management |
| Forest Stand Improvement |

### Pathway 1.2a
### Community 1.2 to 1.3

Time, vegetation development

### Pathway 1.3b
### Community 1.3 to 1.2

Logging or blowdown opens space and light in large or small patch

### Pathway 1.3a
### Community 1.3 to 1.4

Time, vegetation development

### Pathway 1.4a
### Community 1.4 to 1.1

Time, self-thinning (balsam fir and other pioneer tree species die out), vegetation development

### Pathway 1.4b
### Community 1.4 to 1.2

selective harvest

**Conservation practices**

| |
|---|
| Forest Land Management |

### Pathway 1.4b
### Community 1.4 to 1.3

Logging or blowdown opens space and light in large or small patch

**Conservation practices**

| |
|---|
| Forest Land Management |

### State 2
### Grass/Hay Land

### Community 2.1
### Pasture or Hayland

Cleared and cultivated fields of mostly perennial herbaceous species.

### State 3
### Cropland

### Community 3.1
### Annual or Perennial Crops

Cleared and cultivated fields of mostly perennial herbaceous plants

### Transition T1a
### State 1 to 2

Tree and stump removal, pasture cultivation

**Conservation practices**

| |
|---|
| Clearing and Snagging |
| Land Clearing |

### Transition T1b
### State 1 to 3

Clearing, tree harvest

**Conservation practices**

| |
|---|
| Clearing and Snagging |
| Land Clearing |
| Forest Land Management |

### Restoration pathway R2a
### State 2 to 1

Time abandonment, vegetation development

**Conservation practices**

| |
|---|
| Upland Wildlife Habitat Management |

### Restoration pathway R3a
### State 3 to 1

Time, abandonment, vegetation development

**Conservation practices**

| |
|---|
| Forest Land Management |

## Additional community tables

## 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

Edinger, G. J., D. J. Evans, S. Gebauer, T. G. Howard, D. M. Hunt, and A. M. Olivero (editors). 2014. Ecological Communities of New York State. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

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. 2021. NatureServe Explorer: An online encyclopedia of life [web application]. NatureServe, Arlington, Virginia. https://explorer.natureserve.org/. (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 141, Maine]. Available online. (accessed 14 Oct. 2021).

Sperduto, D.D. and William F. Nichols. 2011. Natural Communities of New Hampshire. 2nd Ed. NH Natural Heritage Bureau, Concord, NH. Pub. UNH Cooperative Extension, Durham, NH.

Swain, P. C. 2020. Classification of the Natural Communities of Massachusetts. Massachusetts Division of Fisheries and Wildlife, Westborough, MA

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 July. 2021).

## Contributors

Christopher Mann

## Approval

Nels Barrett, 9/27/2024


## Acknowledgments

Nels Barrett and Nick Butler 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 | 06/29/2020 |
| Approved by | Nels Barrett |
| 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:**