

## **Ecological site F142XA002NY Mucky Depression Frigid LRU**

Last updated: 5/22/2020  
Accessed: 05/02/2024

---

### **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): 142X—St. Lawrence-Champlain Plain

This MLRA is a glaciated area of low relief dominated by broad expanses of nearly level, sandy deltas and shallow lacustrine basins or plains punctuated by low hills of glacial till. Rivers and streams have cut relatively deep but narrow valleys across the plain. Elevation ranges from 80 to 1,000 feet, increasing gradually from the St. Lawrence River southward and from Lake Champlain to the east and west. Local relief generally is less than 30 feet, but glacial till ridges, till plains, and some outwash terraces rise 15 to 80 feet above the adjacent plains.

This area has been glaciated, and a thin mantle of till covers most of the bedrock. Extensive areas of sandy glacial outwash and eolian deposits also occur. Some glacial lake sediments have been deposited above glacial moraines. These deposits are thickest in the valleys and thinnest on the ridges and highlands. During the later stages of the Wisconsin glacial period, seawater entered the Champlain Valley and deposited marine sediments that were later covered by freshwater sediments. The marine deposits are unique to the area.

This area supports hardwoods. The beech-birch-sugar maple forest type is the dominant climax forest type on uplands. Associated with this type are basswood, American elm, maple species, white ash, black cherry, and white pine. The aspen-birch type, earlier in succession, is economically important. Such species as eastern hemlock, red maple, American elm, and spruce are on wet soils.

Some of the major wildlife species in this area are white-tailed deer, red fox, raccoon, beaver, woodchuck, muskrat, cottontail, ruffed grouse, and woodcock.

Land Resource Unit (LRU): Frigid Soil Temperature Regime

#### **Notes:**

The upper St. Lawrence and Champlain Valleys are characterized with soils in the frigid soil temperature regime (mean annual soil temperature greater than 32°F but less than 46°F and with a difference between mean summer and mean winter soil temperatures greater than 41°F at 20 inches below the surface or at a densic, lithic, or paralithic contact, whichever is shallower).

The Frigid Soil Temperature Regime (STR) will have shorter growing season than the lower St. Lawrence and Champlain Valleys which are characterized with soils in the mesic STR. Species more tolerant of colder year round temperatures would also be evident in the Frigid LRU.

### **Classification relationships**

NRCS:

Land Resource Region: R - Northeastern Forage and Forest Region

MLRA: 142 - St. Lawrence-Champlain Plain  
LRU: A/02 - Frigid Mean Annual Soil Temperature

**USFS:**

Domain: 200 - Humid Temperate  
Division: 210 - Warm Continental  
Province: 211 - Northeastern Mixed Forest  
Section: 211E - St. Lawrence and Champlain Valley  
Subsections: 211Ea - St. Lawrence Glacial Marine Plain

**EPA:**

Level I: 8 - Eastern Temperate Forests  
Level II: 8.1 - Mixed Wood Plains  
Level III: 83 - Eastern Great Lakes Lowlands  
Level IV: 83d - St. Lawrence Lowlands  
83e - Upper St. Lawrence Valley

## **Ecological site concept**

**Climate:**

Mean annual precipitation is 38 inches and evenly distributed throughout the year. Most of the rainfall occurs as high intensity, convective thunderstorms during the summer. Snowfall is heavy from late in autumn to early spring. The average temperature in winter is 18°F and in summer it is 66°F. Average frost-free and freeze-free days are 124 and 147, respectively.

**Geology:**

The soils formed in predominantly well decomposed organic material underlain by clayey deposits.

**Landform/Landscape Position:**

The site occurs in depressions on till plains and lake or marine plains. Slope ranges from 0 to 2 percent

**Edaphic:**

The site consists of very deep, very poorly drained, organic soils in depressions on till plains and lake or marine plains. Soils formed in predominantly well decomposed organic material underlain by clayey deposits. Soil are often, but not always, nutrient (calcium) rich.

**Vegetation Dynamics:**

Plant communities associated with nutrient rich peatlands characterize the site. Minerotrophic peatlands are variable based on local hydrology, minerology, and geomorphic conditions. Plant communities are typically conifer or mixed hardwood-conifer forests, woodlands, or shrublands. The site includes northern white cedar swamp, red maple-tamarack swamp, and rich shrub fen (Edinger et al 2014, Thompson and Sorenson 2005).

Common trees include northern white cedar, red maple, tamarack, eastern hemlock, black spruce, and yellow birch. Common shrubs include red osier dogwood, speckled alder, highbush blueberry, winterberry, swamp birch, alder-leaf buckthorn and poison sumac. Herbaceous plants include skunk cabbage, cinnamon fern, marsh fern, starflower and numerous sedges. Strongly minerotrophic peatlands may be dominated by either low or tall shrubs with a limited herb and tree layer.

Natural disturbances influencing the reference plant communities include ponding and duration, drought, insect damage, beaver activity, and tree falls.

## **Associated sites**

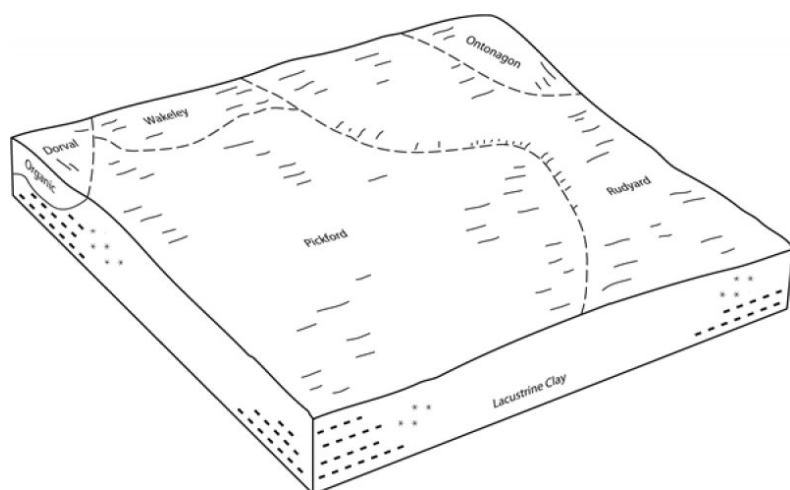
F142XA014NY	<b>Wet Lacustrine Depression</b> Poorly to very poorly drained depressions. Organic layer less than 16 inches thick.
-------------	---

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

The site occurs in depressions on till plains and lake or marine plains. Slope ranges from 0 to 2 percent. Water table is at or near the surface for much of the growing season. Ponding occurs frequently and for long duration (7 to <30 days).

**Figure 1. Mucky Depression (Dorval Soil)****Table 2. Representative physiographic features**

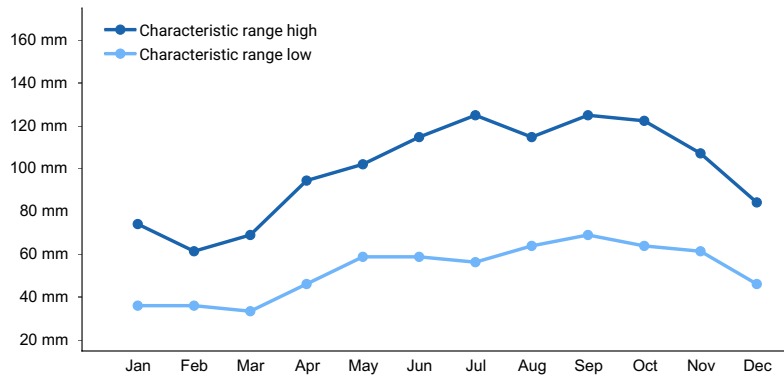
Landforms	(1) Depression
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	61–274 m
Slope	0–2%
Water table depth	0–30 cm
Aspect	Aspect is not a significant factor

## Climatic features

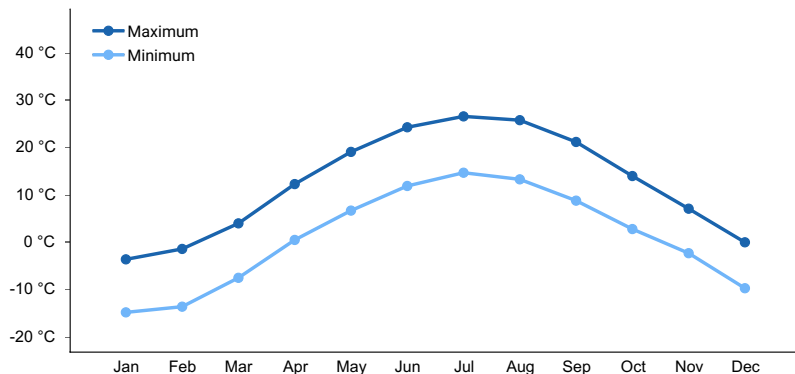
Mean annual precipitation is 38 inches and evenly distributed throughout the year. Most of the rainfall occurs as high intensity, convective thunderstorms during the summer. Snowfall is heavy from late in autumn to early spring. The average temperature in winter is 18°F and in summer it is 66°F. Average frost-free and freeze-free days are 123 and 148, respectively.

**Table 3. Representative climatic features**

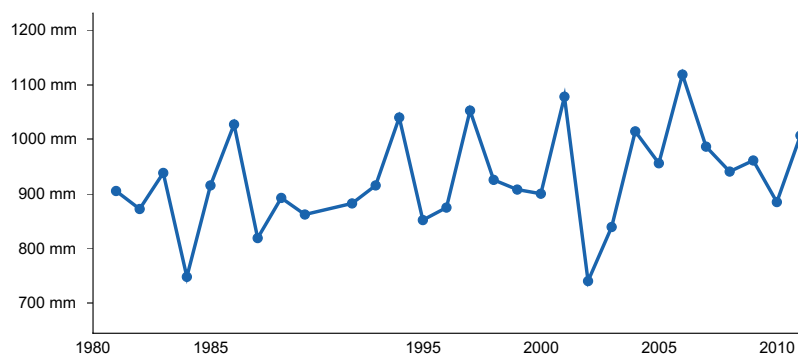
Frost-free period (average)	123 days
Freeze-free period (average)	148 days
Precipitation total (average)	965 mm



**Figure 2. Monthly precipitation range**



**Figure 3. Monthly average minimum and maximum temperature**



**Figure 4. Annual precipitation pattern**

## Climate stations used

- (1) CANTON 4 SE [USW00014743], Canton, NY
- (2) MASSENA INTL AP [USW00094725], Massena, NY
- (3) GOUVERNEUR 3 NW [USC00303346], Gouverneur, NY
- (4) OGDENSBURG 4 NE [USC00306164], Ogdensburg, NY

## Influencing water features

Very poorly drained. Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

## Soil features

The site consists of very deep, very poorly drained, organic soils in depressions on till plains and lake or marine plains. Soils formed in predominantly well decomposed organic material underlain by clayey deposits. Soil are

often, but not always, nutrient (calcium) rich. Permeability is moderate to moderately rapid in the organic layers and very slow in the clayey substratum.

Representative soil is Dorval in New York. Carbondale within MLRA 142 may also be associated with the site.

**Table 4. Representative soil features**

Surface texture	(1) Muck
Drainage class	Very poorly drained
Permeability class	Very slow to moderately rapid
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	20.32 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

The information in this provisional ecological site description, including the state-and-transition model (STM), was developed using historical information, available data, professional experience, and scientific studies. The information is representative of a complex set of plant communities. Not all scenarios or plants are included. Key indicator plants, animals, and ecological processes are described to inform land management decisions.

**Cultural Ecology:** Humans have occupied the St. Lawrence River and Champlain Valley for at least ten thousand years, adapting their ways of life in a variety of changing environments. Initially people lived in small, nomadic groups and later in larger settlements. Historically, the area was within the Iroquois Tribal Territory. European exploration of the area began in the 17th century. Fur trade and settlement of the area followed during the 18th century. Industrialization, riverine-related activities, agriculture, concentrated human settlement in metropolitan areas, and recreation are currently the major human activities affecting the ecosystem (USDA USFS)

Plant communities associated with nutrient rich peatlands characterize the site. Minerotrophic peatlands are variable based on local hydrology, minerology, and geomorphic conditions. Plant communities are typically conifer or mixed hardwood-conifer forests, woodlands, or shrublands. The site includes northern white cedar swamp, red maple-tamarack swamp, and rich shrub fen (Edinger et al 2014, Thompson and Sorenson 2005).

Common trees include northern white cedar, red maple, tamarack, eastern hemlock, black spruce, and yellow birch. Common shrubs include red osier dogwood, speckled alder, highbush blueberry, winterberry, swamp birch, alder-leaf buckthorn and poison sumac. Herbaceous plants include skunk cabbage, cinnamon fern, marsh fern, starflower and numerous sedges. Strongly minerotrophic peatlands may be dominated by either low or tall shrubs with a limited herb and tree layer.

Natural disturbances influencing the reference plant communities include ponding and duration, drought, insect

damage, beaver activity, and tree falls.

State and transition model

Mucky Peatland– Frigid LRU; RX142X02X002

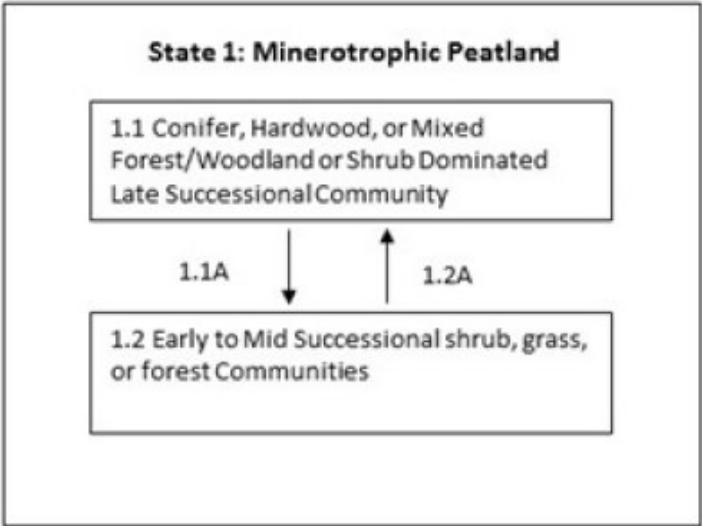


Figure 6. Mucky Peatland STM

Transition	Primary Triggers	Secondary Trigger	Indicator
1.1A	Ponding, beaver activity insect damage, or tree fall		Decrease in tree canopy cover. Increase in early successional species.
1.2A	Decreased ponding frequency and/or time		Increase in mid to late successional species

Figure 7. Mucky Peatland

State 1  
Minerotrophic Peatland

Plant species dominants: Atlantic white cedar-red maple-tamarick/alders-shrubby dogwoods-winterberry/skunk cabbage-cinnamon fern Ponding, beaver activity insect damage, or tree fall are primary triggers causing community change.

Community 1.1  
Late Successional Community

Conifer, hardwood, or mixed forest/woodland or shrub dominated community. Some characteristic species of the community phase are listed below.

Community 1.2  
Early to Mid Successional Community

Shrub, grass, or forest/woodland communities.

Pathway 1.1A  
Community 1.1 to 1.2

Ponding, beaver activity insect damage, or tree fall

Pathway 1.2A  
Community 1.2 to 1.1

Decreased ponding frequency and/or time

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
tamarack	LALA	<i>Larix laricina</i>	Native	—	—	—	—
eastern hemlock	TSCA	<i>Tsuga canadensis</i>	Native	—	—	—	—
black spruce	PIMA	<i>Picea mariana</i>	Native	—	—	—	—
yellow birch	BEAL2	<i>Betula alleghaniensis</i>	Native	—	—	—	—
arborvitae	THOC2	<i>Thuja occidentalis</i>	Native	—	—	—	—
red maple	ACRU	<i>Acer rubrum</i>	Native	—	—	—	—

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
<b>Forb/Herb</b>					
skunk cabbage	SYFO	<i>Symplocarpus foetidus</i>	Native	—	—
starflower	TRBO2	<i>Trientalis borealis</i>	Native	—	—
<b>Fern/fern ally</b>					
cinnamon fern	OSCI	<i>Osmunda cinnamomea</i>	Native	—	—
eastern marsh fern	THPA	<i>Thelypteris palustris</i>	Native	—	—
<b>Shrub/Subshrub</b>					
redosier dogwood	COSES	<i>Cornus sericea ssp. sericea</i>	Native	—	—
highbush blueberry	VACO	<i>Vaccinium corymbosum</i>	Native	—	—
common winterberry	ILVE	<i>Ilex verticillata</i>	Native	—	—
bog birch	BEP4	<i>Betula pumila</i>	Native	—	—
alderleaf buckthorn	RHAL	<i>Rhamnus alnifolia</i>	Native	—	—
poison sumac	TOVE	<i>Toxicodendron vernix</i>	Native	—	—
speckled alder	ALINR	<i>Alnus incana ssp. rugosa</i>	Native	—	—

## Other references

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.

Thompson, E. H. and Sorenson, E. R. 2000. Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont. Vermont Department of Fish and Wildlife and The Nature Conservancy. University Press of New England, One Court Street, Lebanon, NH 03766.

## Approval

Nels Barrett, 5/22/2020

## 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	05/02/2024
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:**

---