USDA Natural Resources Conservation Service

Ecological site F101XY004NY
Mucky Depression

Last updated: 10/03/2024
Accessed: 05/10/2025

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): 101X–Ontario-Erie Plain and Finger Lakes Region

Most of the MLRA is a nearly level to rolling plain. Low remnant beach ridges are commonly interspersed with a relatively level lake plain in the northern part of the area. Drumlins (long, narrow, steep-sided, cigar shaped hills) are prominent in an east-west belt in the center of the area. The Finger Lakes Region consists of a gently sloping to rolling till plain. Elevation increases gradually from the shores of Lake Ontario and Lake Oneida to the Allegheny Plateau, the southern border of the area. The bedrock underlying this area consists of alternating beds of limestone, dolomite, sandstone, and shale of Ordovician to Devonian age. Most of the surface of the area is covered with glacial till or lake sediments. The texture of the lake sediments is silt, loam, or sand. Ancient beaches, formed at different lake levels, form ridges along the shoreline of Lake Erie and Lake Ontario. Stratified drift (eskers and kames) and glacial outwash deposits are in many of the valleys. A large drumlin field occurs in the Finger Lakes Region.

Classification relationships

USDA-NRCS (USDA, 2006):
Land Resource Region (LRR): L — Lake States Fruit, Truck Crop, and Dairy Region
Major Land Resource Area (MLRA): 101— Ontario-Erie Plain and Finger Lakes Region
USDA-FS (Cleland et al., 2007)
Province: 211 — Northeastern Mixed Forest Province (in part)
Section: 211J — Mohawk Valley (in part)
Subsection: 211Jd — Mohawk Valley
Province: 222 — Midwest Broadleaf Forest Province (in part)
Section: 222I — Erie and Ontario Lake Plain
Subsection: 222Ia — Lake Erie Plain
222Ib — Erie-Ontario Lake Plain
222Ic — Eastern Ontario Till Plain
222Id — Cattaraugus Finger Lakes Moraine and Hills
222Ie — Eastern Ontario Lake Plain

Ecological site concept

Landform/Landscape Position:
The site occurs in depressions on till plains, lake plains and outwash plains. Slopes range from 0 to 2 percent.

Soils:
The site consists of very deep, very poorly drained soils that have formed in highly decomposed woody and herbaceous organic materials. Thickness of organic material is ≥ 8 inches (20 cm). Representative soils are Bergen, Carlisle/Catden, Chippeny, Edwards, Palms, Napoleon, Natchuag, Pavilion, and Willette within MLRA 101.

Vegetation
The reference community coincides with NY natural heritage communities: Rich hemlock-hardwood peat swamp, red maple-tamarack peat swamp, rich graminoid fen, and rich shrub fen depending on varying site properties.

Associated sites

F101XY013NY	**Moist Till** Moist Till sites may flank Mucky Depression sites in the landscape.

Similar sites

F101XY010NY	**Wet Lake Plain Depression** Wet Lake Plain Depression sites are also wet but with less organic material.
F101XY014NY	**Wet Till Depression** Wet Till Depression sites are also wet but with less organic material.

Table 1. Dominant plant species

Tree	(1) *Tsuga canadensis* (2) *Acer rubrum*
Shrub	(1) *Alnus incana ssp. rugosa* (2) *Cornus sericea*
Herbaceous	(1) *Symplocarpus foetidus* (2) *Carex*

Physiographic features

The site occurs in depressions on till plains, lake plains and outwash plains. Slopes range from 0 to 2 percent.

Table 2. Representative physiographic features

Landforms	(1) Valley > Depression (2) Swamp or marsh (3) Bog (4) Alluvial fan
Runoff class	Negligible
Flooding frequency	None to frequent
Ponding frequency	None to frequent
Elevation	49–3,798 ft
Slope	1–6%
Water table depth	0–54 in
Aspect	Aspect is not a significant factor

Climatic features

The Koppen-Geiger climate classification of the area in which this MLRA occurs is
Dfb, Warm-summer humid continental. Rainfall occurs as high-intensity, convective thunderstorms in the summer. However, snow comprises most of the precipitation in this area. The frost-free-free period in this area averages 165 days and ranges from 130 to 200 days, with the coldest temperatures and the shortest frost-free periods occurring in the high-elevation areas in the eastern part of the MLRA.

Table 3. Representative climatic features

Frost-free period (characteristic range)	136-140 days

Freeze-free period (characteristic range)	173-186 days
Precipitation total (characteristic range)	37-42 in
Frost-free period (actual range)	135-140 days
Freeze-free period (actual range)	167-187 days
Precipitation total (actual range)	35-42 in
Frost-free period (average)	138 days
Freeze-free period (average)	179 days
Precipitation total (average)	39 in

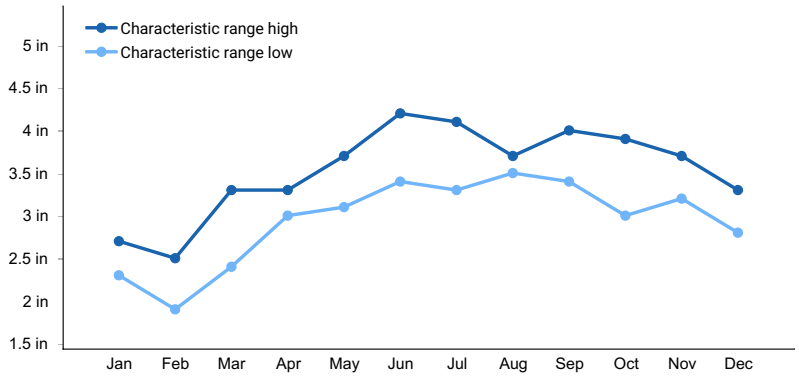


Figure 1. Monthly precipitation range

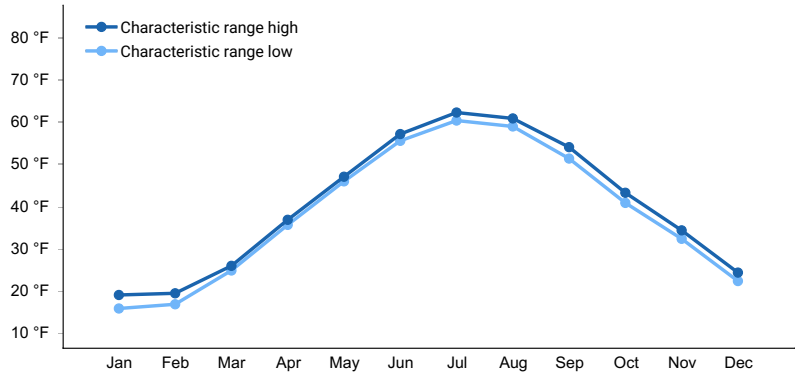


Figure 2. Monthly minimum temperature range

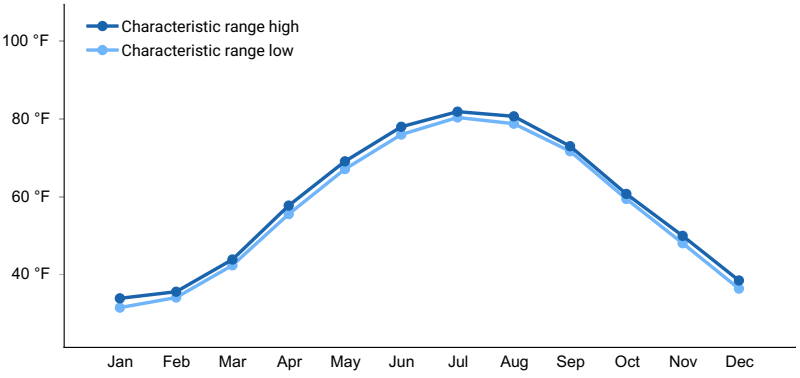


Figure 3. Monthly maximum temperature range

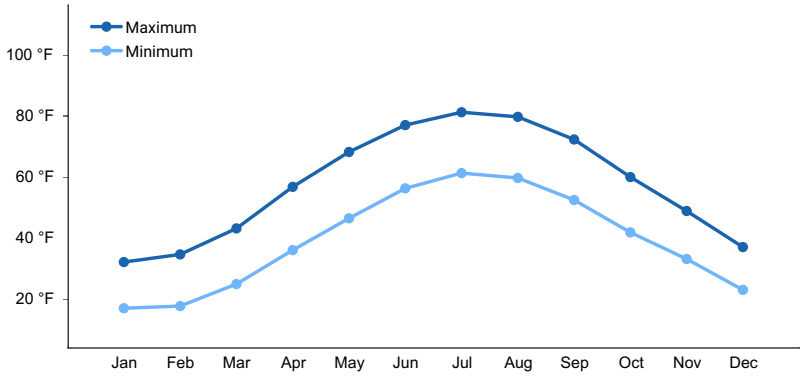


Figure 4. Monthly average minimum and maximum temperature

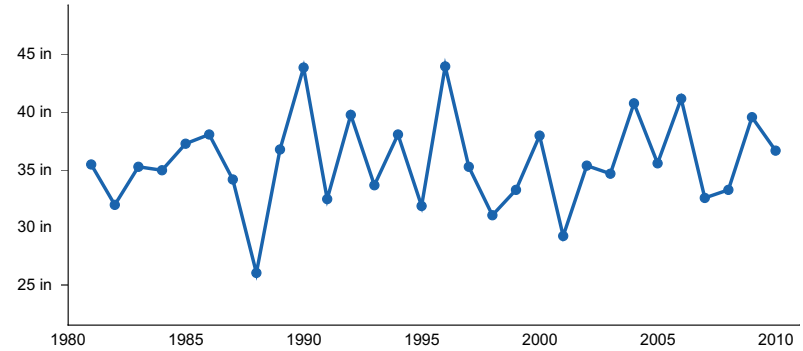


Figure 5. Annual precipitation pattern

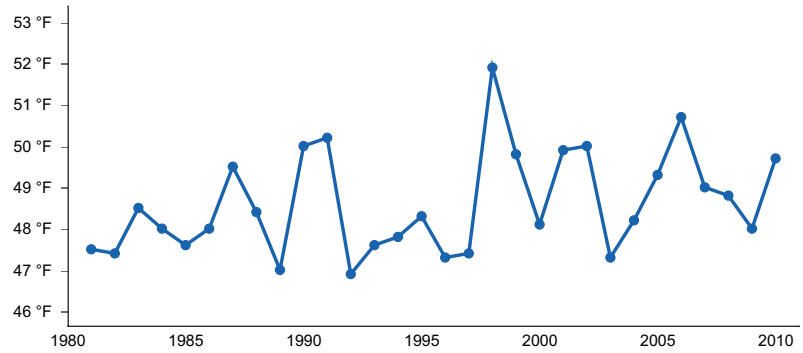


Figure 6. Annual average temperature pattern

Climate stations used

- (1) LOCKPORT 3 S [USC00304844], Lockport, NY
- (2) SUNY ESF SYRACUSE [USC00308386], Syracuse, NY
- (3) DELANSON 2NE [USC00302031], Delanson, NY
- (4) ROCHESTER GTR INTL AP [USW00014768], Rochester, NY
- (5) DUNKIRK CHAUTAUQUA AP [USW00014747], Dunkirk, NY

Influencing water features

Very poorly drained
Water is removed from the soil so slowly that free water remains at or very near the surface during much of the growing season. Internal free water occurrence 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. In areas where rainfall is high or nearly continuous, slope gradients may be greater.

Wetland description

National Wetland Inventory (NWI) Classification (Cowardin et al 1979):

Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Saturated, Fresh, Circumneutral to Alkaline
or
Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Saturated, Fresh, Circumneutral to Alkaline
or
Palustrine, Emergent, Persistent, Seasonally Saturated, Fresh, Circumneutral to Alkaline

Soil features

The site consists of very deep, very poorly drained soils that have formed in highly decomposed woody and herbaceous organic materials. Thickness of organic material is ≥ 8 inches (20 cm). Representative soils are Adrian, Bergen, Carlisle/Catden, Chippeny, Edwards, Palms, Palmyra, Napoleon, Natchuag, Martisco, Palms, Pavilion, and Willette mapped within MLRA 101.

Table 4. Representative soil features

Parent material	(1) Herbaceous organic material (2) Woody organic material (3) Organic material
Surface texture	(1) Mucky peat (2) Gravelly loam
Family particle size	(1) Clayey (2) Coarse-loamy (3) Fine-loamy over sandy or sandy-skeletal (4) Fine-silty (5) Loamy (6) Sandy or sandy-skeletal
Drainage class	Very poorly drained to well drained
Permeability class	Very slow to moderately slow
Depth to restrictive layer	22–72 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	4–16 in
Soil reaction (1:1 water) (Depth not specified)	4.5–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–8%

Ecological dynamics

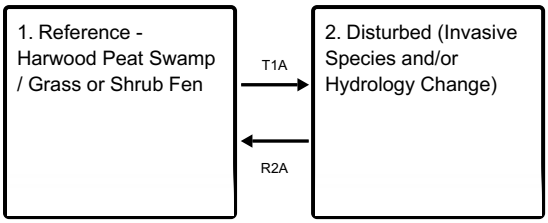
The site occurs within basins, depressions, swamps, seepage wetlands, and fens occurring within mineral rich soils. These various hydro-geologic settings are the primary determinant of water regimes, water chemistry, plant community structure and floristics, and groundwater recharge and discharge relationships (Golet et al 1992). Consequently, the reference plant community of the site is variable.

The site coincides with NY natural heritage communities: Rich hemlock-hardwood peat swamp, red maple-tamarack peat swamp, rich graminoid fen, and rich shrub fen depending on varying site properties.

Natural disturbances affecting the balance of species include wind, ice damage, and beaver activity. Anthropogenic disturbances such as the construction of drainage ditches, roads, diversions, and dams can have significant effects on the plant communities.

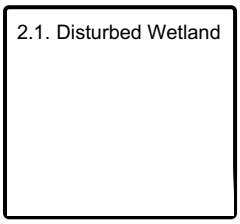
State and transition model

Ecosystem states



State 1 submodel, plant communities

State 2 submodel, plant communities



State 1
Reference - Harwood Peat Swamp / Grass or Shrub Fen

Reference state. Minimally managed. In New York (Edinger et al 2014) site coincides with Red Maple – Tamarack Peat Swamp, Rich Graminoid Fen, Rich Hemlock-Hardwood Peat Swamp, and Rich Shrub Fen.

Community 1.1
Red Maple – Black Ash – Eastern Hemlock / Alder-leaved Buckthorn Swamp Forest

Swamps typically found in depressions, seepage zones, with organic soils, predominately mucks that are influenced by higher pH and considered rich. These swamps range from nearly closed to mostly open (50 to 70%), with scattered shrubs, and a diverse ground layer of sedges, mosses, ferns, and forbs. Characteristic canopy trees include red maple (*Acer rubrum*) and black ash (*Fraxinus nigra*) and eastern hemlock (*Tsuga canadensis*), which usually has at least 20% cover, and various hardwood and conifer associates. Characteristic understory species include sedges (Carex spp.), ferns, and a number species intolerant to acidic conditions, such as skunk cabbage (*Symplocarpus foetidus*) and alder-leaved buckthorn (*Rhamnus alnifolia*). (New York Natural Heritage Program. 2018. Online Conservation Guide for Rich Hemlock-Hardwood Peat Swamp. Available from: http://guides.nynhp.org/guide.php?id=9911. Accessed September 13th, 2018.) Other reference plant communities exist based on site variability. Examples include Red Maple – Tamarack Peat Swamp, Rich Graminoid Fen, Rich Hemlock-Hardwood Peat Swamp, and Rich Shrub Fen.

State 2
Disturbed (Invasive Species and/or Hydrology Change)

Highly disturbed resulting from changes in hydrology and/or presence of invasive species.

Community 2.1
Disturbed Wetland

Structure and function impacted. Invasive species may be present.

Transition T1A
State 1 to 2

Establishment of invasive plants. Changes to hydrology (drainage, diversions, roads,) may also been a driver of change.

Restoration pathway R2A
State 2 to 1

Restoration of hydrology and/or invasive species control.

Conservation practices

Invasive Plant Species Control

Additional community tables

Inventory data references

Site Development and Testing Plan:
Future work to validate the vegetation information in this provisional ecological site description is needed. This will include field activities to collect low and medium intensity sampling and analysis of that data. Field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final approved level document. Reviews of the project plan are to be conducted by the Ecological Site Technical Team.

Other references

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Cowardin L. M., Carter V., Golet F. C., and LaRoe E.T. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. U.S. Government Printing Office, Washington, D.C., 20402.

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NatureServe 2018. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: January 2019).

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Contributors

Joshua Hibit

Approval

Greg Schmidt, 10/03/2024

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	05/21/2020
Approved by	Greg Schmidt
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:**