

# Ecological site F140XY005NY

## Frigid Steep Well Drained Dense Till

Last updated: 5/20/2020  
Accessed: 05/06/2024

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### 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): 140X–Glaciated Allegheny Plateau and Catskill Mountains

This area is primarily in the Southern New York Section of the Appalachian Plateaus Province of the Appalachian Highlands. The top of the dissected plateau in this MLRA is broad and is nearly level to moderately sloping. The narrow valleys have steep walls and smooth floors. The Catskills in the east have steep slopes. Elevation is typically 650 to 1,000 feet on valley floors; 1,650 to 2,000 feet on the plateau surface; and 3,600 feet or more in parts of the Catskills.

The average annual precipitation in most of this area is 30 to 45 inches. Rainfall occurs as high-intensity, convective thunderstorms during the summer, but most of the precipitation in this area occurs as snow. The average annual temperature is 40 to 50 degrees F.

The dominant soil order in this MLRA is Inceptisols. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. Frigid soils are found within the higher elevations.

This area supports forest vegetation, particularly hardwood species. Beech-birch-maple and elm-ash-red maple are the potential forest types. The extent of oak species increases from east to west, particularly in areas of shallow and dry soils. In some areas conifers, such as white pine, are important. Aspen, hemlock, northern white-cedar, and black ash grow on the wetter soils. In some parts of the area, sugar maple has potential economic significance. Some of the major wildlife species in this area are white-tailed deer, cottontail, turkey, pheasant, and grouse.

### Classification relationships

USDA NRCS:

LRR: R - Northeastern Forage and Forest Region

MLRA 140 - Glaciated Allegheny Plateau and Catskills Mountains

EPA Ecoregions:

Level III: 60 - Northern Allegheny Plateau and 58 - Northeastern Highlands

Level IV: 60a - Glaciated Low Allegheny Plateau, 60b - Delaware-Neversink Highlands, 60c - Catskills Transition, and 58y - Catskill High Peaks

USDA USFS:

200 Humid Temperate Domain

212 Laurentian Mixed Forest Province

M212 Adirondack - New England Mixed Forest - Coniferous Forest - Alpine Meadow Province

NY Natural Heritage Program Plant Community Classifications:

Beech-Maple Mesic Forest

## Appalachian Oak-Hickory Forest

### International Vegetation Classification Associations:

Sugar Maple - Yellow Birch - American Beech / Hobblebush Forest (CEGL006631)

Sugar Maple - American Beech - White Ash / Jack-in-the-Pulpit Forest \_CEGL006632)

American Beech - Sugar Maple Glaciated Midwest Forest (CEGL005013 )

Northern Red Oak - Sugar Maple - American Beech / Mapleleaf Viburnum Forest (CEGL006633 )

Northern Red Oak - Sugar Maple / Mapleleaf Viburnum - Northern Spicebush Forest (CEGL006635 )

### NatureServe Ecological Systems:

Laurentian-Acadian Northern Hardwood Forest (CES201.564 )

North-Central Interior Beech-Maple Forest (CES202.693 )

## Ecological site concept

### Landform/Landscape Position:

The site occurs on moderately steep to very steep mountain slopes and ridges. Slopes range from 15-55%.

### Soils:

The soils consists of very deep, well drained soils formed in loamy till derived from sandstone, siltstone, and shale.

A dense fragipan is present beginning at a depth of 43 to 91 cm (17 to 36 in). Soil temperature regime is frigid.

Reaction is very strongly acid or strongly acid throughout the mineral soil. Soil components Lewbeach and Lewbath with slopes of greater than 15% are correlated to this site.

### Vegetation:

Reference community is a Northern Hardwood Forest. Characteristic vegetation includes:

Trees: American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*). Conifers such as eastern white pine (*Pinus strobus*) and hemlock (*Tsuga canadensis*) are minor components.

Shrubs: witch-hazel (*Hamamelis virginiana*), hobblebush (*Viburnum lantanoides*), maple-leaved viburnum (*Viburnum acerifolium*)

Herbaceous: hay-scented fern (*Dennstaedtia punctilobula*), painted trillium (*Trillium undulatum*), and sessile-leaved bellwort (*Uvularia sessilifolia*)

**Table 1. Dominant plant species**

Tree	(1) <i>Acer saccharum</i> (2) <i>Fagus grandifolia</i>
Shrub	(1) <i>Hamamelis virginiana</i> (2) <i>Viburnum lantanoides</i>
Herbaceous	(1) <i>Dennstaedtia punctilobula</i> (2) <i>Trillium undulatum</i>

## Physiographic features

The site occurs on moderately steep to very steep mountain slopes and ridges. Slopes are typically greater than 30% but range from 16-70%.

**Table 2. Representative physiographic features**

Landforms	(1) Mountains > Mountain slope (2) Mountains > Ridge
Slope	20–60%

**Table 3. Representative physiographic features (actual ranges)**

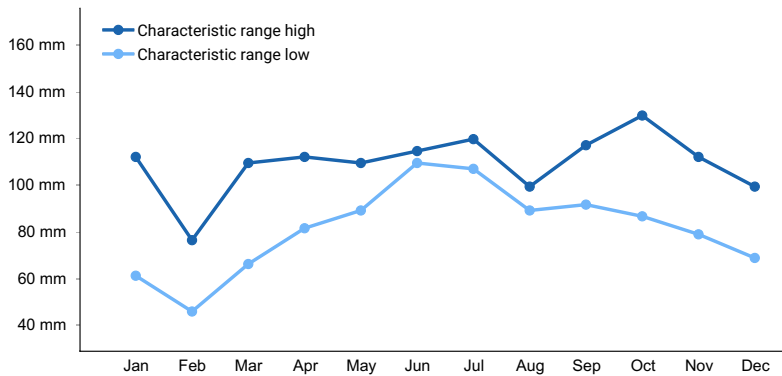
Slope	16–70%
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### Climatic features

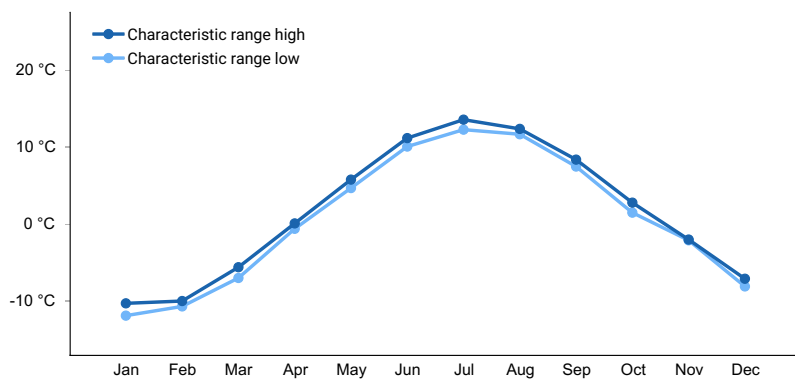
Mean annual precipitation is 46 inches and evenly distributed throughout the year. Most of the rainfall occurs as high intensity, convective thunderstorms during the summer. Snowfall is heavy from late in autumn to early spring. Average frost-free and freeze-free days are 98 and 132, respectively.

**Table 4. Representative climatic features**

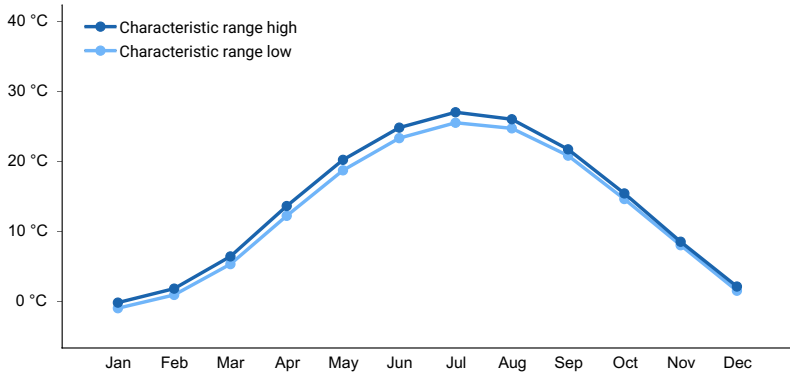
Frost-free period (characteristic range)	90-109 days
Freeze-free period (characteristic range)	124-143 days
Precipitation total (characteristic range)	965-1,295 mm
Frost-free period (actual range)	89-110 days
Freeze-free period (actual range)	118-144 days
Precipitation total (actual range)	965-1,524 mm
Frost-free period (average)	98 days
Freeze-free period (average)	132 days
Precipitation total (average)	1,168 mm



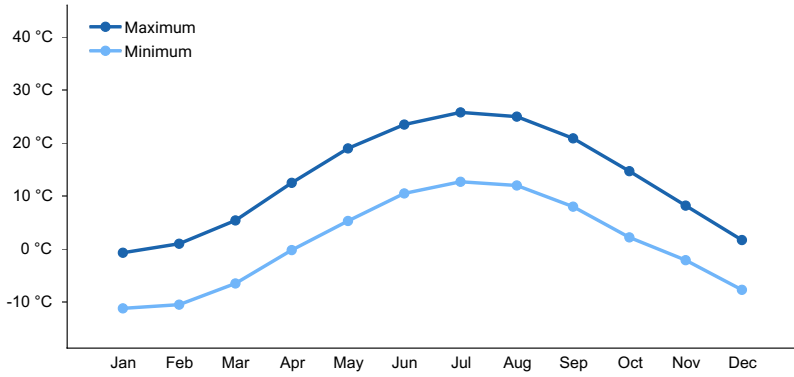
**Figure 1. Monthly precipitation range**



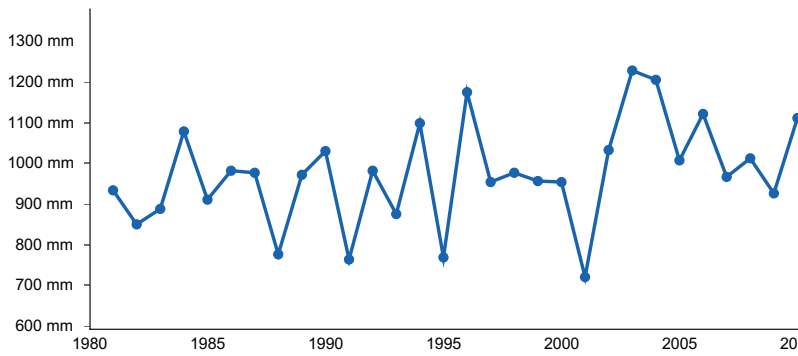
**Figure 2. Monthly minimum temperature range**



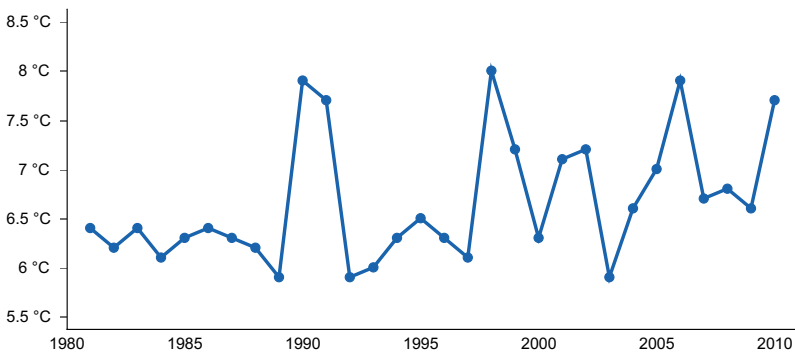
**Figure 3. Monthly maximum temperature range**



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



**Figure 5. Annual precipitation pattern**



**Figure 6. Annual average temperature pattern**

### Climate stations used

- (1) DELHI 2 SE [USC00302036], Delancey, NY
- (2) LANSING MANOR [USC00304575], Gilboa, NY
- (3) SLIDE MTN [USC00307799], Big Indian, NY

- (4) WELLSVILLE [USC00309072], Wellsville, NY
- (5) ALFRED [USC00300085], Alfred Station, NY
- (6) EAST JEWETT [USC00302366], Tannersville, NY

## Influencing water features

### Soil features

The soils consists of very deep, well drained soils formed in loamy till derived from sandstone, siltstone, and shale. A dense fragipan is present beginning at a depth of 43 to 91 cm (17 to 36 in). Soil temperature regime is frigid. Reaction is very strongly acid or strongly acid throughout the mineral soil. Soil components Lewbeach and Lewbath with slopes of greater than 15% are correlated to this site.

**Table 5. Representative soil features**

Parent material	(1) Till–sandstone and shale (2) Till–siltstone
Drainage class	Somewhat excessively drained
Permeability class	Moderate to slow
Depth to restrictive layer	36–48 cm
Soil depth	36–48 cm
Surface fragment cover <=3"	20–35%
Surface fragment cover >3"	15–25%
Available water capacity (Depth not specified)	5.08–7.62 cm
Soil reaction (1:1 water) (Depth not specified)	3.5–5.5
Subsurface fragment volume <=3" (Depth not specified)	12–35%
Subsurface fragment volume >3" (Depth not specified)	1–25%

**Table 6. Representative soil features (actual values)**

Drainage class	Not specified
Permeability class	Not specified
Depth to restrictive layer	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	10–35%
Surface fragment cover >3"	5–25%
Available water capacity (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

### Ecological dynamics

Reference community is a hardwood forest. Characteristic trees include American beech (*Fagus grandifolia*), sugar

maple (*Acer saccharum*), red oak (*Quercus rubra*), yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*). Conifers such as eastern white pine (*Pinus strobus*) and hemlock (*Tsuga canadensis*) are minor components.

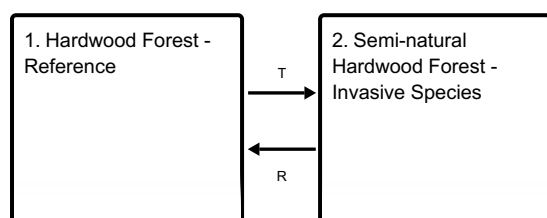
Shrubs and herbaceous plants include witch-hazel (*Hamamelis virginiana*), hobblebush (*Viburnum lantanoides*), maple-leaved viburnum (*Viburnum acerifolium*), hay-scented fern (*Dennstaedtia punctilobula*), painted trillium (*Trillium undulatum*), and sessile-leaved bellwort (*Uvularia sessilifolia*)

Reference community most likely coincides with NY Natural Heritage Program's Beech-Maple mesic forest and Appalachian oak-hickory forests depending on local site conditions.

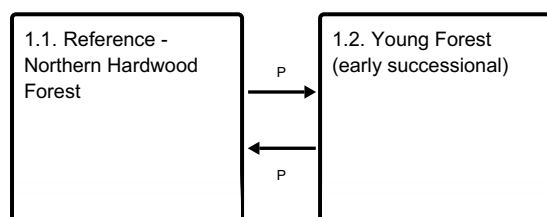
Threats to forests in general include changes in land use (e.g., clearing for development), forest fragmentation (e.g., roads), and invasive species (e.g., insects, diseases, and plants). Other threats may include over-browsing by deer, fire suppression, and air pollution (e.g., ozone and acidic deposition) (NYNHP 2019).

## State and transition model

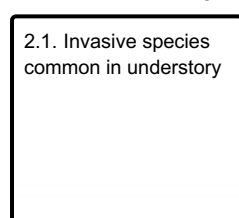
### Ecosystem states



### State 1 submodel, plant communities



### State 2 submodel, plant communities



## State 1

### Hardwood Forest - Reference

The state maintains optimal ecological function and structure with minimal management. Plant community variability occurs with natural disturbances such as ice storms, high wind, insects, and weather extremes.

## Community 1.1

### Reference - Northern Hardwood Forest

Closed canopy forest. Characteristic vegetation includes: Trees: American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*). Conifers such as eastern white pine (*Pinus strobus*) and hemlock (*Tsuga canadensis*) are minor components. Shrubs: witch-hazel (*Hamamelis virginiana*), hobblebush (*Viburnum lantanoides*), maple-leaved viburnum (*Viburnum acerifolium*) Herbaceous: hay-scented fern (*Dennstaedtia punctilobula*), painted trillium (*Trillium undulatum*), and sessile-leaved bellwort (*Uvularia sessilifolia*)

**Resilience management.** From NY Natural Heritage Program: Management should focus on activities that help maintain regeneration of the species associated with this community. Develop a plan to eliminate or control beech

bark disease. Deer have been shown to have negative effects on forest understories (Miller et al. 1992, Augustine & French 1998, Knight 2003) and management efforts should strive to ensure that regenerating trees and shrubs are not so heavily browsed that they cannot replace overstory trees. Avoid cutting old-growth examples and encourage selective logging in areas that are under active forestry.

## **Community 1.2**

### **Young Forest (early successional)**

Open canopy caused by disturbance. Increase in herbaceous and shrub community.

## **Pathway P**

### **Community 1.1 to 1.2**

Natural disturbance (wind, ice storm, insect damage, extreme weather events) or timber harvest.

## **Pathway P**

### **Community 1.2 to 1.1**

Time (succession).

## **State 2**

### **Semi-natural Hardwood Forest - Invasive Species**

Invasive species (i.e Japanese barberry, multiflora rose, garlic mustard, autumn olive, bush honeysuckle,) common within the forest understory.

## **Community 2.1**

### **Invasive species common in understory**

## **Transition T**

### **State 1 to 2**

Disturbances that allowed introduction of invasive species.

## **Restoration pathway R**

### **State 2 to 1**

## **Additional community tables**

### **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.

New York Natural Heritage Program. 2019. Online Conservation Guide for Beech-maple mesic forest. Available from: <https://guides.nynhp.org/beech-maple-mesic-forest/>. Accessed September 11, 2019.

## **Approval**

Nels Barrett, 5/20/2020

## **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	05/06/2024
Approved by	Nels Barrett
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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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:**

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