USDA Natural Resources Conservation Service

Ecological site F144AY007CT
Well Drained Dense Till Uplands

Last updated: 10/03/2024
Accessed: 05/13/2025

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): 144A–New England and Eastern New York Upland, Southern Part

The eastern half of the eastern part of this MLRA is in the Seaboard Lowland Section of the New England Province of the Appalachian Highlands. The western half of the eastern part and the southeastern half of the western part are in the New England Upland Section of the same province and division. The northwestern half of the western part is in the Hudson Valley Section of the Valley and Ridge Province of the Appalachian Highlands. This MLRA is a very scenic area of rolling to hilly uplands that are broken by many gently sloping to level valleys that terminate in coastal lowlands. Elevation ranges from sea level to 1,000 feet in much of the area, but it is 2,000 feet on some hills. Relief is mostly about 6 to 65 feet in the valleys and about 80 to 330 feet in the uplands.

This area has been glaciated and consists almost entirely of till hills, drumlins, and bedrock-controlled uplands with a mantle of till. It is dissected by narrow glacio-fluvial valleys. The southernmost boundary of the area marks the farthest southward extent of Wisconsinian glaciation on the eastern seaboard. The river valleys and coastal plains are filled with glacial lake sediments, marine sediments, and glacial outwash. The bedrock in the eastern half of the area consists primarily of igneous and metamorphic rocks of early Paleozoic age. Granite is the most common igneous rock, and gneiss, schist, and slate are the most common metamorphic rocks. In the parts of the MLRA in eastern and southeastern New York, Devonian- to Pennsylvanian-age sandstone, shale, and limestone are dominant. Carbonate rocks, primarily dolomite and limestone, are the dominant kinds of bedrock in the part of this MLRA in northwestern Connecticut.

Classification relationships

USDA-NRCS (USDA 2006):
Land Resource Region (LRR): N—East and Central Farming and Forest Region
Major Land Resource Area (MLRA): 144A— New England and Eastern New York Upland, Southern Part.

USDA-FS (Cleland et al. 2007)
Province: 221 - Eastern Broadleaf Province
Section: 221A - Lower New England
Subsection: 221Aa – Boston Basin
221Ac – Narragansett-Bristol Lowland and Islands
221Ad – Southern New England Coastal Lowland
221Ae – Hudson Highlands
221Ag - Southeast New England Coastal Hills and Plains
221Ah - Worcester-Monadnock Plateau
221Ai – Gulf of Maine Coastal Plain
221Ak - Gulf of Maine Coastal Lowland
Section: 221B – Hudson Valley
Subsection: 221Ba – Hudson Limestone Valley
221Bb - Miami – Taconic Foothills

221Bc – Hudson Glacial Lake Plains

Ecological site concept

The Well-Drained Dense Till Uplands ecological site consists of well drained, loamy soils formed in basal till derived mostly from gneiss, schist, and granite. The soils are very deep to bedrock and moderately deep to a densic contact. They are nearly level through steep soils on till plains, hills, and drumlins. Representative soils are Essex, Newport, Poquonock, Montauk, Paxton, Annisquam, Bernardston, Broadalbin, and Broadbrook.
Representative plant communities are typically dominated by a mixed oak-sugar maple forest. The vegetation is not well described. Dense till sites are considered slightly more mesophytic than ablation till sites, hence contain more sugar maple (*Acer saccharum*) and white ash (*Fraxinus americana*).

The site is very similar to the Well Drained Dense Till Uplands within MLRA 145, however the growing season is longer within MLRA 145 relative to the surrounding MLRA 144A. Additionally, the unique red soil mineralogy which characteristic of the Connecticut River Valley (MLRA 145) provides a relatively richer substrate for vegetative growth.

Associated sites

F144AY033MA	**Shallow Dry Till Uplands**
F144AY034CT	**Well Drained Till Uplands**

Similar sites

F144AY008CT	**Moist Till Uplands**
F144AY018NY	**Moist Lake Plain**

Table 1. Dominant plant species

Tree	(1) *Quercus rubra* (2) *Acer saccharum*
Shrub	(1) *Viburnum acerifolium* (2) *Ostrya virginiana*
Herbaceous	(1) *Aralia nudicaulis* (2) *Actaea rubra*

Physiographic features

The site occurs on nearly level to steep till hills, ground moraines, and drumlins. Slopes range from 0 to 45 percent.

Table 2. Representative physiographic features

Landforms	(1) Till plain (2) Hill (3) Drumlin (4) Ground moraine (5) Drumlinoid ridge (6) Moraine (7) Ridge (8) Knoll (9) Mountain (10) Hillslope
Runoff class	Very low to very high
Flooding frequency	None
Ponding frequency	None
Elevation	0–615 m

Slope	0–45%
Water table depth	30–183 cm
Aspect	Aspect is not a significant factor

Climatic features

The Koppen-Geiger climate classification of the area in which this MLRA occurs varies between Dfb (Warm-summer humid continental) in the North, and Dfa (Hot-summer humid continental) to the southern portion of the MLRA. Precipitation is usually uniformly distributed throughout the year. Near the coast, however, it is slightly lower in summer. It is slightly higher in spring and fall in inland areas. Rainfall occurs as high-intensity, convective thunderstorms during the summer. During the winter, most of the precipitation occurs as moderate-intensity storms (northeasters) that produce large amounts of rain or snow. The freeze-free period increases in length to the south.

Table 3. Representative climatic features

Frost-free period (characteristic range)	135-162 days
Freeze-free period (characteristic range)	168-201 days
Precipitation total (characteristic range)	1,219-1,321 mm
Frost-free period (actual range)	116-165 days
Freeze-free period (actual range)	140-212 days
Precipitation total (actual range)	1,118-1,346 mm
Frost-free period (average)	146 days
Freeze-free period (average)	180 days
Precipitation total (average)	1,245 mm

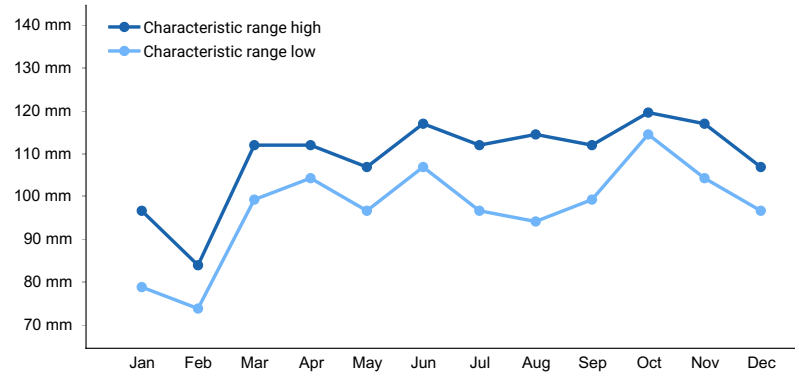


Figure 1. Monthly precipitation range

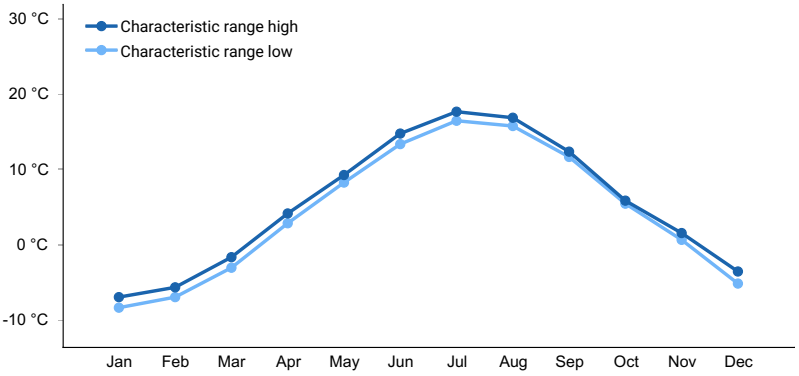


Figure 2. Monthly minimum temperature range

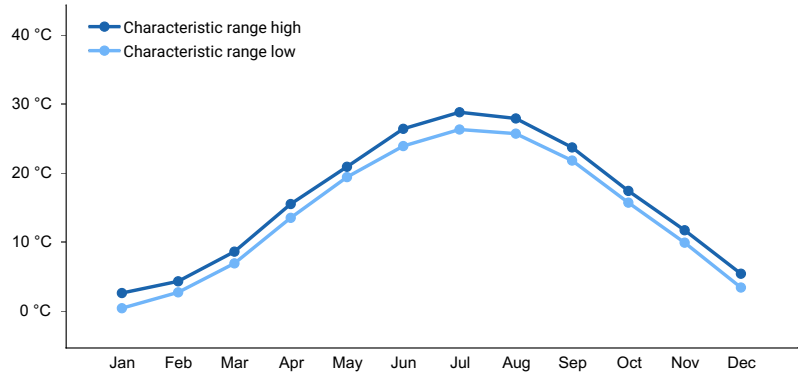


Figure 3. Monthly maximum temperature range

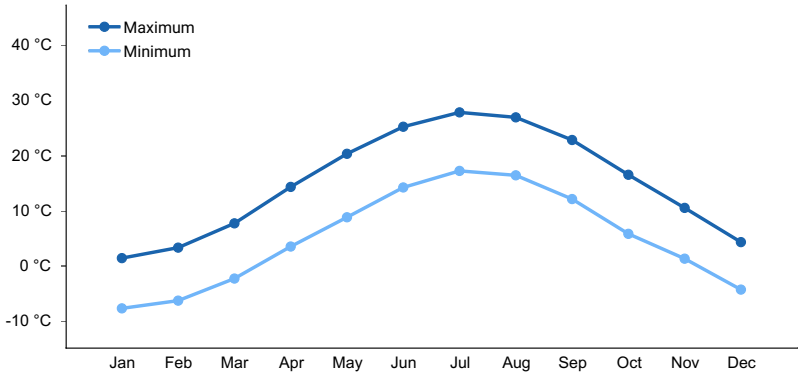


Figure 4. Monthly average minimum and maximum temperature

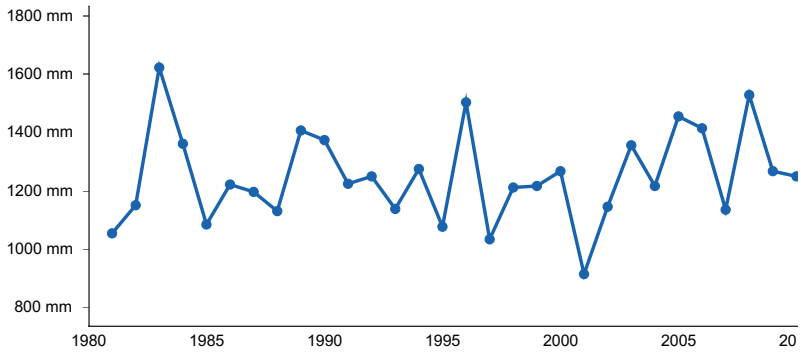


Figure 5. Annual precipitation pattern

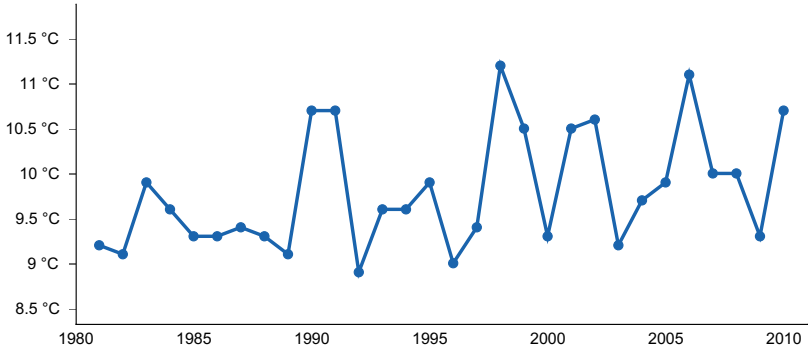


Figure 6. Annual average temperature pattern

Climate stations used

- (1) STORRS [USC00068138], Storrs Mansfield, CT
- (2) NEW BEDFORD [USC00195246], New Bedford, MA
- (3) WANAQUE RAYMOND DAM [USC00289187], Haskell, NJ

- (4) DANBURY [USC00061762], Bethel, CT
- (5) MASSABESIC LAKE [USC00275211], Manchester, NH
- (6) WORCESTER RGNL AP [USW00094746], Leicester, MA

Influencing water features

NONE

Wetland description

NONE

Soil features

The site consists of well drained, loamy soils formed in basal till derived mostly from gneiss, schist, and granite. The soils are very deep to bedrock and moderately deep to a root restricting densic contact or fragipan. They are nearly level through steep soils on till plains, hills, and drumlins. Reaction (pH) ranges from very strongly acid to moderately acid. Representative soils are Essex, Newport, Poquonock, Montauk, Paxton, Annisquam, Bernardston, Broadalbin, and Broadbrook.

Table 4. Representative soil features

Parent material	(1) Basal till–granite (2) Eolian deposits–igneous and metamorphic rock (3) Till–phyllite (4) Schist (5) Slate (6) Conglomerate (7) Shale and siltstone (8) Sedimentary rock
Surface texture	(1) Fine sandy loam (2) Gravelly silt loam (3) Silt loam (4) Stony very fine sandy loam (5) Very fine sandy loam (6) Very stony silt loam (7) Loam (8) Sandy loam (9) Gravelly fine sandy loam (10) Channery fine sandy loam (11) Extremely stony silt loam (12) Very stony fine sandy loam (13) Loamy fine sand (14) Loamy sand (15) Sand
Family particle size	(1) Coarse-loamy (2) Loamy-skeletal (3) Sandy (4) Sandy over loamy
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to slow
Depth to restrictive layer	33–183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–9%
Available water capacity (0-101.6cm)	5.08–15.24 cm

Soil reaction (1:1 water) (0-101.6cm)	3.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	5–30%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

[Caveat: The vegetation information contained in this section and is only provisional, based on concepts, not yet validated with field work.*]

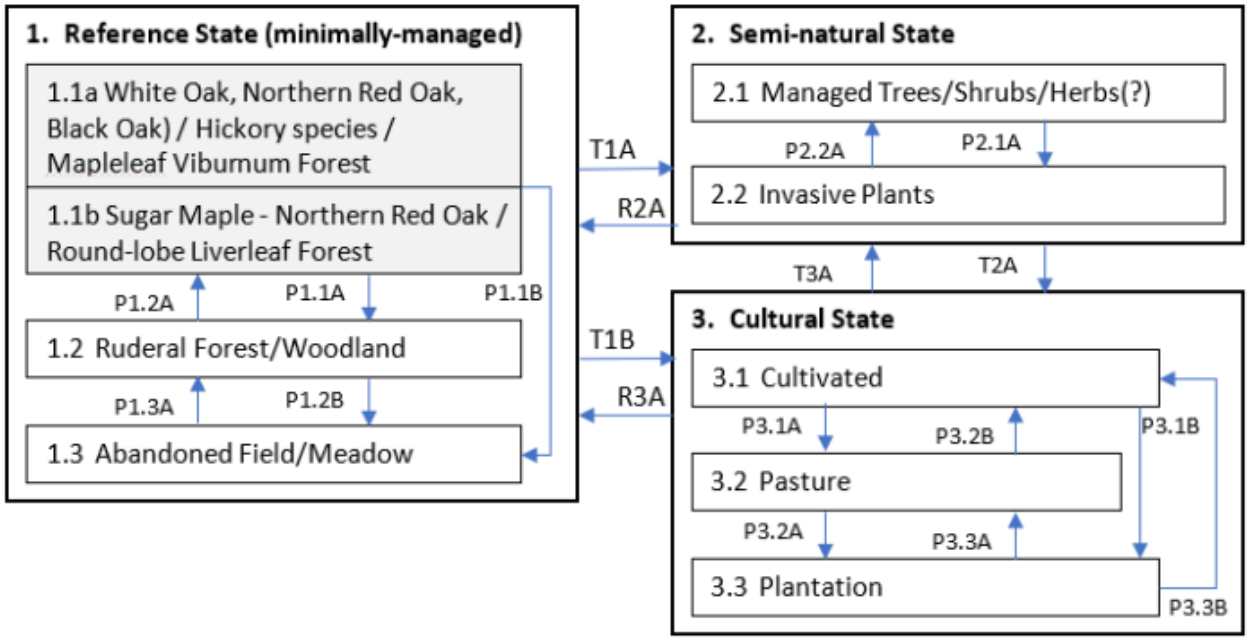
The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe (Comer 2003). Terrestrial ecological SYSTEMS are specifically defined as a group of plant community-types called ASSOCIATIONS that tend to [co-]occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. Any given system will typically manifest itself in a landscape at intermediate geographic scales of tens-to-thousands of hectares and will persist for 50 or more years. A vegetation association is a plant community that is much more specific to a given soil, geology, landform, climate, hydrology, and disturbance history. It is the basic unit for vegetation classification and recognized by the US National Vegetation Classification (US FDGC 2008). Each association will be named by the diagnostic and often dominant species that occupy the different height strata (tree, sapling, shrub, and herb). Within the NatureServe Explorer database (NatureServe, 2015), ecological systems are numbered by a Community Ecological System Code (CES) and individual vegetation associations are assigned an identification number called a Community Element Global Code (CEGL).

Additional and more localized vegetation information is provided by the State Natural Heritage Programs of Connecticut (Metzler and Barrett 2001), Massachusetts (Swain and Kearsley 2001), New Hampshire (Sperduto and Nichols, 2011), New York (Edinger et al., 2014), and Rhode Island (Enser and Lungren, 2006).

The Well-Drained Dense Till Uplands ecological site is characteristic of the Northeastern Interior Dry-Mesic Oak Forest system (CES202.592) and the Appalachian (Hemlock)-Northern Hardwood Forest system (CES202.593). The Representative plant communities are typically dominated by a mixed oak-sugar maple forest. The vegetation is not well-described. Natural disturbances include climate extremes such as, excessive droughts, or storm activity ranging from windthrows to downbursts to ice-storms. Atmospheric deposition may effect trees at high elevations. Excessive deer browse may be an issue. Wildfires do happen but are largely suppressed. Other agents-of-change include land conversions and fragmentation by agricultural, development and logging. In disturbed sites, invasive plants can include tree-of-heaven (*Ailanthus altissima*), European buckthorn (*Rhamnus cathartica*), winged euonymus (*Euonymus alatus*) multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*) and shrub honeysuckles (Lonicera sp.).

[*Caveat] The information presented is representative of very complex vegetation communities. Key indicator plants and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and geography. The reference plant community is not necessarily the management goal. The drafts of species lists are merely 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



Transition	*Drivers/practices*
T1A	Forest mgmt., Disturbance
T1B, T2A	Disturbance/cutting/clearing, Brush removal
R2A, R2B	Restoration & Mgmt, Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife Mgmt, Invasive spp. Control, Plant establishment
T3A	Abandonment, Plant establishment, Forest mgmt.
P2.1A	Disturbance, Invasive species establishment
P2.2A	Invasive spp. Control, Forest mgmt..
P1.3A, P1.2A	Abandonment, succession
P3.1A, P3.2A, P3.3A, P3.1B, P3.2B, P3.3B	Changing agricultural phases
P1.1A, P1.1B, P1.2B	Disturbance, Early Successional Habitat Development

State 1
Reference State (minimally-managed)

Representative plant communities are typically dominated by a mixed oak-sugar maple forest. The vegetation is not well described. Dense till sites are considered slightly more mesophytic than ablation till sites, hence contain more sugar maple (*Acer saccharum*) and white ash (*Fraxinus americana*). The reference plant community includes: • Quercus (alba, rubra, velutina) - Carya spp. / *Viburnum acerifolium* Forest Translated Name: (White Oak, Northern Red Oak, Black Oak) / Hickory species / Mapleleaf Viburnum Forest Common Name: Dry-mesic Oak - Hickory / Viburnum Forest (CEGL006336) • *Acer saccharum* - *Quercus rubra* / *Hepatica nobilis* var. obtusa Forest Translated Name: Sugar Maple - Northern Red Oak / Round-lobe Liverleaf Forest Common Name: Sugar Maple - Ash - Oak - Hickory Mesic Forest (CEGL006046) Others plant communities can include: • *Quercus rubra* - *Acer saccharum* / *Viburnum acerifolium* - *Lindera benzoin* Forest Translated Name: Northern Red Oak - Sugar Maple / Mapleleaf Viburnum - Northern Spicebush Forest Common Name: Red Oak - Transitional Northern Hardwood Forest (CEGL006635) • *Quercus rubra* - *Liriodendron tulipifera* - *Betula lenta* Forest Translated Name: Northern Red Oak - Tuliptree - Sweet Birch Forest Common Name: Lower New England Oak - TulipTree Forest (CEGL8573) • *Quercus rubra* - Carya (glabra, ovata) / *Ostrya virginiana* / *Carex lucorum* Forest Translated Name: Northern Red

Oak - (Pignut Hickory, Shagbark Hickory) / Hophornbeam / Blue Ridge Sedge Forest Common Name: Oak - Hickory / Hophornbeam / Sedge Forest (CEGL006301)

Community 1.1
1.1a White Oak, Northern Red Oak, Black Oak / Hickory species / Mapleleaf Viburnum Forest (CEGL006336) 1.1b Sugar Maple - Northern Red Oak / Round-lobe Liverleaf Forest (CEGL006046)

Community-type 1.1a • Quercus (alba, rubra, velutina) - Carya spp. / *Viburnum acerifolium* Forest Translated Name: White Oak, Northern Red Oak, Black Oak / Hickory species / Mapleleaf Viburnum Forest Common Name: Dry-mesic Oak - Hickory / Viburnum Forest (CEGL006336) This vegetation is ecologically transitional between dry-rich oak-hickory forests of relatively high diversity and dry, acidic oak-species-poor forests. Red oak (*Quercus rubra*), white oak (*Quercus alba*), and black oak (*Quercus velutina*) prominent in association with pignut hickory (*Carya glabra*), shagbark hickory (*Carya ovata*), mockernut hickory (*Carya tomentosa*), red maple (*Acer rubrum*), chestnut oak (*Quercus montana*), sassafras (*Sassafras albidum*), and downy shadbush (*Amelanchier arborea*). White pine (*Pinus strobus*), eastern hemlock (*Tsuga canadensis*), and sweet birch (*Betula lenta*) may also occur as minor associates. Flowering dogwood (*Cornus florida*) occurs in more southerly locales. The shrub layer can be sparse and characterized by mapleleaf viburnum (*Viburnum acerifolium*) with other frequent associates including witrchhazel (*Hamamelis virginiana*), highbush blueberry (*Vaccinium corymbosum*), mountain laurel (*Kalmia latifolia*), beaked hazelnut (*Corylus cornuta*), and American hazelnut(*Corylus americana*). Short shrubs include-Hillside blueberry (*Vaccinium pallidum*) and black huckleberry (*Gaylussacia baccata*), with common lowbush blueberry (*Vaccinium angustifolium*). The herbaceous layer is characterized by Pennsylvania sedge (*Carex pensylvanica*), false Solomon's seal (*Maianthemum racemosum* [= Smilacina racemose]), marginal wood fern (*Dryopteris marginalis*), wild sarsaparilla (*Aralia nudicaulis*), rattlesnake hawkweed (*Hieracium venosum*), white goldenrod (*Solidago bicolor*), pointed leaved tick-trefoil (Hylodesmun glutinosum [=*Desmodium glutinosum*[), panicled tick-trefoil (*Desmodium paniculatum*), cow wheat (*Melampyrum lineare*), striped wintergreen (Chimaphila maculate), white sood aster (*Eurybia divaricata* [= Aster divaricatus]), hayscented fern (*Dennstaedtia punctilobula*). Under less mesic conditions, herbs include poverty oatgrass (*Danthonia spicata*), wavy hairgrass (*Deschampsia flexuosa*), fern-leaved false foxglove (Aureolaria spp.), sweetfern (*Pteridium aquilinum*), and Canada frostweed (Crocanthemum canadense [= *Helianthemum canadense*). invasive plants can include tree-of-heaven (*Ailanthus altissima*), European buckthorn (*Rhamnus cathartica*), winged euonymus (*Euonymus alatus*) multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*) and shrub honeysuckles (Lonicera sp.). (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]). Cross-referenced plant community concepts (typically by political State): CT: Red oak / mapleleaf viburnum Forest (Metzler and Barrett, 2006) MA: Oak-Hickory Forest (Swain and Kearsley, 2001) NH: Mesic Appalachian oak - hickory forest (Sperduto and Nichols, 2011) NY: Appalachian oak-hickory forest (Edinger et al., 2014) RI: undisclosed (Enser and Lundgren, 2006) Community 1.1b • *Acer saccharum* - *Quercus rubra* / *Hepatica nobilis* var. obtusa Forest Translated Name: Sugar Maple - Northern Red Oak / Round-lobe Liverleaf Forest Common Name: Sugar Maple - Ash - Oak - Hickory Mesic Forest (CEGL006046) White ash (*Fraxinus americana*) and sugar maple *Acer saccharum* are common in the tree canopy along with red oak (*Quercus rubra*), black oak (*Quercus velutina*), white oak (*Quercus alba*), shagbark hickory (*Carya ovata*), pignut hickory (*Carya glabra*),American basswood (*Tilia americana*, sweet birch (*Betula lenta*)as associates. Eastern hemlock (*Tsuga canadensis*) can be occasional. Hope hornbeam (*Ostrya virginiana*) and hornbeam (*Carpinus caroliniana*) can form a prominent subcanopy. Shrubs include witchhazel (*Hamamelis virginiana*), mapleleaf viburnum (*Viburnum acerifolium*), northern arrowwood (*Viburnum dentatum* var. lucidum [= *Viburnum recognitum*]), flowering dogwood (*Cornus florida*), beaked hazelnut (*Corylus cornuta*), and northern spicebush (*Lindera benzoin*). The herb layer is often quite diverse with broad-leaved sedge (*Carex platyphylla*), log-stalked sedge (*Carex pedunculata*), eastern woodland sedge (*Carex blanda*), broad loose-flowered sedge (*Carex laxiflora*), red baneberry (*Actaea rubra*), hairy Solomon's seal [= *Polygonatum pubescens*), broad beech fern (*Phegopteris hexagonoptera* (= Thelypteris hexagonoptera]), roundleaf violet (*Viola rotundifolia*), early meadow rue (*Thalictrum dioicum*), blunt lobed hepatica (*Hepatica nobilis* var. obtusa [= Hepatica americana]), rue anemone (*Thalictrum thalictroides* [= Anemonella thalictroides]), nodding fescue (*Festuca subverticillata*), white baneberry (*Actaea pachypoda*), wooly blue violet (*Viola sororia*), running groundsel (Packera obovate[= Senecio obovatus]), and Jack-in-the-pulpit (*Arisaema triphyllum*). (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]). Cross-referenced plant community concepts (typically by political State): CT: Sugar maple -White Ash / roundleaf hepatica Forest (Metzler and Barrett, 2006) MA: Dry, Rich Oak Forest/Woodland (Swain and Kearsley, 2001) NH: Rich Appalachian oak rocky woods (Sperduto and Nichols, 2011) NY: Appalachian oak-hickory forest (Edinger et al., 2014) RI: undisclosed (Enser and Lundgren, 2006)

Community 1.2
Ruderal Forest/Woodland

Community 1.3
Abandoned Field/Meadow

Disturbance

Pathway P1.1A
Community 1.1 to 1.2

Disturbance

Pathway P1.1B
Community 1.1 to 1.3

Disturbance

Pathway P1.2A
Community 1.2 to 1.1

Succession

Pathway P1.2B
Community 1.2 to 1.3

Disturbance

Pathway P1.3A
Community 1.3 to 1.2

Abandonment, Succession

State 2
Semi-natural State

The Semi-natural State would expect plant communities where ecological processes are primarily operating with some land conditioning in the past or present, e.g., managed forests, or plant communities that are an artifact of land management e.g., predominately invasive plants.

Community 2.1
Managed Trees/Shrubs/Herbs(?)

Community 2.2
Invasive Plants

Pathway P2.1A
Community 2.1 to 2.2

Disturbance, Invasive species establishment

Pathway P2.2A
Community 2.2 to 2.1

Invasive spp. Control, Forest mgmt.

State 3
Cultural State

The Cultural State would expect the ecological site to be very strongly conditioned by land management conversion, by transformation to Cultivated/Pasture/Plantation.

Community 3.1
Cultivated

Community 3.2
Pasture

Community 3.3
Plantation

Pathway P3.1A
Community 3.1 to 3.2

Changing agricultural phases

Pathway P3.1B
Community 3.1 to 3.3

Changing agricultural phases

Pathway P3.2A
Community 3.2 to 3.1

Changing agricultural phases

Pathway P3.2B
Community 3.2 to 3.3

Changing agricultural phases

Pathway P3.3A
Community 3.3 to 3.1

Changing agricultural phases

Pathway P3.3B
Community 3.3 to 3.2

Changing agricultural phases

Transition T1A
State 1 to 2

altered by human- induced Disturbance or Management

Conservation practices

Tree/Shrub Establishment
Forest Land Management
Forest stand improvement for habitat and soil quality

Transition T1B
State 1 to 3

Disturbance, clearing, cutting

Restoration pathway R2A
State 2 to 1

Plant removals, plantings, Invasive plant control, successional mgmt., forestry practices Restoration & Mgmt, Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife Mgmt, Invasive spp. Control, Plant establishment

Conservation practices

Brush Management
Tree/Shrub Establishment
Early Successional Habitat Development/Management
Forest Stand Improvement
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Forest Land Management
Invasive Plant Species Control

Transition T2A
State 2 to 3

Land clearing, cutting

Conservation practices

Brush Management
Land Clearing
Herbaceous Weed Control

Restoration pathway R3A
State 3 to 1

Plant removals, plantings, Invasive plant control, successional mgmt., forestry practices Restoration & Mgmt, Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife Mgmt, Invasive spp. Control, Plant establishment

Conservation practices

Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management

Transition T3A
State 3 to 2

Abandonment. Plant establishment, Forest mgmt.

Conservation practices

Tree/Shrub Establishment

Forest Stand Improvement
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

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Contributors

Nels Barrett, Ph.D. (vegetation)

Approval

Greg Schmidt, 10/03/2024

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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	05/13/2025
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):**

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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:**
