Ecological site F145XY012CT
Well Drained Dense Till Uplands

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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): 145X–Connecticut Valley

Major Land Resource Area (MLRA): 145 – Connecticut Valley (USDA-NRCS, 2006). The nearly level floor of the Connecticut Valley makes up most of the area. Nearly level to sloping lowlands are at the outer edges of the river valley. These lowlands are broken by isolated, north- to south-trending trap-rock ridges that are hilly and steep. Elevation ranges from sea level to 100 meters (330 feet) in the lowlands and from 50 to 100 meters (650 to 1,000 feet) on ridges. The geology of this rift valley is a late Triassic and early Jurassic sandstone, shale, and conglomerate sequence. Tilted basalt flows along rift zones form the trap rock ridges exhibiting the greatest landscape relief. Glaciation accounts for glacial lake deposits, outwash, and till. Following glacial retreat, wind-deposited loess caps some areas. Recent alluvium deposits form well-developed flood plain along the Connecticut River. These deposits created some of the most productive agricultural soils in New England. The dominant soils are entisols and inceptisols with a mesic temperature regime in combination with parent materials such as glacial lakebeds, glacial outwash, glacial till, and recent alluvium. From north-to-south within the Connecticut Valley, the climate transitions from humid-continental to humid temperate with pronounced seasons and frequent storms. The forests are predominately central hardwoods to the south and transition hardwoods to the north. Significant habitats include trap rock ridges, sandplains, and floodplains of the Connecticut River and major tributaries. Much of the area is currently in residential and urban development and agriculture. While much of the areas is also forested, habitat loss and fragmentation are widespread throughout the Connecticut Valley.

Classification relationships

USDA-NRCS (USDA, 2006): Land Resource Region (LRR): R – Northeastern Forage and Forest Region Major Land Resource Area (MLRA): 145 – Connecticut Valley USDA-FS (Cleland et al, 2007): Province: 221 – Eastern Broadleaf Forest Section: 221A – Lower New England Subsection: 221Af –Lower Connecticut River Valley Province: M211 – Adirondack New England Mixed Forest – Coniferous Forest – Alpine Meadow (in part) Section: M211B– New England Piedmont (in part) Subsection: 211Bb – Southern Piedmont (in part)

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 hills and drumlins. Representative soils are Broadbrook and Wethersfield. Representative plant communities are typically dominated by a mixed oak-sugar maple (Quercus spp.-Acer saccharum) 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).

Associated sites

F145XY014CT	**Moist Dense Till Uplands**

Similar sites

F145XY011CT	**Well Drained Shallow Till Uplands**
F145XY013CT	**Well Drained Till Uplands**

Table 1. Dominant plant species

Tree	(1) *Quercus rubra* (2) *Quercus velutina*
Shrub	(1) *Viburnum acerifolium*
Herbaceous	(1) *Carex pensylvanica*

Physiographic features

The site occurs on nearly level through steep upland landforms and is not subject to flooding or ponding.

Table 2. Representative physiographic features

Landforms	(1) Upland > Till plain (2) Hill (3) Drumlin
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	0 – 850 m
Slope	0 – 50 %
Water table depth	50 – 90 cm
Aspect	Aspect is not a significant factor

Climatic features

The regional climate of the Connecticut Valley transitions north to south, from humid-continental to humid temperate, respectively, with pronounced seasons and frequent storms. (Beck et al., 2018; Bailey, 2014).

Climate change is occurring, and the resiliency of any ecological site will depend upon the direct and indirect effects upon component species and shifting atmospheric and soil conditions. On these ecological sites, central hardwoods – pine forests are at a low vulnerability risk to climate change with impacts considered both negative and positive. Warmer seasonal temperatures and a prolonged growing season will be beneficial for increasing productivity of central hardwoods, especially trees with southern affinities such as oaks, hickory, and tuliptree. However, climate extremes may introduce earlier leaf phenologies susceptible to frost damage and general plant weakening. Although central hardwoods – pine forests are adaptable to warmer climate shifts, fragmentation and invasive species can amplify any adverse effects of climate change. Several invasive species will continue to be a threat. (Janowiak et al, 2018).

Table 3 Representative climatic features

Frost-free period (characteristic range)	130-140 days
Freeze-free period (characteristic range)	160-190 days
Precipitation total (characteristic range)	1,170-1,320 mm
Frost-free period (actual range)	110-150 days
Freeze-free period (actual range)	150-190 days
Precipitation total (actual range)	1,170-1,320 mm
Frost-free period (average)	140 days
Freeze-free period (average)	170 days
Precipitation total (average)	1,250 mm

- (1) MT CARMEL [USC00065077], Hamden, CT
- (2) HARTFORD BRADLEY INTL AP [USW00014740], Suffield, CT
- (3) MIDDLETOWN 4 W [USC00064767], Middlefield, CT
- (4) AMHERST [USC00190120], Amherst, MA

Influencing water features

NONE

Wetland description

NONE

Soil features

The site consists of well drained, shallow to moderately deep soils formed in glacial and wind deposited parent materials. Representative soils are Broadbrook and Wethersfield.

Table 4. Representative soil features

Parent material	(1) Till – sandstone and shale (2) Basalt
Surface texture	(1) Loam (2) Silt loam (3) Fine sandy loam (4) Stony silt loam (5) Gravelly silt loam (6) Very fine sandy loam
Family particle size	(1) Coarse-loamy (2) Fine-loamy
Drainage class	Well drained
Permeability class	Slow
Depth to restrictive layer	40 – 100 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	5.08 – 12.7 cm
Soil reaction (1:1 water) (0-101.6cm)	3.6 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	0 – 30 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

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 can be provided by the various State Heritage Programs. Additional insights to the vegetation were provided by: "The Vegetation of Connecticut: A Preliminary Classification" (Metzler and Barrett, 2006), "Classification of the Natural Communities of Massachusetts" (Swain and Kersley 2011), "Wetland, Woodland, Wildland" (Thompson and Sorenson 2000), and "Natural Communities of New Hampshire, 2nd Ed." (Spurduto and Nichols, 2011).

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). Representative plant communities are typically dominated by a mixed oak-sugar maple (Quercus spp.-Acer saccharum) 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.).

Other ecological states, a Semi-natural State and a Cultural State are recognized. The Semi-natural State would expect plant communities where ecological processes primarily operate with some conditioning by land management, e.g., managed forests, or plant communities that are an artifact of land management e.g., predominately invasive plants. The Cultural State is a completely converted or transformed state heavily or completely conditioned by land management, e.g., cultivated lands, pasture/haylands, vineyards, and plantations, etc. Generally, the form of vegetation in the Semi-natural State or the Cultural State is not able to be specified until field work is conducted.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 10. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 11. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 12. Community 3.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Inventory data references

Site Development and Testing Plan 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

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Approval

Nels Barrett, 9/27/2024

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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	05/21/2026
Approved by	
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:**

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):**

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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:**
