Ecological site F149BY009MA
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): 149B–Long Island-Cape Cod Coastal Lowland

149B—Long Island-Cape Cod Coastal Lowland This area is in the Embayed Section of the Coastal Plain Province of the Atlantic Plain. It is part of the partially submerged coastal plain of New England. It is mostly an area of nearly level to rolling plains, but it has some steeper hills (glacial moraines). Ridges border the lower plains. The Peconic and Carmans Rivers are on the eastern end of Long Island. The parts of this area in Massachusetts and Rhode Island have no major rivers. This entire area is made up of deep, unconsolidated glacial outwash deposits of sand and gravel. A thin mantle of glacial till covers most of the surface. Some moraines form ridges and higher hills in this area of generally low relief. Sand dunes and tidal marshes are extensive along the coastline.

Classification relationships

USDA-NRCS (USDA, 2006): Land Resource Region (LRR): S—Northern Atlantic Slope Diversified Farming Region Major Land Resource Area (MLRA): 149B—Long Island-Cape Cod Coastal Lowland USDA-FS (Cleland et al., 2007): Province: 221 Eastern Broadleaf Forest Province Section: 221A Lower New England Subsection: 221Ab Cape Cod Coastal Lowland and Islands Subsection: 221An Long Island Coastal Lowland and Moraine

Ecological site concept

The site consists of very deep, well drained, coarse-loamy soils formed in dense glacial till. They are gently sloping to strongly sloping soils on or near terminal moraines. Representative soils are Nantucket and Montauk loam phase. The reference plant community is considered to be an Mixed oak-hardwood forest with occsional pines. Oaks were found to be dominant on terminal moraines within Cape Cod while pitch pine dominated sandy outwash sites (Parshall et al. 2003). Common oaks include black oak, scarlet oak, white, and scrub oak. Pitch pine is subdominant with lesser amounts of beech and hickories. Common shrubs include lowbush blueberry and black huckleberry. Post settlement clearing of forests and an increase in fire has led to a dominance of pitch pine over oaks on terminal moraines within Cape Cod (Parshall et al. 2003). In the absence of severe or frequent fire, oaks replaces pitch pine while other hardwoods such as beech and hickories become a larger component of the forests on more mesic sites.(Parshall et al. 2003).

Associated sites

F149BY010MA	**Moist Till Uplands** Moist Till Uplands

Similar sites

F149BY011MA	**Well Drained Till Uplands** Well-drained Till Upland

F149BY003MA	**Well Drained Lake Plain** Well-drained Lake Plain

Table 1. Dominant plant species

Tree	(1) *Quercus velutina* (2) *Fagus grandifolia*
Shrub	(1) *Vaccinium pallidum* (2) *Viburnum acerifolium*
Herbaceous	(1) *Carex swanii* (2) *Thelypteris noveboracensis*

Physiographic features

This site occurs in moraines and hills in upland landscapes and is not subject to flooding/ponding.

Table 2. Representative physiographic features

Landforms	(1) Upland > Moraine (2) Ground moraine (3) Hill
Runoff class	Low to very high
Flooding frequency	None
Ponding frequency	None
Elevation	0 – 310 m
Slope	0 – 70 %
Water table depth	60 – 180 cm
Aspect	Aspect is not a significant factor

Climatic features

Coastal regions' climate generally considered maritime, experiences a more moderate climate than inland, i.e., cooler summers and warmer winters and delayed onset of spring. However, coastal regions do experience the brunt of extreme weather such as nor'easters and tropical storms, e.g., hurricanes

Table 3 Representative climatic features

Frost-free period (characteristic range)	170-180 days
Freeze-free period (characteristic range)	210-220 days
Precipitation total (characteristic range)	1,140-1,190 mm
Frost-free period (actual range)	160-190 days
Freeze-free period (actual range)	210-230 days
Precipitation total (actual range)	1,120-1,220 mm
Frost-free period (average)	170 days
Freeze-free period (average)	220 days
Precipitation total (average)	1,170 mm

- (1) RIVERHEAD RSCH FM [USC00307134], Riverhead, NY
- (2) HYANNIS [USC00193821], Hyannis, MA
- (3) ISLIP LI MACARTHUR AP [USW00004781], Ronkonkoma, NY
- (4) MINEOLA [USC00305377], Mineola, NY

Influencing water features

N/A

Wetland description

N/A

Soil features

The site consists of moderate to very deep, well to excessively drained, coarse-loamy soils formed in glacial and wind deposited parent materials. Representative soils are Eastchop, Nantucket, and Montauk loam phase.

Table 4. Representative soil features

Parent material	(1) Till – granite and gneiss (2) Eolian deposits – schist (3) Glaciofluvial deposits

Surface texture	(1) Loam (2) Loamy sand (3) Sandy loam
Family particle size	(1) Coarse-loamy
Drainage class	Well drained to excessively drained
Permeability class	Very slow to moderate
Depth to restrictive layer	50 – 180 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	0 – 10 %
Available water capacity (Depth not specified)	7.62 – 15.24 cm
Soil reaction (1:1 water) (Depth not specified)	3.5 – 10
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
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 (associations) that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. They are intended to provide a classification unit that is readily mappable, often from terrain and remote imagery, and readily identifiable by conservation and resource managers in the field. A 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; USNVC 2017). Each association will be named by the diagnostic and often dominant species that occupy the different height strata (tree,

shrub, and herb). Within the NatureServe Explorer database, 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).

[*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.

This ecological site, set in well-drained dense till ecological site, supports reference plant communities of mixed hardwoods, such as oaks (Quercus, spp.), hickories (Carya spp.), American beech (Fagus gradifolia), and occasionally tuliptree (Liriodendron tulipifera) and occasional pines (Pinus spp.). Oaks were found to be dominant on terminal moraines within Cape Cod while pines dominated sandy outwash sites (Parshall et al. 2003). These plant communities coincide with Northern Atlantic Coastal Plain Dry Oak-Hardwood Forest system(CES203.475), and Northern Atlantic Coastal Plain Heathland and Grassland (CES203.895). The prevailing ecological processes are related to coastal influences, such as a coastal climate and storms, and if within close proximity to the coast, maritime effects of wind exposure, salt spray, and sand movement. Fire can be an influence. Threats include development and fragmentation, fire-suppresion, off road vehicles, and invasive plants such as, but not limited to, black locust (Robinia pseudoacacia), tree-of-heaven (Ailanthus altissima), autumn olive (Elaeagnus umbellata), white poplar (Populus alba), multiflora rose (Rosa multiflora), Honeysuckles, (Lonicera spp.), oriental bittersweet (Celatrus orbiculatus), japanese knotweed (Polygonum cuspidatum) wineberry (Rubus phoenicolasius), and Asiatic tearthumb (Polygonum perfoliatum). (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]).

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 2.1 plant community composition

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

Table 8. Community 2.2 plant community composition

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

Table 9. Community 3.1 plant community composition

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

Table 10. Community 3.2 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 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.

References

Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C. Carpenter, and W.H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Coterminous United States. USDA Forest Service, General Technical Report WO-76. Washington, DC. 1–92.

Comer, P., D. Faber-Langendoen, R. Evans, S. Grawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schultz, K. Snow, and J. Teague. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia..

Edinger, G.J., D.J. Evans, S. Gebauer, T.J. Howard, D. Hunt, and A. Olivero. 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..

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

Sneddon, L., R. Zaremba, and M. Adams. 2010. Vegetation classification and mapping at Cape Cod National Seashore, Massachusetts.

Swain, P.C. 2016. Classification of the natural communities of Massachusetts, Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife,.

USNVC [United States National Vegetation Classification]. 2017 (Date accessed). United States National Vegetation Classification Database V2.01. Federal Geographic Data Committee, Vegetation Subcomittee, Washington DC.

Other references

Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C. Carpenter, and W.H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Coterminous United States. USDA Forest Service, General Technical Report WO-76. Washington, DC.

Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K., Snow, and J.Teague. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia.

Edinger, G.J., Evans, D.J., Gebauer, S., Howard, T.G., Hunt, D.M., and A.M. Olivero, A.M. (eds.). 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.

FGDC [Federal Geographic Data Committee]. 2008. National Vegetation Classification Standard, Version 2. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC.

Greller, A. A Classification of Mature Forests on Long Island, New York. Bulletin of the Torrey Botanical Club 104:376–382.

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

Parshall, T., D.R. Foster, E. Faison, D. MacDonald, and B.C.S. Hansen. 2003. Long?term history of vegetation and fire in pitch pine–oak forests on cape cod, Massachusetts. Ecology 84:736–748.

Sneddon, L. A., Zaremba, R. E., and M. Adams. 2010. Vegetation classification and mapping at Cape Cod National Seashore, Massachusetts. Natural Resources Technical Report NPS/NER/NRTR--2010/147. National Park Service, Philadelphia, PA.

Swain, P.C. 2016. Classification of the Natural Communities of Massachusetts. Version 2.0. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. Westborough, MA.

United States Department of Agriculture, Natural Resources Conservation Service, 2006. Land Resource Regions and Major land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

United States Department of Agriculture, Natural Resources Conservation Service, 2015. National Soils Information System (NASIS).

USNVC [United States National Vegetation Classification]. 2017. United States National Vegetation Classification Database, V2.01. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. http://usnvc.org/explore-classification/ (Accessed: 2018)

Contributors

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Approval

Nels Barrett, 9/17/2024

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	05/23/2020
Approved by	
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:**

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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:**