USDA Natural Resources Conservation Service

Ecological site F144AY032NH
Dry Till Uplands

Last updated: 10/04/2024
Accessed: 05/14/2025

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

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 (0 to 305 meters) in much of the area, but it is 2,000 feet (610 meters) on some hills. Relief is mostly about 6 to 65 feet (2 to 20 meters) in the valleys and about 80 to 330 feet (25 to 100 meters) 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 Dry Till Uplands ecological site consists of moderately deep to very deep, somewhat excessively drained, coarse-loamy, skeletal, glacial till derived mostly from gneiss, schist, and granite. Soils are dry and nutrient poor. Slopes range from 0 to 50 percent on hills and ridges. Representative soils are Gloucester and Lippitt. Representative plant communities are typically dominated by an oak-hickory (Quercus spp. – Carya spp.) forest or woodland with associate pines (Pinus spp.).

Associated sites

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

Table 1. Dominant plant species

Tree	(1) *Quercus montana* (2) *Quercus coccinea*
Shrub	(1) *Gaylussacia baccata* (2) *Vaccinium pallidum*
Herbaceous	Not specified

Physiographic features

This site occurs on sloping hill and moraine landforms that is not subject to flooding.

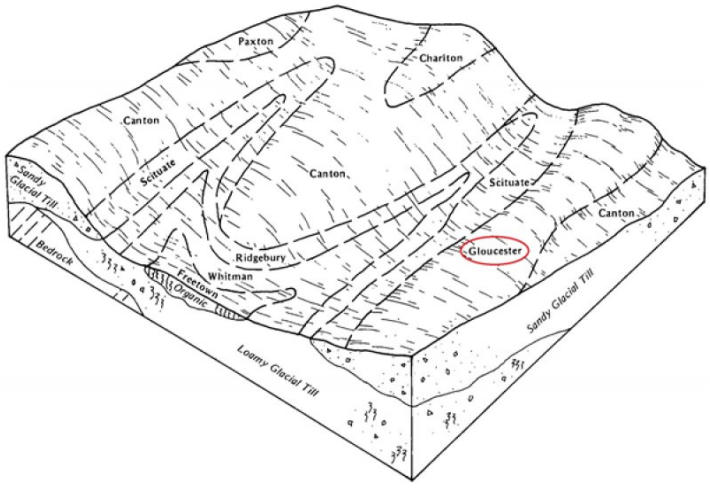


Figure 1. Dry Till Upland ecological site - Gloucester soils

Table 2. Representative physiographic features

Landforms	(1) Upland > Ground moraine (2) Moraine (3) Hill
Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	0–375 m
Slope	3–45%

Water table depth	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) in the southern portion of the MLRA. Precipitation is usually uniformly distributed throughout the year. Near the coast, however, it is slightly lower in summer. Precipitation 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)	115-132 days
Freeze-free period (characteristic range)	146-160 days
Precipitation total (characteristic range)	1,219-1,346 mm
Frost-free period (actual range)	112-147 days
Freeze-free period (actual range)	145-178 days
Precipitation total (actual range)	1,194-1,372 mm
Frost-free period (average)	125 days
Freeze-free period (average)	156 days
Precipitation total (average)	1,270 mm

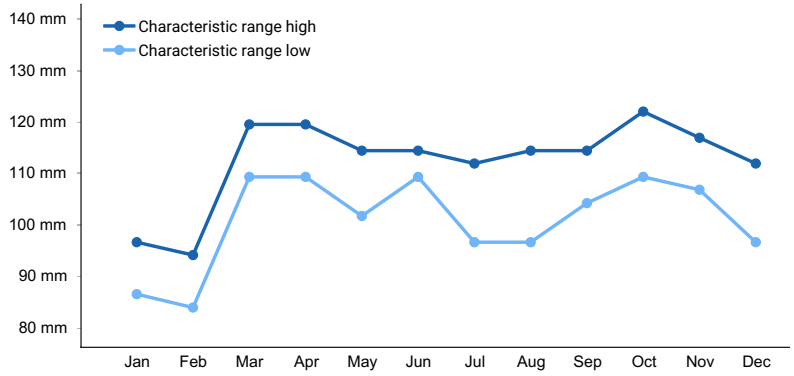


Figure 2. Monthly precipitation range

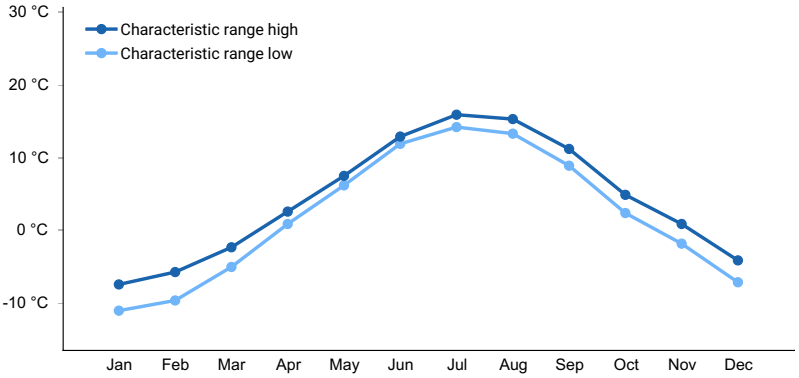


Figure 3. Monthly minimum temperature range

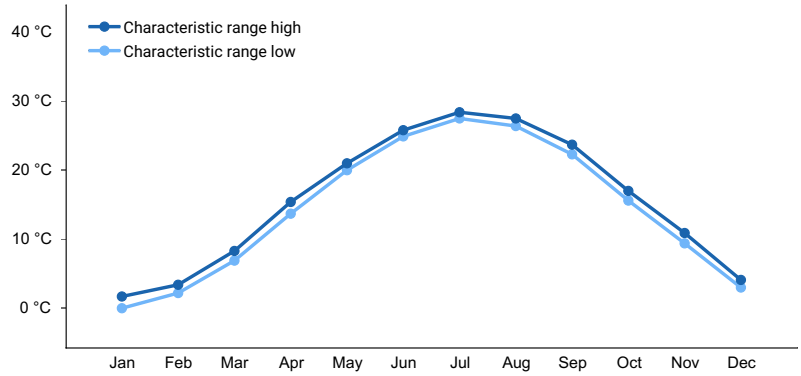


Figure 4. Monthly maximum temperature range

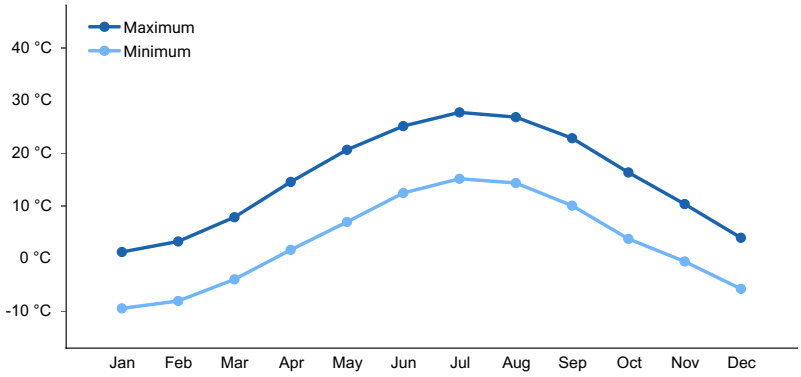


Figure 5. Monthly average minimum and maximum temperature

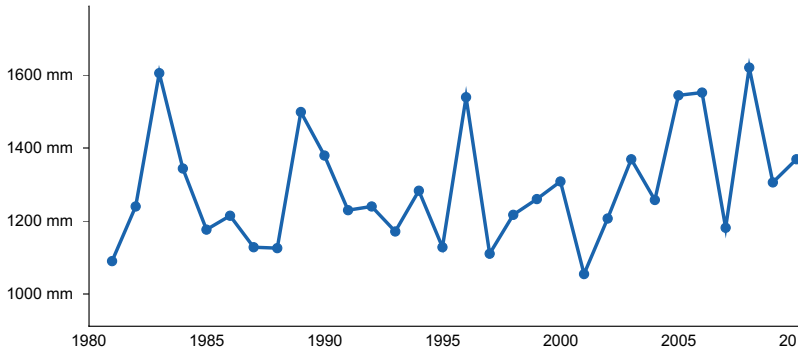


Figure 6. Annual precipitation pattern

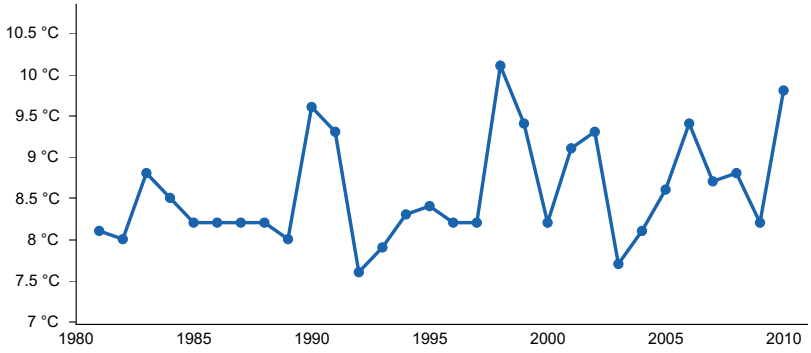


Figure 7. Annual average temperature pattern

Climate stations used

- (1) WIGWAM RSVR [USC00069568], Morris, CT
- (2) BELCHERTOWN [USC00190562], Belchertown, MA
- (3) BAKERSVILLE [USC00060227], New Hartford, CT

- (4) EPPING [USC00272800], Fremont, NH
- (5) KINGSTON [USC00374266], Kingston, RI
- (6) STORRS [USC00068138], Storrs Mansfield, CT

Influencing water features

NONE

Wetland description

NONE

Soil features

The site consists of moderately deep to very deep, somewhat excessively drained, coarse-loamy, skeletal, glacial till derived mostly from gneiss, schist, and granite. Soils are dry and nutrient poor. Representative soils are Gloucester and Lippitt.

Table 4. Representative soil features

Parent material	(1) Till–schist (2) Eolian deposits–granite and gneiss
Surface texture	(1) Fine sandy loam (2) Gravelly fine sandy loam (3) Gravelly sandy loam
Family particle size	(1) Loamy-skeletal (2) Sandy-skeletal
Drainage class	Somewhat excessively drained
Permeability class	Slow to rapid
Depth to restrictive layer	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–9%
Available water capacity (Depth not specified)	5.08–10.16 cm
Soil reaction (1:1 water) (0-101.6cm)	3.5–6.4
Subsurface fragment volume <=3" (Depth not specified)	10–45%
Subsurface fragment volume >3" (Depth not specified)	5–16%

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).

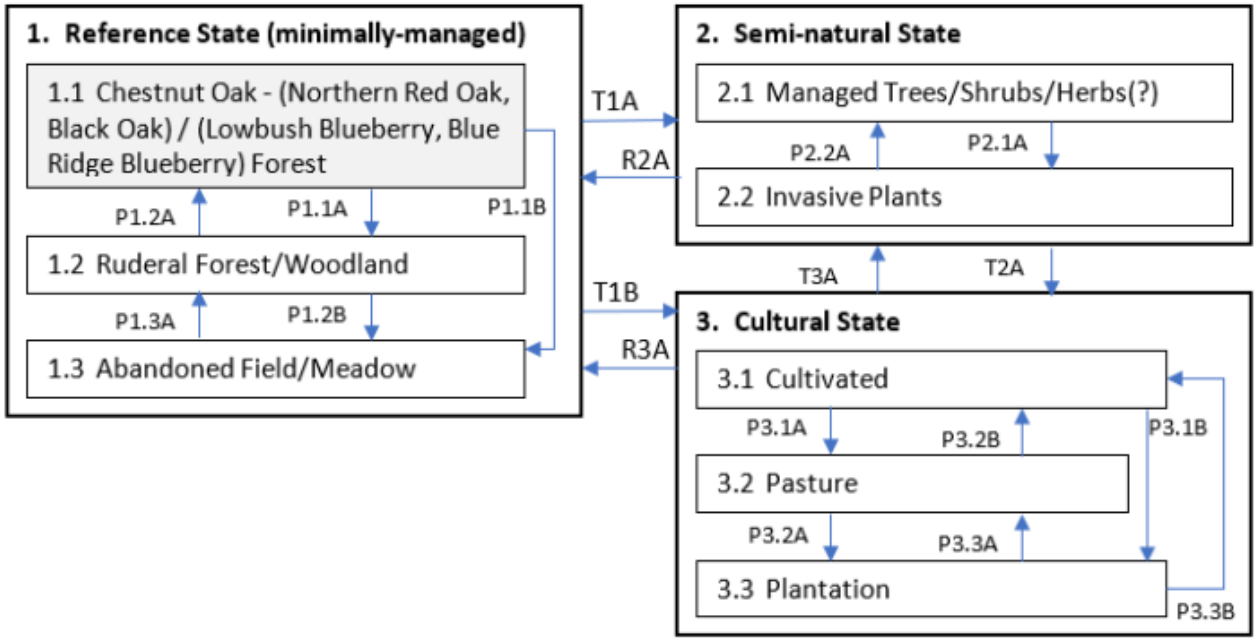
Additional and more localized vegetation information is provided by the State Natural Heritage Programs of Connecticut (Metzler and Barrett 2001), Massachusetts (Swain and Kearsley 2001), New Hampshire (Sperduto and Nichols, 2011), New York (Edinger et al., 2014), and Rhode Island (Enser and Lungren,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

The Dry Till Uplands ecological site is characteristic of the Central Appalachian Dry Oak-Pine Forest system (CES202.591), the Northeastern Interior Dry-Mesic Oak Forest system (CES202.592 and the Northern Atlantic Coastal Plain Dry Oak-Hardwood Forest (CES203.475). The Representative plant communities are typically dominated by a mixture of dry-site oak and pine species with a udertory of ericaceous heath plants. Natural disturbances include climate extremes such as, excessive droughts, or storm activity ranging from windthrows to downbursts to ice-storms. 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 multiflora rose (*Rosa multiflora*).

[*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

144AY032 – Dry Till Uplands



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)

The reference plant community includes: • *Quercus montana* - Quercus (rubra, velutina) / Vaccinium (angustifolium, pallidum) Forest Translated Name: Chestnut Oak - (Northern Red Oak, Black Oak) / (Lowbush Blueberry, Blue Ridge Blueberry) Forest Common Name: Lower New England High Slope Chestnut Oak Forest (CEGL006282) Others plant communities can include: • *Pinus strobus* - Quercus (rubra, velutina) - *Fagus grandifolia* Forest Translated Name: Eastern White Pine - (Northern Red Oak, Black Oak) - American Beech Forest Common Name: Northeastern White Pine - Oak Forest (CEGL006293) • *Quercus rubra* - (*Quercus montana*) / Vaccinium spp. / *Deschampsia flexuosa* Woodland Translated Name: Northern Red Oak - (Chestnut Oak) / Blueberry species / Wavy Hairgrass Woodland Common Name: Red Oak / Heath Woodland Rocky Summit (CEGL006134) • *Quercus coccinea* - *Quercus velutina* / *Sassafras albidum* / *Vaccinium pallidum* Forest Translated Name: Scarlet Oak - Black Oak / Sassafras / Blue Ridge Blueberry Forest Common Name: Northeastern Coastal Oak / Heath Forest (CEGL006375) • *Fagus grandifolia* - *Quercus alba* - *Quercus rubra* Forest Translated Name: American Beech - White Oak - Northern Red Oak Forest Common Name: Northeastern Atlantic Coastal Beech - Oak Forest (CEGL006377)

Community 1.1
Chestnut Oak - (Northern Red Oak, Black Oak) / (Lowbush Blueberry, Blue Ridge Blueberry) Forest (CEGL006282)

Quercus montana - Quercus (rubra, velutina) / Vaccinium (angustifolium, pallidum) Forest Translated Name: Chestnut Oak - (Northern Red Oak, Black Oak) / (Lowbush Blueberry, Blue Ridge Blueberry) Forest Common Name: Lower New England High Slope Chestnut Oak Forest (CEGL006282) The canopy includes chestnut oak (*Quercus montana* [= Quercus prinus]), which can be codominant with red oak (*Quercus rubra*). White oak (*Quercus alba*), black oak (*Quercus velutina*), and red maple (*Acer rubrum*) are common associates, with other less frequent trees including sweet birch (*Betula lenta*), scarlet oak (*Quercus coccinea*), downy shadbush (*Amelanchier arborea*), pitch pine (*Pinus rigida*), and white pine (*Pinus strobus*). Sassafras (*Sassafras albidum*), flowering dogwood (*Cornus florida*), and blackgum (*Nyssa sylvatica*) can be minor associates at the southern and western portions of the range. Low-shrubs are typically well-developed and mostly consist of ly of ericaceous heath species, including common lowbush blueberry (*Vaccinium angustifolium*), hillside blueverry (*Vaccinium pallidum*), deerberry (*Vaccinium stamineum*), black huckleberry (*Gaylussacia baccata*), or sheep laurel (*Kalmia angustifolia*). Tall-shrubs are uncommon but may include American chestnut (*Castanea dentata*), mountain laurel (*Kalmia latifolia*), mapleleaf viburnum (*Viburnum acerifolium*), witchhazel (*Hamamelis virginiana*), scrub oak (*Quercus ilicifolia*). The herbaceous layer is of sparse to moderate cover, depending on shrub cover, and may include Pennsylvania sedge (*Carex pensylvanica*), wavy hairgrass (*Deschampsia flexuosa*), poverty oatgrass (*Danthonia spicata*), white snakeroot (*Ageratina altissima* var. altissima), plantain-leaved pussytoes (*Antennaria plantaginifolia*), wild sarsaparilla (*Aralia nudicaulis*), eastern teaberry (*Gaultheria procumbens*), striped wintergreen (Chimaphila maculate), rosy sedge (*Carex rosea*), swan's sedge (*Carex swanii*), pink corydalis (*Corydalis sempervirens*), bastard toadflax (Comandra umbellate), pink lady's slipper (*Cypripedium acaule*), marginal wood fern (*Dryopteris marginalis*), trailing arbutus (*Epigaea repens*), downy rattlesnake plantain (*Goodyera pubescens*), rattlesnake haqwkweed (*Hieracium venosum*), common clubmoss (*Lycopodium clavatum*), Indian cucumberroot (*Medeola virginiana*), cow-wheat (*Melampyrum lineare*), Indian pipes (*Monotropa uniflora*), dwarf cinqfoil (*Potentilla canadensis*), bracken fern (*Pteridium aquilinum*), sessile-leaved bellwort(*Uvularia sessilifolia*). (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]). Cross-referenced plant community concepts (typically by political State): CT: Black oak – chestnut oak / black huckleberry Forest (Metzler and Barrett, 2006) MA: Chestnut Oak Forest/Woodland (Swain and Kearsley, 2001) NH: Chestnut Oak Forest/Woodland (Sperduto and Nichols, 2011) NY: Appalachian oak forest (Edinger et al., 2014) RI: Chestnut Oak Forest (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

REFERENCES

Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C.A. Carpenter, and W.H.McNab. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. [Map. presentation scale 1:3,500,000, colored; A.M. Sloan, cartographer] Gen. Tech. Report WO-76D. U.S. Department of Agriculture, Forest Service, Washington, DC. (https://www.fs.fed.us/research/publications/misc/73326-wo-gtr-76d-cleland2007.pdf)

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.

Enser, R., Gregg, D., Sparks, C., August, P., Jordan, P., Coit, J., Raithel, C., Tefft, B., Payton, B., Brown, C. and LaBash, C., 2011. Rhode Island ecological communities classification. Rhode Island Natural History Survey, Kingston, RI.

Enser, R. and Lundgren, J.A., 2006. Natural communities of Rhode Island. Rhode Island Natural History Survey, Kingston (RI).

FGDC [Federal Geographic Data Committee]. 2008. National Vegetation Classification Standard, Version 2. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC..
Gawler, S.C. and Cutko, A., 2010. Natural landscapes of Maine: a guide to natural communities and ecosystems. Maine Natural Areas Program, Department of Conservation.

Metzler, K.J. and Barrett, J.P., 2006. The Vegetation of Connecticut, a Preliminary Classification. Department of Environmental Protection, State Geological and Natural History Survey of Connecticut.

NatureServe 2015. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: December 2015).

PRISM Climate Group, Oregon State University. Available http://prism.oregonstate.edu, (created February 26, 2013).

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. Agricultural Handbook 296. (https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051845.pdf).

Sperduto, D.D., & Nichols, W.F. 2011. Natural Communities of New Hampshire, Second Ed. NH Natural Heritage Bureau, Concord, NH. Publ. UNH Cooperative Extension.

Swain, P.C. and Kearsley, J.B., 2001. Classification of the natural communities of Massachusetts. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife.

Thompson, E.H. and Sorenson, E.R., 2000. Wetland, woodland, wildland. Vermont Department of Fish and Wildlife and The Nature Conservancy. Publ. University Press of New England.

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.

Contributors

Nels Barrett, Ph.D. (vegetation)

Approval

Greg Schmidt, 10/04/2024

Acknowledgments

Michael Margo and tech team provided earlier drafts. Josh Hibit made compliance updates w/ 2021 Checklist V.2

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	05/14/2025
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:**

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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:**
