

# Ecological site F144AY022MA

## Dry Outwash

Last updated: 4/24/2024  
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): 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

## Ecological site concept

The Dry Outwash ecological site is widely distributed and consists of very deep, excessively drained soils and somewhat excessively drained soils formed in sandy outwash and other glaciofluvial deposits. They are nearly level through very steep soils on various glaciofluvial landforms. Representative soils are Hinckley, Hoosic, Knickerbocker, Merrimac, Oakville Otisville, Quonset, Wapanucket, and Windsor.

The representative plant communities are varied but generally consist of pines: pitch pine (*Pinus rigida*), eastern white pine (*P. strobus*) which may be also mixed with some oaks: chestnut oaks (*Quercus montana*), black oak (*Q. velutina*), scarlet oak (*Q. prinus*) and, bear oak (*Q. ilicifolia*).

## Associated sites

F144AY027MA	<b>Moist Sandy Outwash</b>
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## Similar sites

F144AY025MA	<b>Semi-Rich Moist Outwash</b>
F144AY021MA	<b>Semi-Rich Dry Outwash</b>

Table 1. Dominant plant species

Tree	(1) <i>Pinus rigida</i> (2) <i>Quercus montana</i>
Shrub	(1) <i>Gaylussacia baccata</i>
Herbaceous	(1) <i>Pteridium aquilinum</i>

## Physiographic features

This site occurs across a wide range of landforms, and is rarely subject to flooding.

Table 2. Representative physiographic features

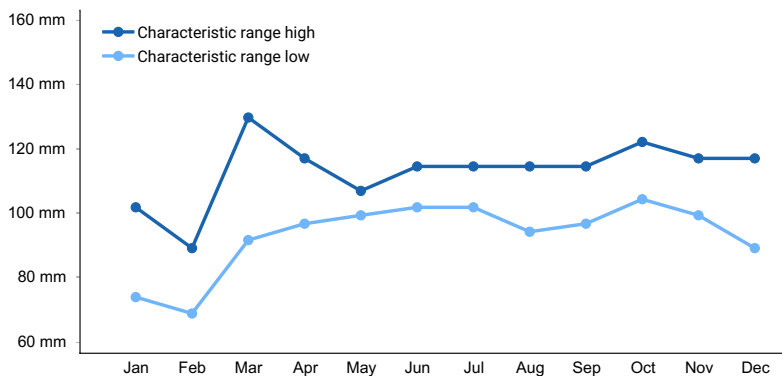
Landforms	(1) Delta plain > Delta (2) Lake plain > Esker (3) Outwash plain > Kame (4) River valley > Outwash plain (5) Upland > Terrace (6) Valley > Outwash delta (7) Flood plain (8) Hillslope (9) Ridge (10) Lake plain (11) Lake terrace (12) Outwash terrace
Runoff class	Negligible to medium
Flooding frequency	None to rare
Ponding frequency	None
Elevation	0–451 m
Slope	0–60%
Water table depth	76–183 cm
Aspect	Aspect is not a significant factor

## Climatic features

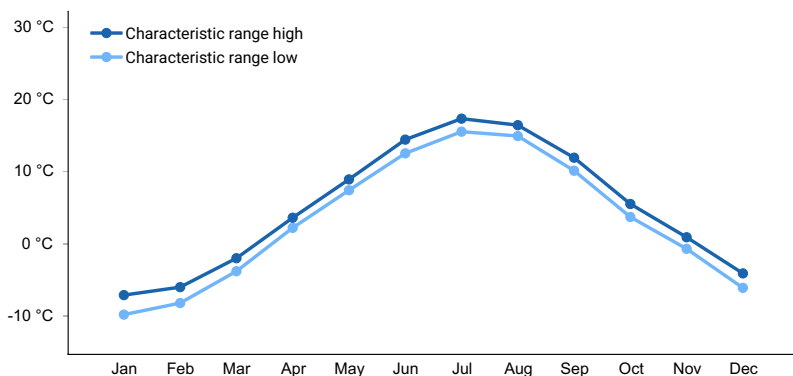
The Koppen-Geiger climate classification of the area in which this MLRA occurs varies between Dfb (Warm-summer humid continental) in the North, and Dfa (Hot-summer humid continental) in the southern portion of the MLRA. Precipitation is usually uniformly distributed throughout the year. Near the coast, 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)	123-151 days
Freeze-free period (characteristic range)	151-182 days
Precipitation total (characteristic range)	1,143-1,321 mm
Frost-free period (actual range)	116-159 days
Freeze-free period (actual range)	146-196 days
Precipitation total (actual range)	1,067-1,372 mm
Frost-free period (average)	138 days
Freeze-free period (average)	169 days
Precipitation total (average)	1,219 mm



**Figure 1. Monthly precipitation range**



**Figure 2. Monthly minimum temperature range**

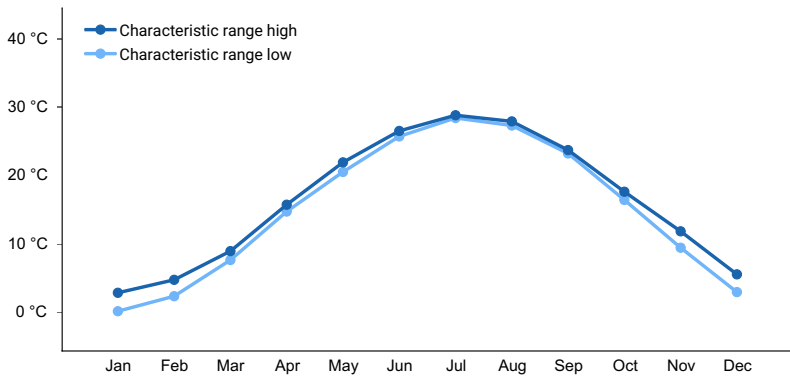


Figure 3. Monthly maximum temperature range

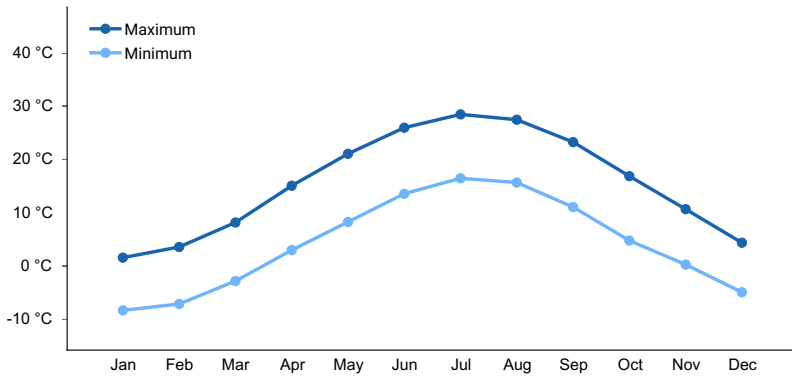


Figure 4. Monthly average minimum and maximum temperature

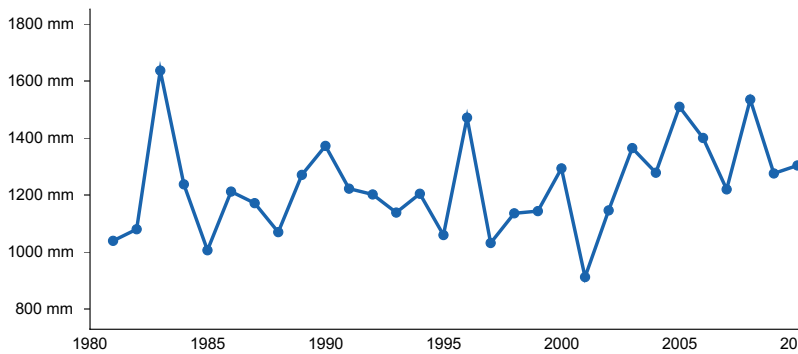


Figure 5. Annual precipitation pattern

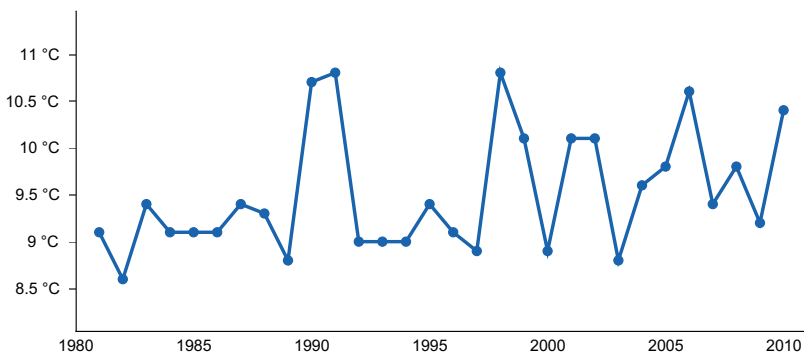


Figure 6. Annual average temperature pattern

### Climate stations used

- (1) DANBURY [USC00061762], Bethel, CT
- (2) NORWICH PUB UTIL PLT [USC00065910], Norwich, CT
- (3) WANAQUE RAYMOND DAM [USC00289187], Haskell, NJ

- (4) SARATOGA SPRINGS 4 SW [USC00307484], Saratoga Springs, NY
- (5) MIDDLEBORO [USC00194711], Middleboro, MA
- (6) DURHAM [USC00272174], Madbury, NH
- (7) WORCESTER RGNL AP [USW00094746], Leicester, MA
- (8) VALATIE 1 N [USC00308746], Valatie, NY

### Influencing water features

NONE

### Wetland description

NONE

### Soil features

This widely distributed site consists of very deep, excessively drained soils and somewhat excessively drained soils formed in coarse textured glaciofluvial deposits.

Representative soils are Hinckley, Hoosic, Knickerbocker, Merrimac, Oakville Otisville, Quonset, Wapanucket, and Windsor.

**Table 4. Representative soil features**

Parent material	(1) Glaciofluvial deposits–granite and gneiss (2) Eolian deposits–sandstone (3) Outwash–schist (4) Shale (5) Phyllite (6) Metamorphic and sedimentary rock (7) Basalt
Surface texture	(1) Loamy sand (2) Gravelly fine sandy loam (3) Gravelly sandy loam (4) Loamy coarse sand (5) Channery loam (6) Gravelly loam (7) Fine sandy loam (8) Loamy fine sand (9) Gravelly loamy sand (10) Sandy loam
Family particle size	(1) Loamy-skeletal (2) Sandy (3) Sandy-skeletal
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Very slow to rapid
Depth to restrictive layer	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–2%
Available water capacity (Depth not specified)	2.54–12.7 cm
Soil reaction (1:1 water) (Depth not specified)	3.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–60%

Subsurface fragment volume >3" (Depth not specified)	0–45%
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## 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. 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). 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, 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).

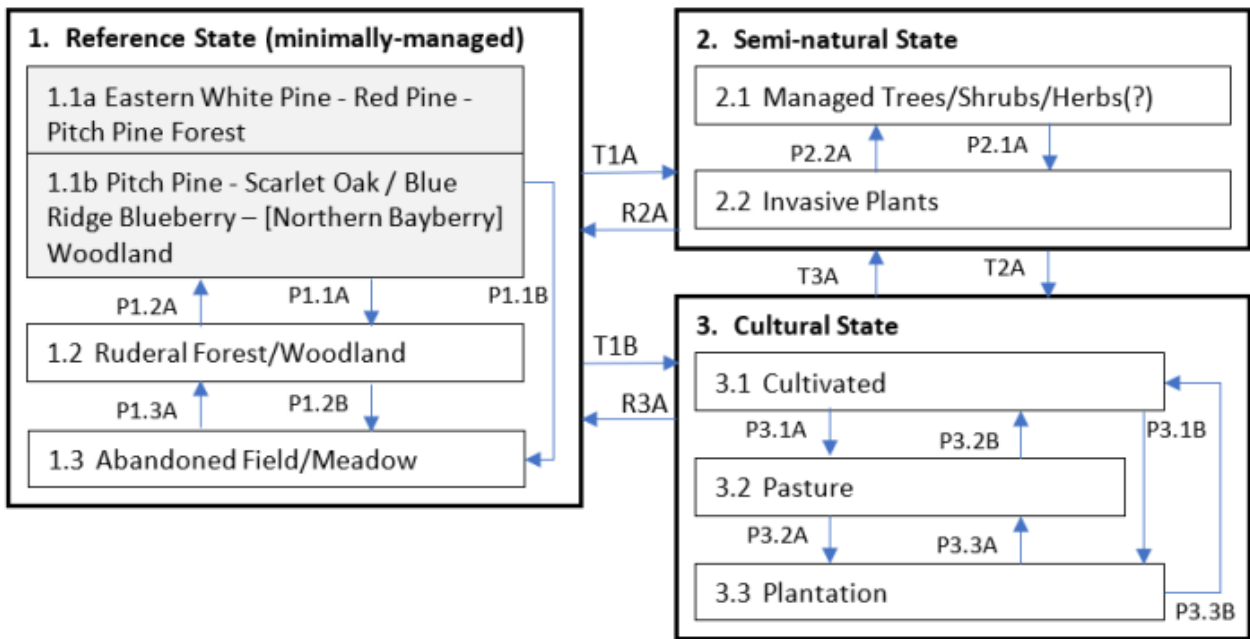
Additional and more localized vegetation information is provided by the State Natural Heritage Programs of Connecticut (Metzler and Barrett 2001) and Massachusetts (Swain and Kearsley 2001), New Hampshire (Sperduto and Nichols, 2011), and New York (Edinger et al., 2014).

The Dry Outwash ecological site is widely distributed and characteristic of the Central Appalachian Dry Oak-Pine Forest system (CES202.591), the Laurentian-Acadian Pine-Hemlock-Hardwood Forest system (CES201.563), the Northeastern Interior Pine Barrens system (CES202.590), and the Northern Atlantic Coastal Plain Pitch Pine Barrens system (CES203.269). The representative plant communities are varied but generally consist of pines (pitch pine (*Pinus rigida*), eastern white pine (*P. strobus*)) which may be also mixed with oaks (chestnut oaks (*Quercus montana*), black oak (*Q. velutina*), scarlet oak (*Q. prinus*) and , bear oak (*Q. ilicifolia*). 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. Wildfires do happen but are largely suppressed. Other agents-of-change include land conversions and fragmentation by agricultural cropping, development, tree harvests, and disease white pine blister rust (*Cronartium ribicola*) and southern pine bark beetle (*Dendroctonus frontalis*). Non-native pines include the Austrian pine (*Pinus nigra*), Japanese black pine (*Pinus thunbergia*), mugo pine (*Pinus mugo*), and Scotch pine (*Pinus sylvestris*).

[\*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

## 144AY022 –Dry Outwash



Transition	Drivers/practices
T1A	Forest mgmt., Disturbance
T1B, T2A	Disturbance/cutting/clearing, Brush removal
R2A, R2B	Restoration & <u>Mgmt.</u> , Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife <u>Mgmt.</u> , 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 state is varied depending on landscape position and proximity to the coast. Two modal communities are highlighted and others follow: • *Pinus strobus* - *Pinus resinosa* - *Pinus rigida* Forest Translated Name: Eastern White Pine - Red Pine - Pitch Pine Forest Common Name: Northeastern Dry Pine Forest (CEGL006259) • *Pinus rigida* - *Quercus coccinea* / *Vaccinium pallidum* - (*Morella pensylvanica*) Woodland Translated Name: Pitch Pine - Scarlet Oak / Blue Ridge Blueberry – [Northern Bayberry] Woodland Common Name: Pitch Pine - Scarlet Oak Woodland (CEGL006381) Other communities 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) • *Pinus rigida* / *Quercus ilicifolia* / *Morella pensylvanica* Woodland Translated Name: Pitch Pine / Bear Oak / Northern Bayberry Woodland Common Name: Coastal Pitch Pine / Bear Oak Barrens (CEGL006315) • *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) • *Quercus ilicifolia* - *Quercus prinoides* Scrub Translated Name: Bear Oak - Dwarf Chinkapin Oak Scrub Common Name: Outwash Bear Oak Barrens (CEGL006111) • *Pinus rigida* -

Quercus (velutina, montana) Forest Translated Name: Pitch Pine - (Black Oak, Chestnut Oak) Forest Common Name: Inland Pitch Pine - Oak Forest (CEGL006290) • *Pinus rigida* / *Quercus ilicifolia* / *Lespedeza capitata* Woodland Translated Name: Pitch Pine / Bear Oak / Round-head Bushclover Woodland Common Name: Inland Pitch Pine / Bear Oak Barrens (CEGL006025) • *Pinus rigida* / *Vaccinium* spp. - *Gaylussacia baccata* Woodland Translated Name: Pitch Pine / Blueberry species - Black Huckleberry Woodland Common Name: Pitch Pine / Heath Barrens (CEGL005046) • *Amelanchier canadensis* - *Viburnum* spp. - *Morella pensylvanica* Scrub Forest Translated Name: Canadian Serviceberry - *Viburnum* species - Northern Bayberry Scrub Forest Common Name: Northern Tall Maritime Scrub Forest • *Juniperus virginiana* / *Morella pensylvanica* Woodland Translated Name: Eastern Red-cedar / Northern Bayberry Woodland Common Name: Maritime Red-cedar Woodland (CEGL006212) • *Quercus stellata* - *Quercus velutina* / *Morella pensylvanica* / *Deschampsia flexuosa* Forest Translated Name: Post Oak - Black Oak / Northern Bayberry / Wavy Hairgrass Forest Common Name: North Atlantic Coast Maritime Post Oak Forest (CEGL006373)

## **Community 1.1**

### **Northeastern Dry Pine Forest (CEGL006259)**

Community 1.1(a) *Pinus strobus* - *Pinus resinosa* - *Pinus rigida* Forest Translated Name: Eastern White Pine - Red Pine - Pitch Pine Forest Common Name: Northeastern Dry Pine Forest (CEGL006259) This dry pine forest of New England has a canopy mix of mostly pines and occasionally oaks. White pine (*Pinus strobus*), pitch pine (*Pinus rigida*) and occasionally red pine (*Pinus resinosa*). Northern red oak (*Quercus rubra*) and possibly black oak (*Q. velutina*) as well as grey birch (*Betula populifolia*) or bigtooth aspen (*Populus grandidentata*) may occur at low cover. Shrubs are dominated by heaths such as blueberries (*Vaccinium* spp.). Herbs are generally sparse and include sweetfern (*Pteridium aquilinum*), eastern teaberry (*Gaultheria procumbens*), and pennsylvania sedge (*Carex pennsylvanica* or Blue Ridge sedge (*Carex leucorum*)). (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]). Cross-referenced plant community concepts (typically by political state): CT: Undisclosed (Metzler and Barret, 2006) MA: White Pine - Oak Forest (Swain and Kearsley, 2001) ME: Oak-Pine Forest (Grawler and Cutko, 2010) NH: Dry red oak - white pine forest (Sperduto and Nichols, 2011) NY: Appalachian oak-pine forest (Edinger et al., 2014) RI: Mixed Pine-Oak Forest (Enser and Lundgren, 2006)

## **Community 1.2**

### **Ruderal Forest/Woodland**

## **Community 1.3**

### **Abandoned Field/Meadow**

#### **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**

Abandonment, Sucession

#### **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**

Different phase of intense land use - may be cultivated crops, pasture/hay, or plantations (including nursery crops)

## **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

**Conservation practices**

Brush Management
Land Clearing
Herbaceous Weed Control

**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

## 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.

## **Approval**

Nels Barrett, 4/24/2024

## **Acknowledgments**

## 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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