USDA Natural Resources
Conservation Service

Ecological site F144BY503ME
Loamy Flat

Last updated: 9/27/2024
Accessed: 05/11/2025

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): 144B–New England and Eastern New York Upland, Northern Part

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This major land resource area (MLRA) is characterized by plateaus, plains, and mountains. The climate is generally cool and humid with an average annual precipitation of 34 to 62 inches (865 to 1,575 millimeters). The average annual air temperature is typically 40 to 48 degrees F (4 to 9 degrees C). The freeze-free period generally is 130 to 200 days, but it ranges from 110 days in the higher mountains to 240 days in some areas along the Atlantic coast. The soils in this region are dominantly Entisols, Spodosols, and Inceptisols. They commonly have a fragipan. The dominant suborders are Ochrepts, Orthods, Aquepts, Fluvents, and Saprists. The soils in the region dominantly have a frigid soil temperature regime with some cryic areas at higher elevation, a udic soil moisture regime, and mixed mineralogy. Most of the land is forested, and 98 percent is privately owned. Significant amounts of forest products are produced including lumber, pulpwood, Christmas trees, and maple syrup. Principal agricultural crops include forage and grains for dairy cattle, potatoes, apples, and blueberries. Wildlife habitat and recreation are important land uses. Stoniness, steep slopes, and poor drainage limit the use of many of the soils.

Classification relationships

Classification relationships
NRCS:
Land Resource Region: R—Northeastern Forage and Forest Region
MLRA: 144B—New England and Eastern New York Upland, Northern Part

Ecological site concept

This site occurs on flat till plains and ground moraines at elevations between 10 and 2,500 feet. It has a seasonally-high water table, from November through May, that is within 24 inches of the soil surface. From June through October the water table often drops below 24 inches except following large rain events. This site may exhibit pit and mound topography from a history of blowdowns that excavate pits as tree roots tip up and deposit mounds of soil next to the pit.
Soils of this site are poorly- and somewhat-poorly-drained complexes of till, often with a densely-compacted layer 10-25 inches below the surface. This dense layer is hard to dig through and usually has about 15 percent rock fragments (by volume). Importantly, it perches water in the upper soil layers, resulting in redoximorphic features near the soil surface. These are mineral soils, but they may have a layer of mucky peat material on the surface, particularly in poorly-drained depressions.
This site is dominated by red spruce, often with balsam fir occurring in younger patches. Understory is typically sparse, though wild raspberries and other early seral species may occupy large areas when trees are removed by logging, blowdowns, insects or disease.
This site is often managed for spruce-fir timber products, and as such may produce more fir than spruce in a managed state. However, historically these sites were likely dominated by red spruce with a limited understory.

This site includes the following state natural heritage program types:
• Lowland Spruce-fir Forests (Sperduto and Nichols 2004)
• Low Elevation Spruce-fir Forests (Gawler and Cutko 2010)
• Lowland Spruce-fir Forests (Thompson and Sorenson 2000)

Associated sites

F144BY502ME	**Loamy Till Toeslope** The Loamy Flat site and Loamy Till Toeslopes site share many of the same soils, but Loamy Flats occur on flatter areas grading into wetlands and produce spruce-fir forests, whereas the Loamy Till Toeslope occurs at the base of slopes and produces semi-rich mixedwood forests.
F144BY301ME	**Loamy Till Swamp** The Loamy Till Swamp site occurs lower in the watershed than the Loamy Flat site. The two sites occur together along a soil drainage gradient from somewhat poorly to poorly- and very poorly-drained.
F144BY304ME	**Wet Clay Flat** The Loamy Flat site occurs on somewhat-poorly and poorly-drained soil complexes that are somewhat drier and have significantly less understory production than the Wet Loamy Flat site.

Similar sites

F144BY502ME	**Loamy Till Toeslope** The Loamy Flat site and Loamy Till Toeslopes site share many of the same soils, but Loamy Flats occur on flatter areas grading into wetlands and produce spruce-fir forests, whereas the Loamy Till Toeslope occurs at the base of slopes and produces semi-rich mixedwood forests.
F144BY304ME	**Wet Clay Flat** The Loamy Flat site occurs on somewhat-poorly and poorly-drained soil complexes that are somewhat drier and have significantly less understory production than the Wet Loamy Flat site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on flat till plains and ground moraines at elevations between 10 and 2,500 feet. Slopes range from 0-8%, sometimes up to 15%. It has a seasonally-high water table, from November through May, that is within 24 inches of the soil surface. From June through October the water table often drops below 24 inches except following large rain events. This site may exhibit pit and mound topography from a history of blowdowns that excavate pits as tree roots tip up and deposit mounds of soil next to the pit.

Table 2. Representative physiographic features

Landforms	(1) Till plain
Flooding frequency	None
Ponding frequency	None
Elevation	0–2,500 ft
Slope	0–8%
Water table depth	0–6 in
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

The climate is humid and temperate. It is characterized by warm summers and cold winters. The average first frost around October 1st and the last freeze of the season occurs around April 23rd. Temperature extremes in the summer can reach as high as 100 degrees F and as low as -33 degrees F in the winter. The average relative humidity is 71 percent. The sun shines on average 57 percent of the time. Bad storm events can come in from the northeast, thus the term “nor’easter”. Winter blizzards can result in several feet of snow, while summer hurricane events can produce 2-3 inches of rain per hour. Annual rainfall occurs quite evenly over the entire year with August being the driest month during the growing season from April through September. Rainfall during this period generally falls during thunderstorms, and fairly large amounts of rain may fall in a short time. Eighty-eight percent of the snowfall occurs from December through March and average total snowfall is 64 inches per year. This makes for a “mud season” from March through April where runoff is high and ponding may occur because surface water runoff is very slow. The original data used in developing the table below was obtained from the USDA-NRCS National Water & Climate Center climate information database. All the climate station monthly averages for maximum and minimum temperature and precipitation were then added together and averaged to make this table. The precipitation and temperature data come from the years 1981 through 2010.

Table 3. Representative climatic features

Frost-free period (characteristic range)	117-140 days
Freeze-free period (characteristic range)	144-170 days
Precipitation total (characteristic range)	42-48 in
Frost-free period (actual range)	98-146 days
Freeze-free period (actual range)	133-180 days
Precipitation total (actual range)	40-54 in
Frost-free period (average)	126 days
Freeze-free period (average)	159 days
Precipitation total (average)	46 in

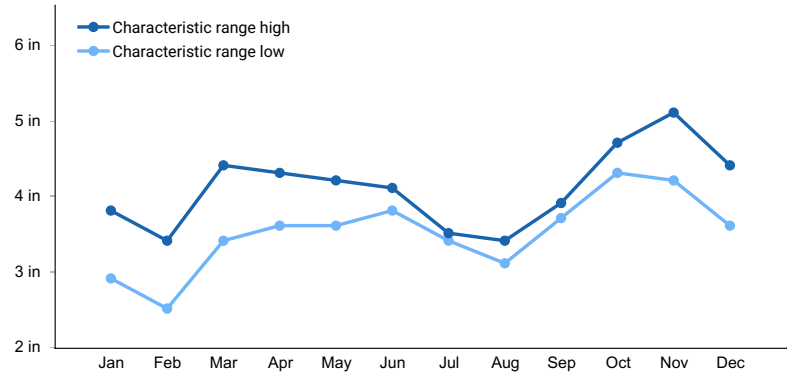


Figure 1. Monthly precipitation range

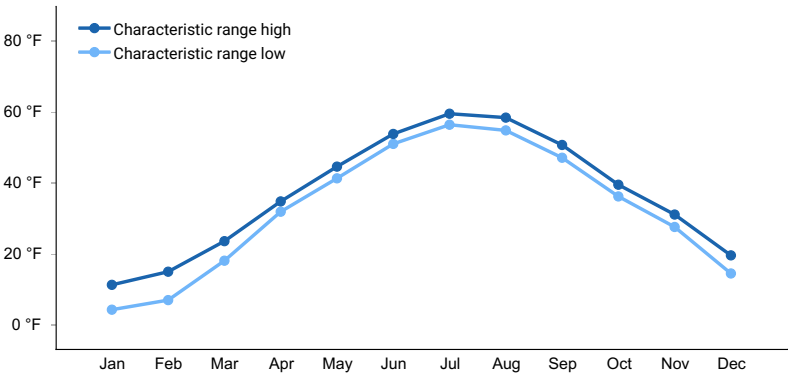


Figure 2. Monthly minimum temperature range

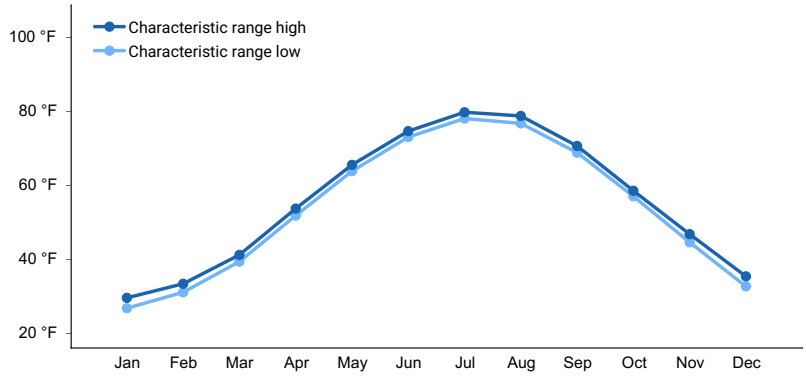


Figure 3. Monthly maximum temperature range

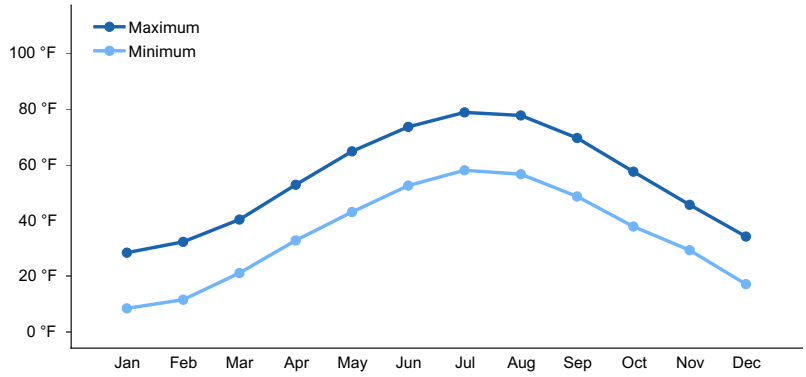


Figure 4. Monthly average minimum and maximum temperature

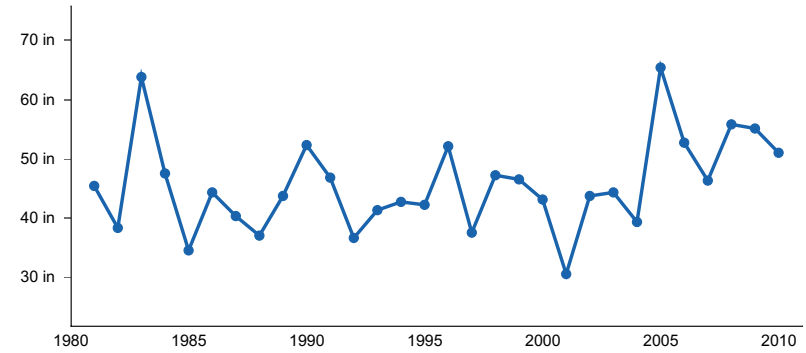


Figure 5. Annual precipitation pattern

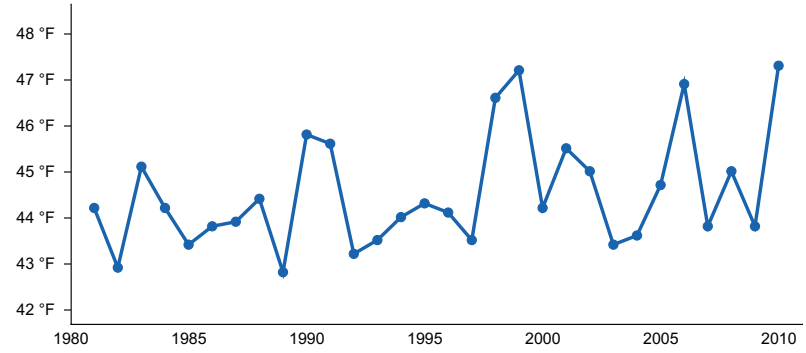


Figure 6. Annual average temperature pattern

Climate stations used

- (1) BELFAST [USC00170480], Belfast, ME
- (2) ACADIA NP [USC00170100], Bar Harbor, ME
- (3) CORINNA [USC00171628], Corinna, ME

- (4) DOVER-FOXCROFT WWTP [USC00171975], Dover Foxcroft, ME
- (5) FARMINGTON [USC00172765], Farmington, ME
- (6) GARDINER [USC00173046], Gardiner, ME
- (7) JONESBORO [USC00174183], Addison, ME
- (8) LEWISTON [USC00174566], Auburn, ME
- (9) MADISON [USC00174927], Anson, ME
- (10) NEWCASTLE [USC00175675], Newcastle, ME
- (11) ORONO [USC00176430], Old Town, ME
- (12) WATERVILLE TRTMT PLT [USC00179151], Waterville, ME
- (13) WEST ROCKPORT 1 NNW [USC00179593], Rockport, ME
- (14) AUGUSTA STATE AP [USW00014605], Augusta, ME
- (15) BANGOR INTL AP [USW00014606], Bangor, ME
- (16) PORTLAND INTL JETPORT [USW00014764], Portland, ME

Influencing water features

This site is not typically influenced by streams or wetlands.

Soil features

Soils of this site are poorly- and somewhat-poorly-drained complexes of till often with a densely-compacted layer 10-25 inches below the surface. This dense layer is hard to dig through and often has about 15 percent rock fragments (by volume). Importantly, it perches water in the upper soil layers, resulting in redoximorphic features near the soil surface. These are mineral soils, but they may have a layer of mucky peat material on the surface, particularly in poorly drained depressions.

Table 4. Representative soil features

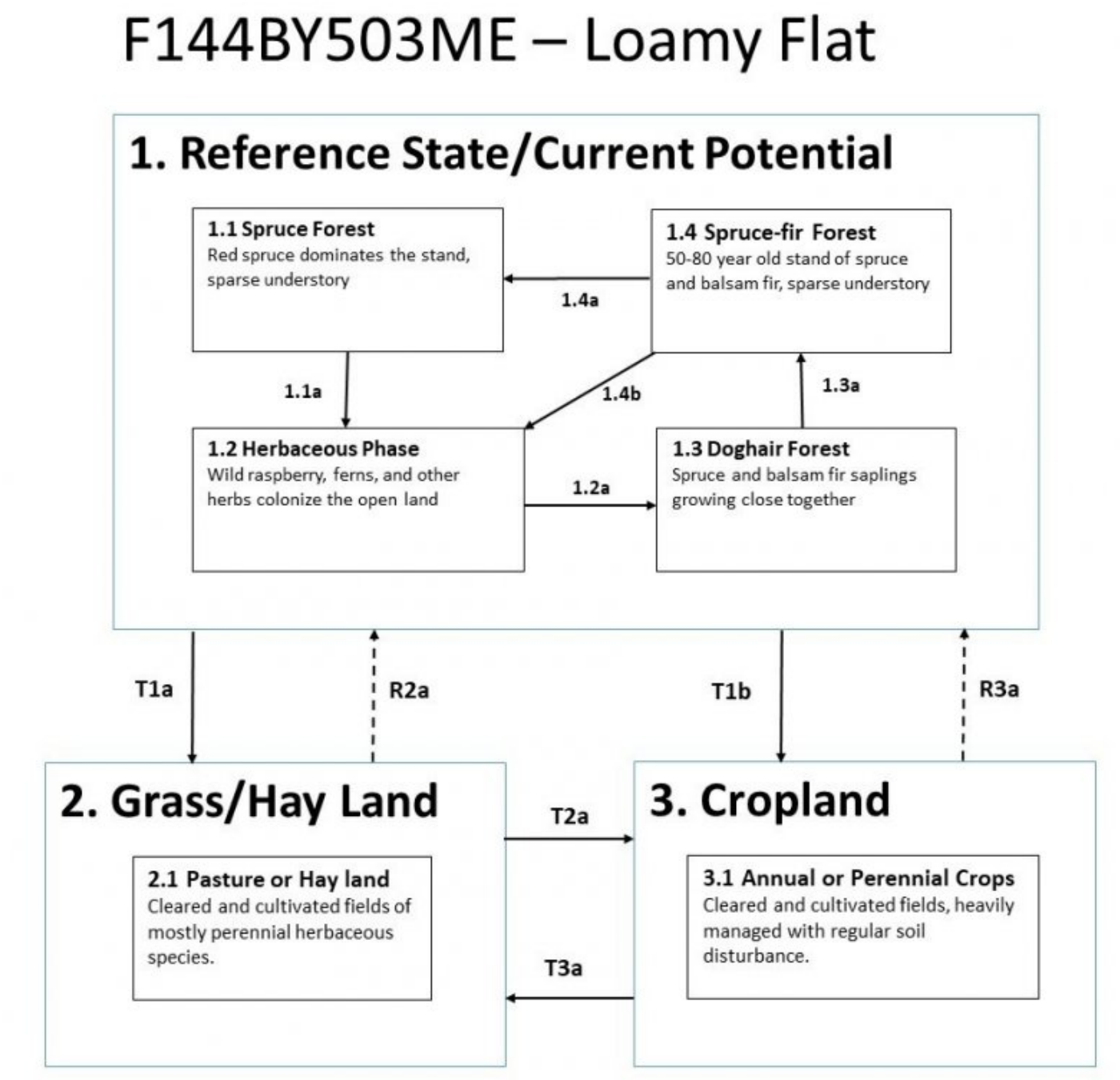
Parent material	(1) Till–igneous and metamorphic rock (2) Lodgment till–igneous and metamorphic rock
Surface texture	(1) Silt loam (2) Fine sandy loam (3) Very fine sandy loam
Drainage class	Poorly drained to somewhat poorly drained
Soil depth	0–20 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–2%
Available water capacity (Depth not specified)	2.6–9.3 in
Calcium carbonate equivalent (Depth not specified)	0%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	3.5–6.5
Subsurface fragment volume <=3" (Depth not specified)	8–10%
Subsurface fragment volume >3" (Depth not specified)	0–7%

Ecological dynamics

This site is dominated by red spruce, often with balsam fir occurring in younger patches. Understory is typically

sparse, though wild raspberries and other early seral species may occupy large areas when trees are removed by logging, blowdowns, insects or disease.
This site is often managed for spruce-fir timber products, and as such may produce more fir than spruce in a managed state. However, historically these sites were likely dominated by red spruce with a limited understory. In some areas, this site has been cultivated as grass hay or cropland.

State and transition model



State 1
Reference State/Current Potential

Community 1.1
Spruce Forest

Red Spruce dominates the stand, sparse understory.

Dominant plant species

- red spruce (*Picea rubens*), tree

Dominant resource concerns

- Seasonal high water table

Community 1.2
Herbaceous Phase

Wild Raspberry, ferns, and other herbs colonize the open land.

Dominant plant species

- American red raspberry (*Rubus idaeus*), other herbaceous

Community 1.3
Doghair Forest

Spruce and Balsam fir growing close together.

Dominant plant species

- red spruce (*Picea rubens*), tree
- balsam fir (*Abies balsamea*), tree

Community 1.4
Spruce-Fir Forest

50-80 year old stand of spruce and balsam fir, sparse understory.

Dominant plant species

- red spruce (*Picea rubens*), tree
- balsam fir (*Abies balsamea*), tree

Pathway 1.1a
Community 1.1 to 1.2

Logging, insect damage, or blowdown that light and water available at the soil surface.

Conservation practices

Forage Harvest Management
Forest Trails and Landings

Pathway 1.2a
Community 1.2 to 1.3

Time, vegetation development, tree establishment

Conservation practices

Tree/Shrub Establishment

Pathway 1.3a
Community 1.3 to 1.4

Time, vegetation development, self-thinning

Pathway 1.4a
Community 1.4 to 1.1

Time, vegetation development, self-thinning

Pathway 1.4b
Community 1.4 to 1.2

Logging, insect damage, or blowdown that light and water available at the soil surface.

Conservation practices

Forest Trails and Landings
Forest Land Management

State 2
Grass/Hay Land

Community 2.1
Pasture of Hayland

Cleared and cultivated fields of mostly perennial herbaceous species.

State 3
Cropland

Community 3.1
Annual or Perennial Crops

Cleared and cultivated fields, heavily managed with regular soil disturbance.

Transition T1a
State 1 to 2

Tree removal and cultivation of hay/pasture land

Conservation practices

Forest Trails and Landings
Forest Land Management

Transition T1b
State 1 to 3

Tree removal and cultivation of crops.

Conservation practices

Clearing and Snagging
Forest Land Management

Restoration pathway R2
State 2 to 1

Abandonment, time, vegetation development

Conservation practices

Tree/Shrub Establishment
Wetland Wildlife Habitat Management
Forest Land Management

Transition T2a
State 2 to 3

Pasture converted to cropland

Conservation practices

Land Clearing

Restoration pathway R3
State 3 to 1

Abandonment, time, vegetation development

Conservation practices

Tree/Shrub Establishment
Wetland Wildlife Habitat Management
Forest Land Management

Restoration pathway R3a
State 3 to 2

T3 – Intensive agriculture converted to pasture/hay land

Conservation practices

Restoration and Management of Rare and Declining Habitats
Upland Wildlife Habitat Management
Early Successional Habitat Development/Management

Additional community tables

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.

Other references

Gawler, S. and A. Cutko. 2010. Natural Landscapes of Maine. A Guide to Natural Communities and Ecosystems. Maine Natural Areas Program, Maine Department of Conservation, Augusta, ME.
Johanson, J. K., Butler, N. R. and C. Bickford. 2016. Classifying Northern New England Landscapes for Improved Conservation. Rangelands 38:6.
Sperduto, D.D. and W.F. Nichols. 2004. Natural Communities of New Hampshire. New Hampshire Natural Heritage Bureau and The Nature Conservancy.
Thompson, E. H., and E. R. Sorenson. 2000. Wetland, woodland, wildland: A guide to the natural communities of Vermont. The Nature Conservancy and the Vermont Department of Fish and Wildlife. University Press of New England, Hanover, NH. 456 pp.
USDA NRCS 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. USDA Handbook 296.

Contributors

Jamin Johanson
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Approval

Nels Barrett, 9/27/2024

Acknowledgments

Nels Barrett, Ph.D.

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	06/29/2020
Approved by	Nels Barrett
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):**

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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):**

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:**

17. **Perennial plant reproductive capability:**