Ecological site F143XY110ME
Broad Floodplain Riparian Complex

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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): 143X–Northeastern Mountains

MLRA 143, known as the Northeastern Mountains, covers approximately 23 million acres of mountains, hills, and valleys in northern Maine, New Hampshire, Vermont, New York, and Massachusetts. The area is sparsely populated, with less than five percent of the land area developed for agriculture, residential, and urban development. About 90 percent of the area is forested, most of which is actively managed for timber. Elevations are mostly between 1,000 to 4,000 feet, with a few isolated peaks more than 5,000 feet above sea level. The present day mountains are but remnants of a much larger ancient range that has been eroding for approximately 500 million years. Bedrock consists of mostly very old metamorphic rock (gneiss, schist, slate, marble, quartzite, etc.) with younger intrusions of igneous rock (e.g. granite and granodiorite) from the Triassic and Cretaceous periods. MLRA 143 differs somewhat geologically from its neighboring MLRAs (142, 144A, 144B, 145, and 146), which have greater amounts of nutrient-rich sedimentary rock. Compared to MLRA 143, they are all lower in elevation, with longer growing seasons large areas that were once submerged by the ocean following glaciation.

The characteristic landforms and soils of northern New England were derived from the massive continental ice sheet that engulfed the region during North America’s most recent glaciation. Mighty glaciers, embedded with sediment and rock fragments, scoured bedrock and compacted mineral beds in a steady march south and east toward the Atlantic Ocean. The softer sedimentary rocks were pulverized into fine silts and clays under the immense weight of ice a mile thick, while the more resistant igneous and metamorphic rocks were sculpted into steep mountains and hills or plucked and dragged along the base of the glacier. With a warming climate, the ice retreated northward, depositing a thin layer of unsorted glacial till sediment atop the newly-exposed bedrock and compacted mineral beds. Deeper mounds of unsorted till formed small hills, kames, moraines and drumlins. Enormous chunks of ice detached as the glacier retreated, melting slowly in place and forming many kettle lakes and basins where water and fine sediments collect. Raging torrents of glacial meltwater dissected much of the barren landscape, entraining coarse and fine sediments, carving river valleys, and leaving well-sorted deposits of mostly sand and gravel along the watercourse. By 10,000 years ago the ice sheet had fully receded from MLRA 143. Silty floodplains developed along perennial rivers, many of which occupy the same channels that once gushed with sediment-rich glacial meltwater. Over time, wet basins accumulated fine sediment, some dried out, and still others became acidified by organic matter inputs from colonizing vegetation.

In terms of climate, MLRA 143 is distinguished from neighboring MLRAs by a shorter growing season and the occurrence of cryic soil temperature regimes at high elevations. The majority of MLRA 143 averages 32 to 44 inches of precipitation annually with a five to six month growing season and frigid winter temperatures. However, the higher elevations may receive up to double the annual precipitation of the lower elevations, and have a three to four month growing season with extremely cold winters. As the northernmost MLRA in the region with the coldest temperatures and shortest growing season, the Northeastern Mountains have less overall tree diversity, fewer pine and oak trees, and more abundant spruce and fir trees than neighboring MLRAs.

Classification relationships

This site occurs in Ecological Site Group 1 (Floodplains) of MLRA 143 (The Northeastern Mountains), in the

Northeastern Forage and Forest Region (Land Resource Region R).

The Northeastern Forage and Forest LRR includes all of Maine, New Hampshire, Vermont, Rhode Island, and Connecticut, as well as large portions of Massachusetts, New York, New Jersey, Pennsylvania, and Ohio. Its southern boundary marks the extent of the Wisconsin ice sheet, which engulfed the entire LRR as recently as 10,000 to 15,000 years ago. Erosional and depositional processes associated with glaciation created many of the topographic patterns that distinguish MLRAs within the Northeastern region. Harder granitic and metamorphic bedrock to the north were more resistant to glacial erosion, resulting in the relatively nutrient poor mountains of MLRA 143; whereas nutrient-rich sedimentary bedrock of MLRAs 139, 140, and 146 resulted in relatively flat, fertile landscapes ideal for cultivation. Other areas were depressed below sea-level by the sheer mass of the glacier, resulting in pockets of marine sediments which distinguish MLRAs 142, 144A, 144B, and 145.

Precipitation is sufficient to support productive forestland throughout the Northeastern region. Still, a latitudinal temperature gradient from mesic to frigid soil temperatures results in a general transition from central hardwoods and pine in the southern MLRAs to northern hardwoods and spruce-fir forests farther north (no true boreal forests exist in the region). Elevations are generally low throughout the Northeastern region, with the exception of MLRA 143 which has many high mountain ecosystems with cryic temperature regimes and alpine vegetation above the tree line.

Ecological site concept

This site occurs next to large rivers and includes a complex of soils and landforms associated with floodplains. Well-drained natural levees occur near the stream bank, with broad, somewhat poorly to moderately well-drained floodplains behind. Side channels often carry water past the levees into the floodplains during high water, the lowest areas of the floodplain, including poorly- and very poorly-drained oxbows and depressions, may be ponded at times. These soils are derived from alluvium, are typically silt loams to fine sands in texture, and may have gravel or sand layers from particular flooding events. Poorly-drained soils are often organic over alluvium.

The variability in microtopography on this site results in a patchy mosaic of plant communities. Silver maple is the most common overstory species, with diverse grasses and herbs indicating differences in soil wetness throughout the site due to slight variability in elevation above the water table. This site is subject to ice scour and flooding, but the most extensive disturbance is cultivation. These broad, flat landforms are nutrient rich with high water-holding capacity. These factors along with their adjacency to rivers made them ideal farming locations for early settlers, much of which continues today. The effects of altered flow regimes from modern dams may also be significant, but require further study.

Similar sites

F143XY120ME	**Small Floodplain Riparian Complex** The Small Floodplains site occurs next to small rivers and streams, supports mostly herbaceous species, and has floodplains too small for extensive cultivation; whereas the Broad Floodplains site occurs next to large rivers supporting tree cover and extensive cultivation.

Table 1. Dominant plant species

Tree	(1) *Acer saccharinum*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site consists of complex microtopography associated with rivers, including: stream banks, natural levees, floodplains, backswamps, stream terraces, etc. Slopes are gentle throughout this site, and minor changes in slope and elevation often correspond to major differences in flooding, ponding, and the resultant soil moisture and vegetation. This site is therefore considered a riparian complex of distinct soils and plant communities which occur together on distinctive, but closely associated fluvial landforms.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Natural levee (3) Backswamp
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	0–457 m
Slope	0–3%
Ponding depth	0–30 cm
Water table depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of this site is typical of MLRA 143, with very cold snowy winters, warm rainy summers, and a relatively short growing season. Precipitation is fairly constant from month to month and averages about 45 inches annually. Growing degree days ranges from 104-138 days from June to September.

Table 3. Representative climatic features

Frost-free period (average)	104 days
Freeze-free period (average)	138 days
Precipitation total (average)	1,143 mm

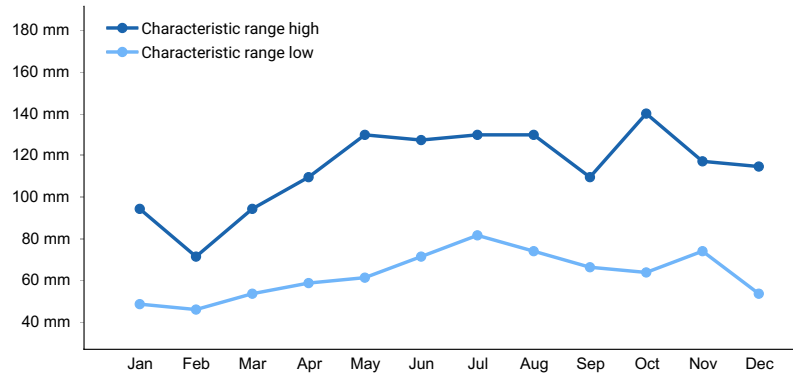

Figure 1. Monthly precipitation range

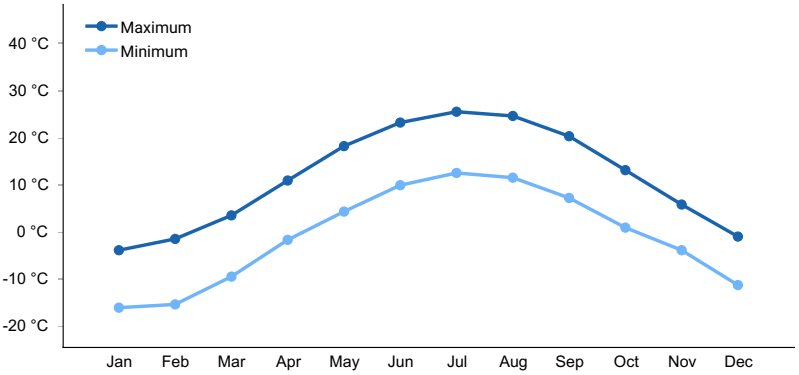

Figure 2. Monthly average minimum and maximum temperature

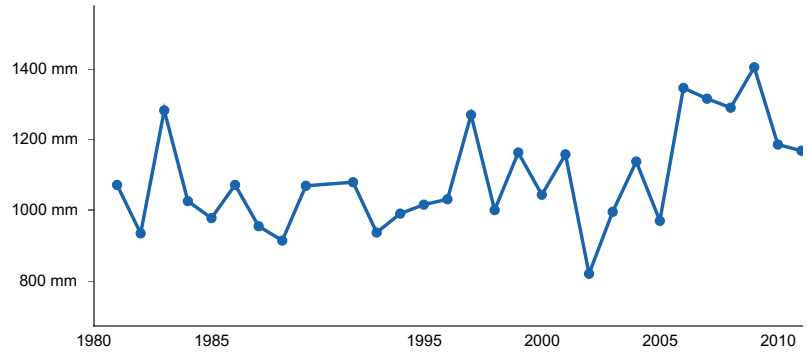

Figure 3. Annual precipitation pattern

Climate stations used

- (1) NORTH STRATFORD [USC00276234], Guildhall, NH
- (2) NEWCOMB [USC00305714], Newcomb, NY
- (3) RUMFORD 1 SSE [USC00177325], Rumford, ME
- (4) NORTHFIELD [USC00435733], Northfield, VT
- (5) JACKMAN [USC00174086], Jackman, ME

Influencing water features

This site occurs next to large perennial rivers that, when in reference condition, regularly overtop their banks, depositing sediment and nutrients on broad, forested floodplains. Natural levees often form near the channel, and side-channels may carry additional water behind the levees to low-lying areas on the floodplain. The lowest areas, including abandoned meander channels (oxbows), may be poorly- or very poorly-drained wetland inclusions within the riparian complex. Small changes in elevation above the water table may result in large variability in soil moisture and plant community.

Soil features

The soils of this site include well-drained natural levees and mounds, moderately well- to somewhat-poorly drained floodplains, and poorly- to very-poorly drained oxbows and depressions. All of these soils are formed in alluvium, with some of the wetter areas having a very thick organic cap. Textures are typically silt loams to sandy loams and may include lenses of distinctive textures or gravels from particular flooding events. These soils are deep, nutrient rich, and often cultivated.

Table 4. Representative soil features

Parent material	(1) Alluvium–granite (2) Organic material–metasedimentary rock
Surface texture	(1) Silt loam (2) Fine sandy loam (3) Very fine sandy loam
Family particle size	(1) Loamy
Drainage class	Very poorly drained to well drained
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–38.1 cm
Calcium carbonate equivalent (0-101.6cm)	0%

Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	3.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–35%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

This site is a complex of plant communities occurring on floodplains and associated landforms. The vast majority is dominated by silver maple, with a diverse understory of ferns (particularly ostrich fern), graminoids, shrubs, and forbs.

Natural levees are well-drained and form near poorly-drained stream banks. The stream banks tend to support water-loving graminoids and forbs, while natural levees often have silver maple as well as grass and shrub species that prefer well-drained soil conditions.

Behind the natural levees, the floodplains typically have silver maple with some red maple, white or brown ash, and many other tree species possible in small quantities. Depressions, oxbows and other low-lying areas may exhibit little tree cover and be herbaceous-dominated. These herbaceous areas tend to have organic soils. All of these varied communities are closely associated and form the riparian plant community complex.

Because this site is flat, nutrient-rich, and close to major waterways, it has been cultivated in many areas for crop or pasture land. Man made dams that affect flow regimes may also have a significant impact on the dynamics of this site, but require further study. Beaver dams typically do not influence the flow regime on rivers of this size, despite the fact that beaver activity is common on this site.

State and transition model

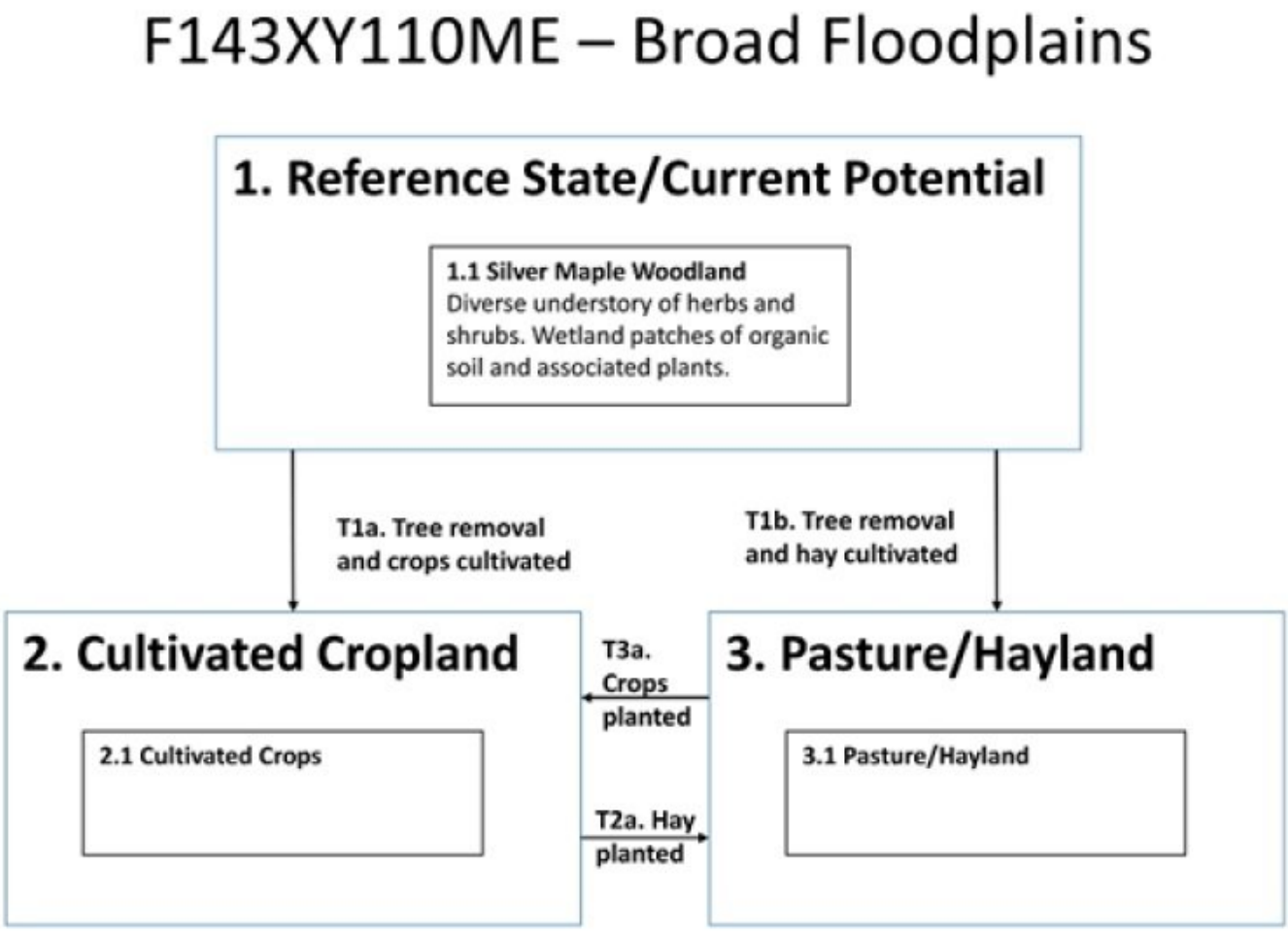

Figure 5. STM

Other references

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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, Maine.

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Sperduto, D. and B. Kimball. 2011. The Nature of New Hampshire: Natural Communities of the Granite State. The Nature Conservancy and The New Hampshire Heritage Bureau. University Press of New England, Lebanon, NH.

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.

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Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
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:**

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:**
