

Ecological site F142XA004NY

Acidic Shallow Sandy Outwash

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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): 142X–St. Lawrence-Champlain Plain

This MLRA is a glaciated area of low relief dominated by broad expanses of nearly level, sandy deltas and shallow lacustrine basins or plains punctuated by low hills of glacial till. Rivers and streams have cut relatively deep but narrow valleys across the plain. Elevation ranges from 80 to 1,000 feet, increasing gradually from the St. Lawrence River southward and from Lake Champlain to the east and west. Local relief generally is less than 30 feet, but glacial till ridges, till plains, and some outwash terraces rise 15 to 80 feet above the adjacent plains.

This area has been glaciated, and a thin mantle of till covers most of the bedrock. Extensive areas of sandy glacial outwash and eolian deposits also occur. Some glacial lake sediments have been deposited above glacial moraines. These deposits are thickest in the valleys and thinnest on the ridges and highlands. During the later stages of the Wisconsin glacial period, seawater entered the Champlain Valley and deposited marine sediments that were later covered by freshwater sediments. The marine deposits are unique to the area.

This area supports hardwoods. The beech-birch-sugar maple forest type is the dominant climax forest type on uplands. Associated with this type are basswood, American elm, maple species, white ash, black cherry, and white pine. The aspen-birch type, earlier in succession, is economically important. Such species as eastern hemlock, red maple, American elm, and spruce are on wet soils.

Some of the major wildlife species in this area are white-tailed deer, red fox, raccoon, beaver, woodchuck, muskrat, cottontail, ruffed grouse, and woodcock.

LRU notes

Land Resource Unit (LRU): Frigid Soil Temperature Regime

The upper St. Lawrence and Champlain Valleys are characterized with soils in the frigid soil temperature regime (mean annual soil temperature greater than 32°F but less than 46°F and with a difference between mean summer and mean winter soil temperatures greater than 41°F at 20 inches below the surface or at a densic, lithic, or paralithic contact, whichever is shallower).

The Frigid Soil Temperature Regime (STR) will have shorter growing season than the lower St. Lawrence and Champlain Valleys which are characterized with soils in the mesic STR. Species more tolerant of colder year round temperatures would also be evident in the Frigid LRU.

Classification relationships

NRCS:

Land Resource Region: R - Northeastern Forage and Forest Region

MLRA: 142 - St. Lawrence-Champlain Plain

LRU: A/02 - Frigid Mean Annual Soil Temperature

USFS:

Domain: 200 - Humid Temperate
Division: 210 - Warm Continental
Province: 211 - Northeastern Mixed Forest
Section: 211E - St. Lawrence and Champlain Valley
Subsections: 211Ea - St. Lawrence Glacial Marine Plain

EPA:

Level I: 8 - Eastern Temperate Forests
Level II: 8.1 - Mixed Wood Plains
Level III: 83 - Eastern Great Lakes Lowlands
Level IV: 83d - St. Lawrence Lowlands
83e - Upper St. Lawrence Valley

Ecological site concept

Landform/Landscape Position:

The site occurs on outwash plains, terraces and valley trains. Slopes range from 0 to 25 percent.

Soils:

The site consists of shallow, well drained, coarse-textured and gravelly soils derived from acidic sandstone and/or igneous rocks. The soils have an ortstein (iron cementation) layer in the upper part of the soil which will restrict roots. Reaction ranges from extremely acid through moderately acid throughout but includes ultra-acid in the O horizons. Representative soil is Constable.

Vegetation:

The reference plant community is a pine-northern hardwood forest (Edinger et al. 2014). Characteristic trees include white pine, red pine, eastern hemlock, red oak, sugar maple, paper birch and yellow birch (Edinger et al. 2014). Red spruce and balsam fir may also be present. Blueberries are characteristic shrubs, bracken fern is a common herb, and mosses and lichens may be common to abundant (Edinger et al 2014).

Primary disturbances are wind, insects (particularly during droughts), and ice storms. These are more important than fire, although they predispose forests to fire during drought conditions. Fire interval is 27-50 years in red pine-eastern white pine communities (USDA USFS)

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The site occurs on glacial outwash plains, terraces and valley trains. Slopes range from 0 to 25 percent.

Table 2. Representative physiographic features

Landforms	(1) Outwash plain (2) Outwash terrace (3) Valley train
Flooding frequency	None
Ponding frequency	None
Slope	0–25%
Aspect	Aspect is not a significant factor

Climatic features

Mean annual precipitation is 38 inches and evenly distributed throughout the year. Most of the rainfall occurs as high intensity, convective thunderstorms during the summer. Snowfall is heavy from late in autumn to early spring. The average temperature in winter is 18°F and in summer it is 66°F. Average frost-free and freeze-free days are 120 and 145, respectively.

Table 3. Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	145 days
Precipitation total (average)	39 in

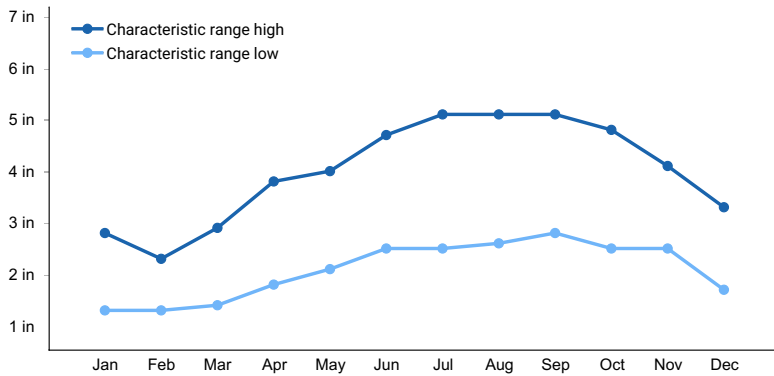


Figure 1. Monthly precipitation range

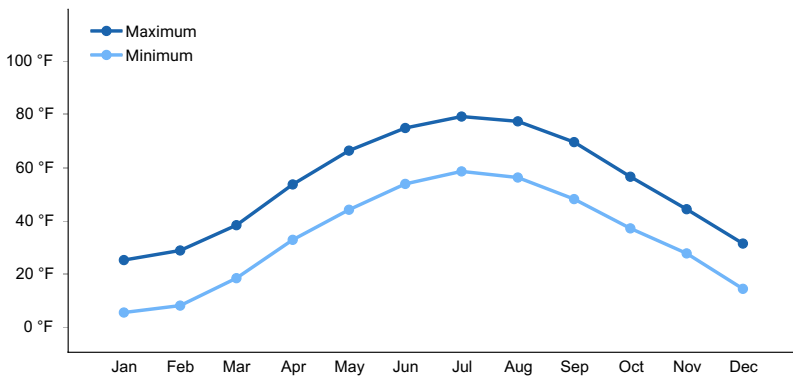


Figure 2. Monthly average minimum and maximum temperature

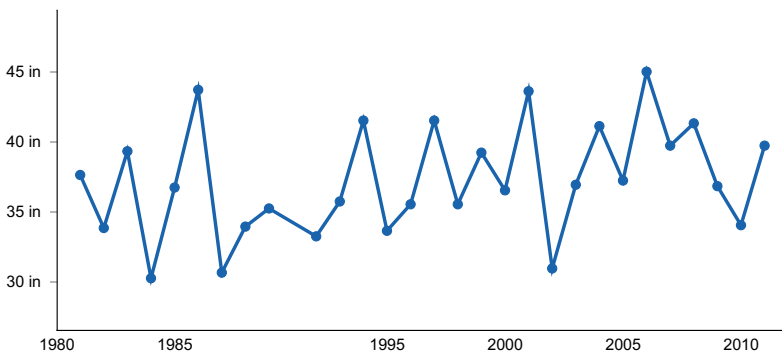


Figure 3. Annual precipitation pattern

Climate stations used

- (1) MALONE [USC00304996], Malone, NY

- (2) MASSENA INTL AP [USW00094725], Massena, NY
- (3) LAWRENCEVILLE 3 SW [USC00304647], Nicholville, NY
- (4) CANTON 4 SE [USW00014743], Canton, NY

Influencing water features

Soil features

The site consists of shallow, well drained, coarse-textured gravelly, glaciofluvial soils derived mainly from acid sandstone or igneous rock. These soils have an ortstein (iron cementation) layer in the upper part of the soil which will restrict roots. Reaction ranges from extremely acid through moderately acid throughout but includes ultra-acid in the O horizons. Representative soil is Constable.

Table 4. Representative soil features

Parent material	(1) Glaciofluvial deposits–sandstone
Surface texture	(1) Very gravelly sand (2) Fine sandy loam
Drainage class	Well drained to excessively drained
Permeability class	Slow
Available water capacity (0-40in)	2 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	3.6–6.5
Subsurface fragment volume <=3" (Depth not specified)	30–45%
Subsurface fragment volume >3" (Depth not specified)	5–9%

Ecological dynamics

The information in this provisional ecological site description, including the state-and-transition model (STM), was developed using historical information, available data, professional experience, and scientific studies. The information is representative of a complex set of plant communities. Not all scenarios or plants are included. Key indicator plants and ecological processes are described to inform land management decisions.

Cultural Ecology: Humans have occupied the St. Lawrence River and Champlain Valley for at least ten thousand years, adapting their ways of life in a variety of changing environments. Initially people lived in small, nomadic groups and later in larger settlements. Historically, the area was within the Iroquois Tribal Territory. European exploration of the area began in the 17th century. Fur trade and settlement of the area followed during the 18th century. Industrialization, riverine-related activities, agriculture, concentrated human settlement in metropolitan areas, and recreation are currently the major human activities affecting the ecosystem (USDA USFS).

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common herb, and mosses and lichens may be common to abundant (Edinger et al 2014).

Primary disturbances are wind, insects (particularly during droughts), and ice storms. These are more important than fire, although they predispose forests to fire during drought conditions. Fire interval is 27-50 years in red pine-eastern white pine communities (USDA USFS).

In many areas the site has been converted to pastureland and/or cropland with either annual or perennial crops. Conifer plantations were established in many parts of upstate New York in the early to mid-1900s as part of reforestation efforts. Remnant plantations are evident throughout the state.

State and transition model

Acidic Shallow Sandy Outwash – Frigid LRU; RX142X02X004

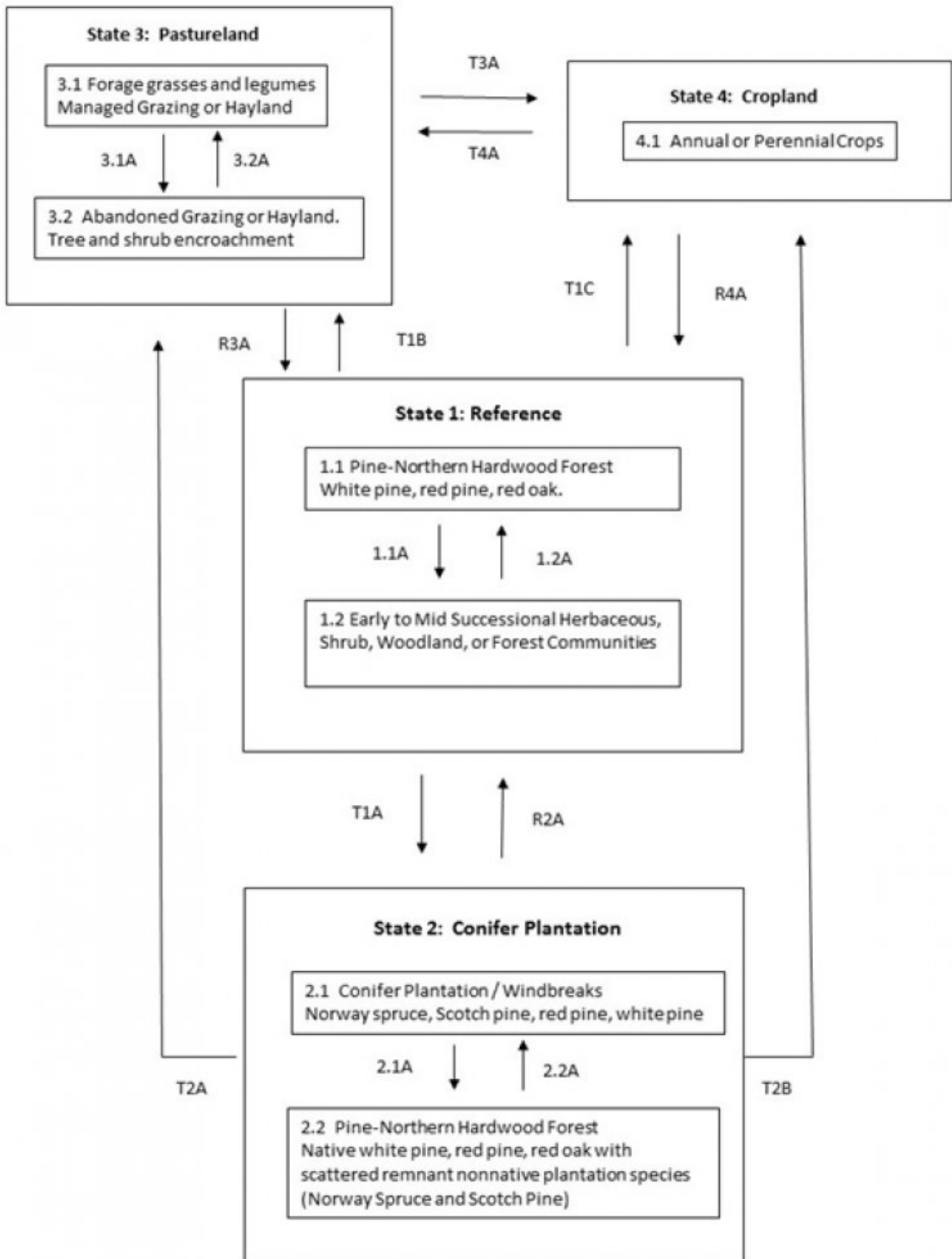


Figure 5. Acidic Shallow Sandy Outwash STM

Acidic Shallow Sandy Outwash – Frigid LRU; RX142X02X004

Transition	Primary Triggers	Secondary Trigger	Indicator
1.1A	Wind, insects, drought, ice storms.	Early successional Habitat Development/ Management; Logging	Decrease in tree canopy cover. Increase in shrubs/herbs
1.2A, 2.1A	Succession		Increase in over-story tree cover
2.2A, T1A	Land Clearing; Tree Planting		Plantation establishment
3.1A	Abandonment		Encroachment of shrubs, trees, and
T1B, T1C, T2A, T2B	Land Clearing; Land Smoothing	Crop Establishment or Forage and Biomass Planting	
T3A	Crop Establishment		
T4A	Forage and Biomass Planting		
R2A	Forest Stand Improvement; Forest Harvest Management		Removal of non-native plantation trees
R3A, R4A	Tree/Shrub Establishment; Ecological Restoration.		Establishment of native forest communities.

Figure 6. Acidic Shallow Sandy Outwash STM Legend

State 1 Reference

Characteristic vegetation: Eastern white pine-red pine/lowbush blueberry/bracken fern-Pennsylvania sedge

State 2 Conifer Plantation

Norway spruce, Scotch pine, and red pine are common species used in plantations. Abandoned plantations will consist of native trees such as white pine and red oak with scattered remnant plantation species.

State 3 Pastureland

Forage grasses and legumes planted for managed grazing or hayland.

State 4 Cropland

Annual or perennial crops.

Other references

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

Landfire. 2005. Rapid Assessment Reference Condition Model. PNVG; R7 NHNE Northern Hardwoods Northeast. <https://www.landfire.gov/>.

USDA-NASS. 2012 Census of Agriculture. St. Lawrence County New York. Accessed on 11/17/17: https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/New_York/cp36089.pdf

USDA-USFS. Ecological Subregions of the United States. 212E--St. Lawrence and Champlain Valley. Northeastern Forest Experiment Station, Northeastern Area State and Private Forestry, and the Eastern Region. Accessed on 11/17/17: <https://www.fs.fed.us/land/pubs/ecoregions/ch14.html#212E>

Approval

Nels Barrett, 5/22/2020

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	06/01/2023
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):**
-
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:**
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
-
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:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-
14. **Average percent litter cover (%) and depth (in):**
-
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:**
-