What Makes Clayplain Forest Different From Other Types?

A variety of features to which the plants and animals respond

- Climate
- Soils
- Hydrology
- Geology
- Landscape position
- Topography
Clay soils that developed in fine sediments of the post-glacial sea/lake and the warm valley climate are likely the most important factors.
Presettlement extent of clayplain forests was nearly equal to the distribution of clay soils. A small percentage of the low, wet areas were likely beaver-created non-forested wetlands.
What’s Left of It?

Clayplain forest has been reduced to about 10% of it’s natural extent.

Much of the existing forest is early- or mid-successional, with a large amount of non-native shrubs and not characteristic of a mature forest ecosystem.
Lower Lake Plain: clay soils and thus clayplain forest very strongly dominant

Upper Lake Plain: clayplain forest dominant in a mosaic with transition hardwood limestone forest, transition hardwood forest, and other types
Nested Mosaics: soils
Nested Mosaics: fine-scale heterogeneity
Soil conditions
- very fertile
- cold and wet in spring
- frequent ponding after rains
- dry and hard in summer

Tree responses
- shallow rooting
- many species have slow growth
- others?
Three Different Natural Community Types: Mesic Clayplain Forest, Wet Clayplain Forest, Wet Sand-Over-Clay Forest

- **Mesic Clayplain Forest**
  - most diminished of the three types
  - predominantly Vergennes soils
- **Wet Clayplain Forest**
  - proportionally more remains
  - Covington, Panton, Livingston soils
- **Wet Sand-Over-Clay Forest**
  - largest patches in the Little Otter area
  - scattered patches elsewhere
  - variable based on depth to clay
Dominant and Characteristic Trees

- Maples – Red and Sugar (and Silver near streams)
- Hemlock
- White Pine
- Oaks – White, Red, Swamp White, Bur
- Shagbark Hickory
- Beech
- Ashes – White and Black (and Green near streams)
- Basswood
- American Elm (pre-disease much more common)
- Hophornbeam (understory small tree)
- Musclewood (understory small tree)
Dominant and Characteristic Trees

![Graph showing relative dominance of different tree species in four forest types: Mesic Forest, Wet-Mesic Forest, All Clay Soil Types, and Sand-Over-Clay Forest. The species include Red Maple, Hemlock, White Pine, Shagbark Hickory, Beech, Sugar Maple, White Ash, Basswood, Red Oak, White Oak, Swamp White Oak, Hophornbeam, Black Ash, Trembling Aspen, Bigtooth Aspen, Bur Oak, and Sweet Birch.](image)
## Presettlement Versus Present Overstory Tree Composition

<table>
<thead>
<tr>
<th>Tree Type</th>
<th>Large Trees</th>
<th>Chittenden Cty. 1800</th>
<th>Middlebury 1790</th>
<th>Present Clayplain</th>
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<tbody>
<tr>
<td>MAPLE</td>
<td>19</td>
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<td>HEMLOCK</td>
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<td>ASH</td>
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<td>PINE</td>
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<tr>
<td>OAK</td>
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<td>4</td>
<td>7</td>
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<tr>
<td>HICKORY</td>
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<tr>
<td>BEECH</td>
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<td>20</td>
<td>5</td>
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<tr>
<td>BIRCH</td>
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<td>ASPEN</td>
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<td>in “other”?</td>
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<tr>
<td>OTHER</td>
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<td><strong>Small Trees &amp; Exotics</strong></td>
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<tr>
<td>HOPHORNBEAM</td>
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<tr>
<td>MUSCLEWOOD</td>
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<td>EXOTICS</td>
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Threats to Clayplain Forest

- Loss of forest fragments by conversion to other land cover types
- Further fragmenting the fragments with roads, houses, utility corridors, etc.
- Invasive exotic species—more and more arrive
- Heavy logging, as large openings are usually followed by a profusion of exotic shrubs and greater amounts of edge
- Grazing livestock in forest
Conservation of Clayplain Forest

- Widespread and sustained public outreach and conservation education
- Protecting “priority” forest fragments
- Protecting rare and uncommon species’ sites
- Creating greater connectivity
- Buffering forest fragments
- Restoring forest – esp. increase size of existing fragments
- Control of invasives within priority fragments
Conservation Activities
It’s all about the Partnerships

- The Nature Conservancy
  - three southern Champlain Valley matrix blocks
  - several important clayplain forest preserves
  - largest restoration—Hubbardton River Clayplain Preserve
  - native plant nursery, now at Green Mountain College

- Vermont Fish and Wildlife Department
  - WMAs
  - Grant funding
Conservation Activities

It’s all about the Partnerships

- Natural Resources Conservation Service
  - smaller restoration projects
  - WHIP, WRP, etc. projects
- USFWS Partners for Fish and Wildlife
- Vermont Land Trust
  - STAs
  - buffers
  - management recommendations
- Charlotte Land Trust
- Private landowners
Simple Conservation Measures

- Keep forested areas forested
- Maintain large blocks and clusters of forest
- Allow abandoned fields to regrow to forest
  - enhance with planting native stock
- Maintain tree and shrub cover in fencerows
- Build structures, roads, driveways and utilities outside of forest patches
- Create ‘soft edges’ where possible
- Use a consulting or county forester to plan tree harvests
Funding and Support
have been provided since 1996 by many:

- Lake Champlain Basin Program
- Vermont Fish and Wildlife Department
- The Nature Conservancy
- Teresa Heinz Scholars for Environmental Research
- South Lake Champlain Trust
- Cornell University Conservation and Sustainable Development Research Training Group
- Middlebury College Geography Department and Environmental Studies Program
- Middlebury Area Land Trust
- Addison County Regional Planning Commission