

REDISCOVERING NORTHAMPTON

a compilation of reports by

Laurie L. Sanders, M.S.

for Planning & Sustainability

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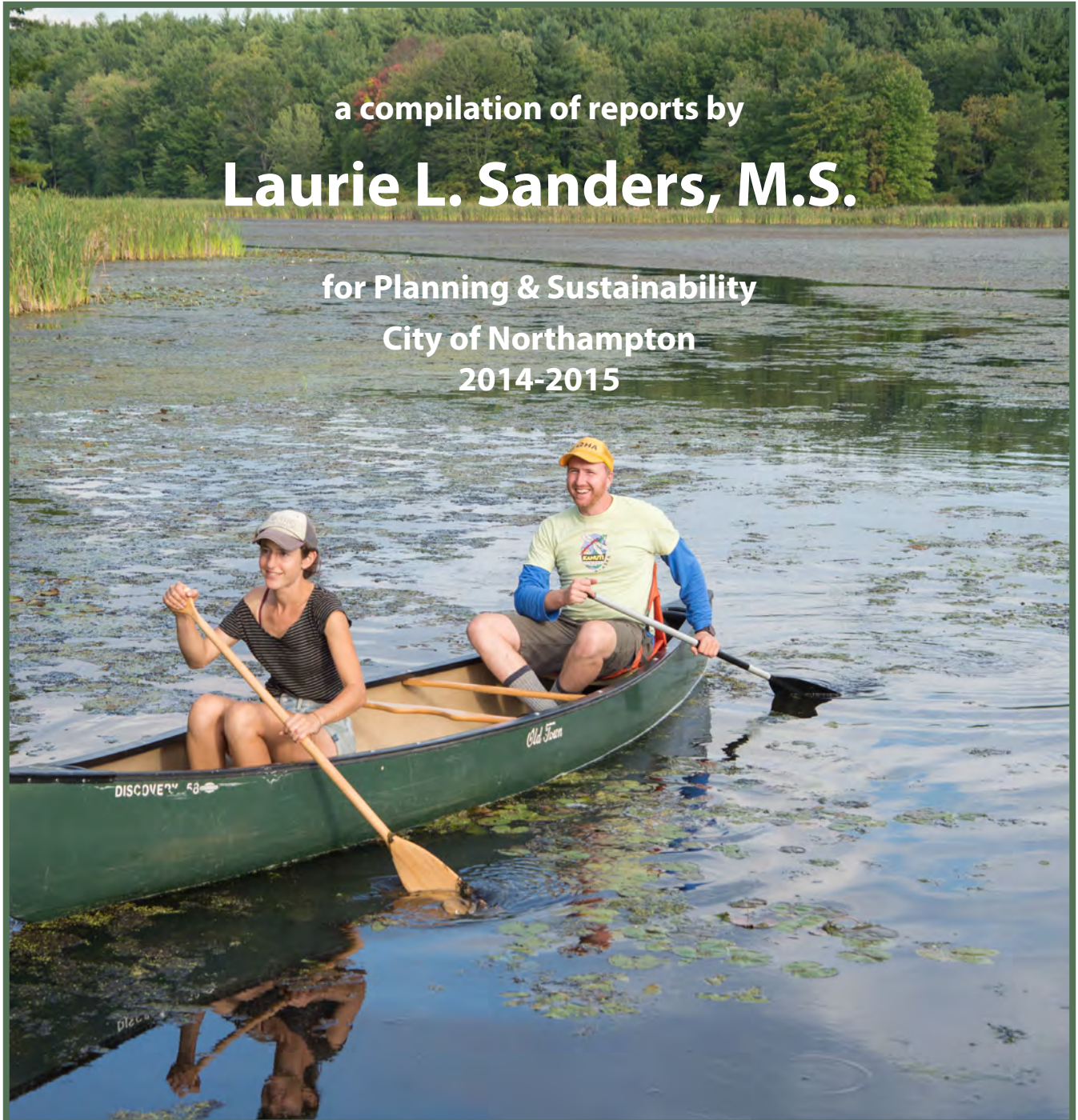


photo by Paul Griffin

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REDISCOVERING NORTHAMPTON

1	1	A Natural History of the Barrett Street Marsh
19	2	A Natural History of the Beaver Brook / Broad Brook Greenway
35	3	A Natural History of the Broad Brook Greenway and Fitzgerald Lake
36		Chapter Table of Contents
60		Section 1: Broad Brook - Fitzgerald Lake Greenway
61		<i>Pines Edge</i>
63		<i>Elizabeth Rock</i>
66		<i>Forest Legacy Lands</i>
69		<i>Marian Street</i>
72		<i>Broad Brook Gap</i>
80		<i>408 Bridge Road</i>
84		Section 2: Upper Drainage of Broad Brook
85		<i>Burke</i>
90		<i>Sullivan</i>
96		<i>"Girl Scout"</i>
109	4	A Natural History of the Burts Bog Greenway
130		Sandy Hill Lots
134		Indian Hill Section

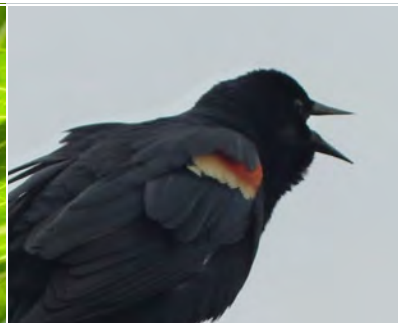
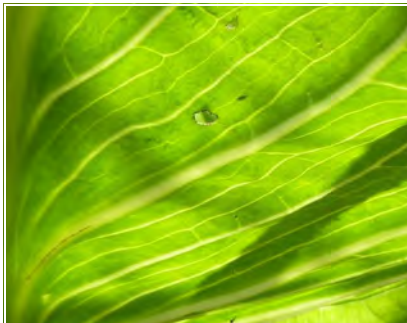
147	5	The Connecticut River Greenway
148		Connecticut River Greenway Overview
151		The Natural History of the Brickyard Greenway
162		Cross Path Road - Kossakowski Section (2.92 Acres)
164		A Natural History of the Elwell Section
187		A Natural History of the Montview Section
195		A Natural History of the Pomeroy Terrace Section
199		The Natural History of the Pynchon & Manhan Meadows
217		The Natural History of Rainbow Ranch
231		Sheldon Field Farmland
233	6	The Natural History of the Florence Greenway
234		The Natural History of the Garfield Avenue Greenway
243		A Natural History of Mary Brown's Dingle
253	7	An Overview of the Mill River Greenway
257		The Natural History of the Brickyard Greenway
258		The Natural History of the Bay State Section
267		A Natural History of the Beaver Brook Section
281		A Natural History of the Florence Meadows Section
304		A Natural History of the Historic Mill River
312		A Natural History of the Leeds Memorial
318		A Natural History of the Button Factory
335		A Natural History of the Upper Leeds Rail Trail
345		A Natural History of the Vistron Section
355		A Natural History of the Yankee Hill Section

367	8	The Natural History of the Mineral Hills Greenway
368		Chapter Table of Contents
389		Part 1: A Natural History of the Quarry & Vicinity
415		Part 2: A Natural History of the Bookends Parcel
432		Part 3: A Natural History of the Ridge Mineral Hills Greenway
447	9	A Natural History of the Parson's Brook Greenway
461	10	A Natural History of the Robert's Meadow Reservoir
469	11	The Natural History of the Rocky Hill Greenway and the Ice Pond
483	12	A Natural History of the Sawmill Hills Greenway
484		Chapter Table of Contents
505		Conservation Parcel 1: Turkey Hill / Ryan Road/ Sylvester Road
512		Conservation Parcel 2: Formerly West & McGowan
514		Conservation Parcel 3: Formerly Symanski
520		Conservation Parcel 4: Formerly Reutener
526		Conservation Parcel 5: Sawmills Hills Core Area
538		Conservation Parcel 6: "Jeep Eater Trail"
543		Conservation Parcel 7: Formerly Spring Meadow Subdivision
552		Conservation Parcel 8: Roberts Hill Greenway
561	13	A Natural History of the West Farms Greenway



Beaver Brook Bridge

1 A Natural History of the Barrett Street Marsh



Barrett Street Marsh



During the last twenty years, the Barrett Street Marsh has experienced some dramatic changes—in wildlife, hydrology and vegetation. The reasons are many, but the primary agents of change have been beavers.

Beavers were first observed in the Barrett Street Marsh sometime around 2004, and although the state's beaver populations had soared after the 1996 ban on trap-

ping, their arrival in the marsh was hardly expected. Not only is the marsh surrounded by roads and development, but to get to it, an enterprising beaver has to travel more than half a mile from the Connecticut River, much of it on foot and through culverts and pipes. Specifically, a beaver would have to head up a short stretch of Slough Brook, then climb into a buried pipe and trudge several hundred feet in total darkness, before reemerging briefly into the daylight, and then make its way through two more pipes, one of which is roughly 600 feet long! From that point, the last $\frac{1}{4}$ mile to the marsh is via an open drainage ditch and would be the easiest part of the journey.



An agent of change: a beaver in the Barrett Street Marsh.

Barrett Street Marsh



The Barrett Street Marsh, outlined in yellow, in context to other development and nearby protected properties—including Child's Park (light yellow triangle to the west), Mary Brown's Dingle, the bike trail, and to the northeast, the Connecticut River and Elwell Island.

As complicated as that trek might sound, by 2005, not one, but several beavers had made the journey and were living in the marsh. That year, they built a dam just upstream from the box culvert that goes under Barrett Street and the water level in the marsh rose an estimated four feet (Daily Hampshire Gazette, 3/25/2006). The higher water levels flooded nearby properties, and pretty quickly, a heated debate

ensued, with one side advocating trapping as the solution and the others petitioning that the animals be accommodated and allowed to stay.

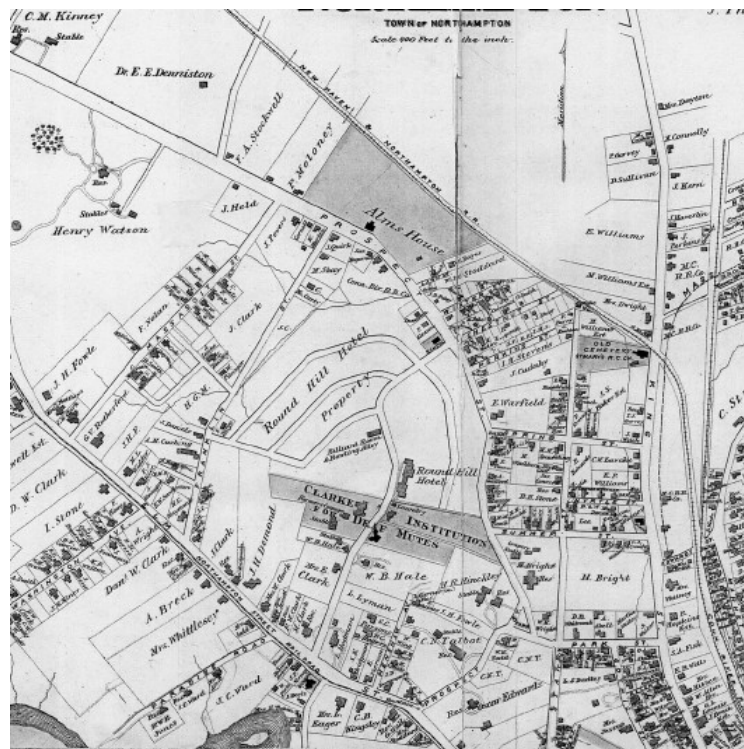
Meanwhile, the rising water level behind the dam had aggravated long-standing and well-known drainage problems. These problems date back to late 1800s when the marsh was not a marsh, but farm land. Although this area was wet when the English first settled here, it was ditched and drained early on, perhaps as early as the 1660s, and almost certainly by the 1700s. In 1819, the land became part of the farm for the nearby City Alms' House (located where B'nai Israel now stands) and during those years it was probably used as a cow pasture (a cow pass was created when the railroad to Williamsburg was built in 1868).



This 1853 map shows the water draining from Round Hill and the future Child's Park, under Prospect Street and then ditched on the land owned by the City's Poor Farm.

In the late 1800s, the water that now flows north through the Barrett Street Marsh flowed south, joining a brook that no longer exists on the landscape, but is piped underground. Known as King Street Brook, its headwaters began in uplands of Round Hill, Prospect Street and Childs Park, and because the brook flowed parallel to what became known as King Street for much of its length, it became known as King Street Brook. In downtown, it joined another small stream known as Market Street Brook, which flowed south into the Mill River.

But very early on in Northampton's history, where these two brooks joined, street flooding was a problem whenever



In 1873, the drainage from Round Hill and Child's Park still flowed south and into King Street Brook.

there was high water. By 1871, the flooding was severe enough that the City tried to alleviate it by ditching the Poor Farm land and routing that portion of the water to the north, across King Street and into the Connecticut River via Slough Brook (Town Reports, 1871). That partial diversion helped, but it didn't solve everything since most of King Street Brook (all the drainage from the south side Round Hill, Prospect Street, and the southeast corner of Child's Park) was still flowing through downtown.

By the 1880s, flooding wasn't the only problem with King Street Brook. The water in the channel near downtown was in terrible shape, fouled by road runoff, animal wastes and the slops and sewage from the houses that backed up to it. Responding to the complaints of awful smells, vermin and the threat of disease, in 1882 the City authorized the construction of a 900-foot underground sewer line along King Street, which enclosed that portion of the brook—an action which at least helped to contain the stink (City Reports, 1882).

For the next twenty years, the flooding and odor situation along King Street Brook was apparently bearable, but by 1891, the ditch running through the Barrett Street Marsh wasn't in such great shape. That year, the Gazette reported that the Poor Farm's land was "strong, wet land" in "need of draining" that could "afterwards produce three tons of hay to the acre" (DHG, 5/21/1891).

A dozen years later, the King Street Brook was also back in the news. The sewer was getting clogged by sand from the brook and this time, to solve the sand problem and the troubles with downtown flooding, the City decided to re-route all of the water in the upper watershed of King Street Brook and divert it north through what is now the Barrett Street Marsh and into the Connecticut River. This meant digging a culvert under the Williamsburg railroad line and then connecting a new ditch to the 1871 drainage ditch that went through the pasture of the Poor Farm. In 1905, a strip of land was taken by the City through eminent domain and a broad ditch, about 15-20 feet wide and 4 feet deep was dug that extended to Slough Brook and eventually the Connecticut River (City Reports, 1905).

Unfortunately, the underlying flaw with this decision—and its on-going legacy—is that over the length of 2,675 feet, the drop in elevation from the Williamsburg Railroad (aka bike path) to the other side of Damon Road and Route 91 is just one foot. Or, according to calculations done by Huntley Surveyors in 1984, a gradient of .037%.

In spite of its almost non-existent grade, the ditch functioned well enough as long as it was periodically dredged and maintained. In fact, within the Barrett Street Marsh the city-owned land along the ditch re-

mained dry enough to farm until the 1960s, with local farmers raising both corn and hay.

But during the 1960s, things changed. New developments along King Street (including what is now the Stop & Shop Plaza) and off of Barrett Street (Coachlite Apartments, etc) filled in the land along the margins of the city-owned property. The City also stopped routine maintenance of the ditches. And then, new wetland laws were enacted, and it was no longer as simple as getting some machinery and a DPW crew together to dredge out the ditches.

By the early 1970s, the main ditch, side channels and some of the culverts were partially blocked with sediments and rotting plant materials, causing the water to back up behind the Barrett Street culvert. By 1973, parts of the former farmland had transitioned to marsh, and the Conservation Commission, recognizing this, wrote a letter to the City encouraging the area be “set aside and preserved in perpetuity as a ‘Buffer Zone’” because of its importance in groundwater recharge and as a wildlife refuge.

Two years later, two Northampton residents—Willow Zuchowski and Fred Morrison—brought a formal request to the City and asked to have the property transferred from the DPW to the Conservation Commission. Zuchowski had been studying the marsh’s vegetation and Morrison, a teacher in the Northampton school system, had been bringing students from the Jackson Street Elementary School to



The fields of the former Poor Farm in the 1950s are near the bottom of this image, running along the then-operating railroad line. In the northeast corner, the linear ditch that takes the water to Slough Brook can be seen taking off from the intersection of Damon Road and King Street.



A closer view of the property reveals a linear drainage ditch carrying water to the north.

the marsh for years to learn about the natural world. In 1976, the City Council approved the transfer and the land was reassigned from the DPW to the Conservation Commission and the Barrett Street Marsh became the City's second conservation area.

During the next two decades, the Barrett Street Marsh continued to rejuvenate, functioning both as a storm-water detention basin and also, increasingly, as a wildlife habitat. By the late 1980s, the marsh had become a green island, surrounded by development, and an oasis for wildlife. Ducks, red -winged blackbirds, spring peepers, toads, muskrats, and hundreds of other kinds of animals relied on the marsh as a part-or full-time habitat. In an effort to introduce more people to this small piece of wild nature, in 1992, the City built a handicapped-accessible boardwalk into the marsh from the bike path.



By the 1960s, the drainage and a number of short side ditches have been dug through the marsh.

But well before then, drainage concerns had been mounting. In 1984, Almer Huntley had prepared a detailed analysis on behalf of the Super Stop & Shop project and included recommendations for action to address drainage problems in the marsh. Two years later, in 1986, an abutter requested that the City maintain the ditch because the rising water level was impacting his land. In response, the DPW filed the paperwork for a permit to dredge the ditch, but the requirements in the Order of Conditions from the Conservation Commission were considered too onerous and the DPW filed an appeal to the MA DEP. The appeal, due to misunderstandings, was never acted upon and the abutter subsequently filed legal



Willow Zuchowski and Fred Morrison at the Barrett Street Marsh in 2013. Zuchowski now lives in Costa Rica where she has helped protect thousands of acres, and Morrison has become a leading expert in Massachusetts on rare dragonflies and native bees.

action against the City. In 1990, a judge determined that the City had failed to adequately maintain King Street Brook and the City was required to compensate the abutter for the property losses.

Over the next ten years, the City commissioned three additional drainage analyses and took several steps to improve drainage. In 2004, the beavers settled in and the drainage issues in the Barrett Street Brook took on a whole new dimension.



Part of the beaver dam near the north end of the marsh. This is the largest area of open water and a favorite spot for ducks to gather.

In 2006, the City received a special emergency permit to use lethal traps and that spring, eight beavers were killed. The following fall, the dam was breached and the first beaver dam— a Castor Master— was installed. But with other beavers still living in the marsh, it wasn't long before new dams were built in and around the marsh. As new dams went in, the City installed additional beaver deceivers. This was the solution that had emerged—it allowed the beavers to live, but also kept the water level at an acceptable height. So far, five beaver deceivers have been installed, and since 2009, the water level in the marsh has been stable.

Vegetation Patterns

Although the water level has been stable for several years, it is also slightly higher than it was in 1993, and that change—as minimal as it is—has strongly influenced the distribution of plant life in the low-lying sections of the conservation area.

Back in 1993, for instance, the marsh included five major plant



The Barrett Street Marsh in 2013 includes a mix of forest, marsh and open water.



Vegetation Map Legend

Red Maple Dominated Forest

Five patches of red maple-dominated woods are found within the conservation area:

1a: This long stretch of red maple along the bike path can be divided in two subsections, east and west.

The eastern portion is located along the steeper slopes of the bike path and consists of an even-aged stand (~ 50 years old) growing on fill and altered soils. The canopy is almost exclusively red maple, but red oak, elm, and black cherry are also present; black locust is frequent along the bike trail. The understory varies, but Morrow's honeysuckle and privet are now common in the shrub layer; while native shrubs include choke cherry and high-bush blueberry. Herbaceous plants in the understory include spotted touch-me-not, cinnamon fern, sensitive fern, interrupted fern, royal fern, New York fern, lady fern, Virginia creeper, poison ivy, goldenrod, garlic mustard, and true solomon's seal. Sheep laurel and leatherleaf, which is not common in Northampton, are along the margin of the marsh. Asiatic bittersweet is here too.

The western portion begins ~ 200 feet west of the boardwalk, near a second drainage channel, and the red maple forest is older and taller. The forest also includes sugar maple and silver maple, as well as a few white oak, pin oak and big-toothed aspen and is more open. Large portions are free of invasives, but non-native species are present, especially privet. Asiatic bittersweet, multiflora rose, and Morrow's honeysuckle are present. Spicebush, choke cherry and scattered apples are also present. In the understory, Canada mayflower and cinnamon fern are the dominants, but also growing here are wild oats, grape, jack-in-the-pulpit, poison ivy, wild sarsaparilla, Virginia creeper, and hayscented fern. Near the stream/drainage channel is a large clone of Japanese knotweed, as well as interrupted fern, ostrich fern, and lady fern and lots of garlic mustard.

1b: The final community type is found on a spit of land southeast of the Coachlite Apartments. In 1993, the eastern edge was dominated by species typical of abandoned fields (crab apples, red cedar, white pine, hawthorn, large clones of panicked dogwood, as well as grasses, sedges and wildflowers). Today the area still includes apple and cedar, but red maple, alder, northern arrowwood and glossy buckthorn are the dominants. Multiflora rose, honeysuckle, elderberry are common too. Transitioning to the forest, red maple mingles with black locust, and multiflora rose is common. Both areas are used—and abused—by people.

1c: This narrow peninsula is dominated by red maple, with scattered red oak. Sheep laurel, high bush blueberry, Canada mayflower, low-bush blueberry and glossy buckthorn are most common. Alder, wild raisin and northern arrowwood form the margins. Other common species here include winterberry, maleberry, shadbush, alternate-leaved dogwood, chokeberry, and royal fern. There are also scattered gray birch, white pine, winterberry, pin oak, elm and white oak. In the understory, the ground is mostly open, but common wintergreen, partridgeberry, multiflora rose, clubmoss and royal fern occur here.

1d: Red maple canopy, with an abundance of glossy buckthorn, silky dogwood, and crab apple in the understory. Maleberry, winterberry, elderberry, alder and grape are common as is dewberry.

2. Wetland Shrub Thicket: The margin of the marsh is bordered by a mix of shrubs that include silky dogwood, arrowwood, winterberry and speckled alder. Scattered among these shrubs are young red maples, slippery elm and elderberry. Few plants grow beneath the shrubs other than sensitive fern, but openings include skunk cabbage, cinnamon fern, goldenrod, field horsetail, tussock sedge, purple loosestrife, and various grasses and sedges. Willows are common along Carlon Drive; glossy buckthorn is especially common in the vicinity of Carlon Drive.

3. Meadowsweet/Tussock Sedge Community: This plant community formerly covered several acres, but due to higher water levels, it has been severely reduced to a few patches along the wetland's forested margin (bike trail slope) and near the boardwalk. Meadowsweet, reed canary grass, turtlehead, impatiens, sensitive fern, Joe-Pye weed, fringed loosestrife, and tussock sedge are among the common species here.

4. Sedges, Grasses, Bulrushes and Wildflowers: This open mix includes skunk cabbage, silky dogwood, meadowsweet, sensitive fern, tussock sedge, *Calamagrostis* (reed grass), swamp candles, turtlehead, and marsh fern; scattered purple loosestrife and cattails are present here too.

5. Skunk Cabbage Patch: An open swath of skunk cabbage, mixed with garlic mustard, below a red maple canopy. The drainage ditch at the back of the Pheasant Hill Apartments also receives water from sump pumps.

6. Open Water & Cattail Colony: Historic ditches and beaver impoundments bordered by stand of cattails, with scattered stems of purple loosestrife. This area also includes a few patches with bulrushes, sedges, grasses, and other wetland wildflowers (swamp candles, swamp milkweed, joe-pye weed). These are found in open, sunny locations where more aquatic conditions transition to inundated soils. Marsh fern and sensitive fern are also common. Yellow iris is found near the open water near the Stop & Shop parking lot.



(A) The Barrett Street Marsh, as seen from the conservation area near Stop & Shop and looking toward the bike trail. The former rail line is now enclosed in trees. (B) The Barrett Street Marsh, as seen from the beaver dam near Barrett Street.



(C) A muskrat lodge in a small opening in the cattails. This image was taken within the conservation area near Carlon Drive. (D) From the beaver dam, looking north toward Barrett Street. This is a popular place for ducks and geese.



(E) Beaver-chewed red maples are common on the property. The Nonotuck would find it impossible to believe that beavers were once again living in Northampton, let alone near downtown! (F) The beaver lodge is massive. The best way to get to it is from Barrett Street, where an informal trail leads along the edge of the marsh.



(A) The gravel path from the bike trail leads to the boardwalk that was built in 1992. (B) Few people explore the marsh or its other wet spots, like this nice swath of skunk cabbage in the property's southwest corner.



(C) The boardwalk is now more than 20 years old—and showing its age. (D) Twenty years ago, spirea (seen in the foreground) was common, but now that the water level has increased, it is much less frequent and found only along the borders of the red maple forest.



(E) The red maple forest beyond the cattail marsh in late September glows with color. (F) In the southwest part of the property, there are a series of large trees. These may have been along an old property line or marked the boundary between two fields.

communities (cattail colony, meadowsweet/tussock sedge, alder/silky dogwood shrub thickets, red maple forest, a small peninsula of abandoned, drier field) and very little open water. Today those same plant communities exist, but their ratios are different (For more details, see the *Vegetation Map*). There is now more than half an acre of open water (about ten times as much as before), and while the cattails that used to live in the open water areas have died, they have spread out laterally and invaded zones that once supported meadowsweet/tussock sedge and shrub thickets. The latter two communities now cover a much smaller fraction of the marsh, and even the peninsula that once supported old-field vegetation is much soggy and has changed in composition. The only area that has not been sharply influenced by the higher water level is the upland along the bike path, which remains dominated by red maple.

But the distribution of plant communities is not the only change at the Barrett Street Marsh. During the last twenty years, the composition of the vegetation has also changed and the conservation area has unfortunately become a who's who of the worst non-native plant invaders. From half a dozen non-native plant species in 1993, today there are more than a dozen, including Norway maple, black locust, multi-flora rose, common buckthorn, glossy buckthorn, Morrow's honeysuckle, Japanese barberry, privet, Japanese knotweed, garlic mustard, moneywort, lesser celandine, yellow iris, purple loosestrife, Asiatic bittersweet, tansy, sweet cherry, and Japanese maple.



Clockwise from the top: Asiatic bittersweet; Glossy Buckthorn, Wintercreeper, Japanese barberry and Winged Euonymus.

And not only are there more kinds of non-native plant species, there are also more of them. With the exception of black locust, all of the non-native species that were growing at the Barrett Street Marsh in 1993—multiflora rose, Japanese knotweed, common buckthorn, and Morrow's honeysuckle—have increased in quantity and cover. In addition, two of the new invaders—purple loosestrife and glossy buckthorn—have really taken off, and part of their success is thanks to the presence of beavers. In the case of purple loosestrife, the marsh's wetter conditions allow it to establish in more parts of the conservation area. In terms of the glossy buckthorn, it is flourishing because the beavers leave it untouched. They prefer other species over nasty-tasting glossy buckthorn (its secondary chemicals have emetic qualities), which means that not only is the buckthorn left to grow, but now the trees and alders that were once shading it have been beaver-chewed down, which gives the glossy buckthorn more sunlight and better growing conditions. And as the beavers effectively release the glossy buckthorn, it will produce more flowers and fruit, which means it will spread and establish even more plants, here and elsewhere.

All that said, the Barrett Street Marsh is still a great place to learn about native plant species. The combination of habitats—uplands, swamp forest, marsh and open water—provide suitable conditions for a remarkable diversity of



The tender, new fronds of royal fern begin to unfurl in the early spring.



Flowering plants at the marsh: Highbush blueberry (top); speckled alder, with male and female flowers; and a jack-in-the-pulpit.

plant life. Just as it would be a good site to hold an identification workshop on non-native invasive plants, it also remains a good place to host a wetland plant identification training on native species.

Wildlife

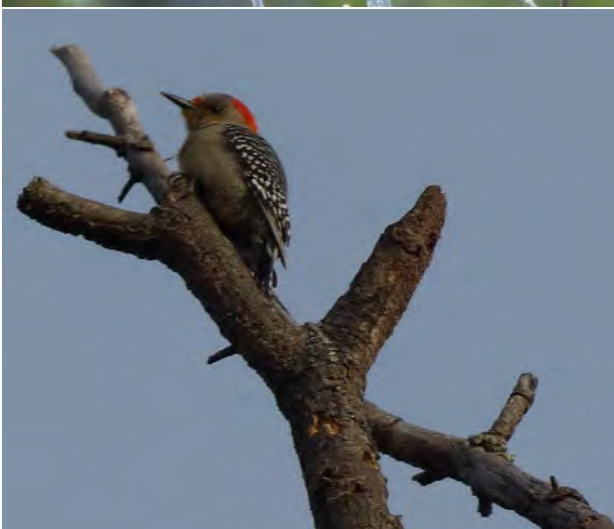
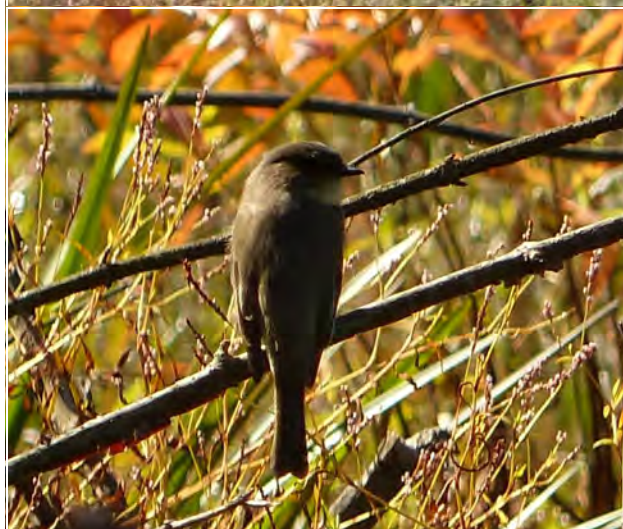
Acre-for-acre, the Barrett Street Marsh is the best—and certainly the most accessible—place in the entire city to easily observe wildlife. In a single week, a wildlife camera recorded nine different species of mammals, including beaver, muskrat, skunk, opossum, raccoon, gray squirrel, eastern cottontail rabbit, as well as white-tailed deer and red fox...and a house cat. In addition to the mammals captured on camera, during the last decade black bear and coyotes have been occasionally observed passing through the marsh, and mink tracks are common in the winter.

Birdlife is also impressive. Year-round residents include great horned owls, screech owls, blue jays, cardinals, Carolina wrens, crows, goldfinches, and many others. In the spring and fall, it is an important stopover for thousands of migrants, including red-winged blackbirds, grackles, several kinds of ducks, phoebes, flycatchers, warblers, woodcock, rails and many others. In fact, at certain times, there have been so many grackles and red-winged blackbirds that their raucous calls have drowned out the traffic sounds of nearby King Street and Route 91. And during the summer, more than a dozen kinds of birds nest in the marsh (Canada geese, mallards, yellow-throats, yellow warblers, song sparrows, robins, red-winged blackbirds, grackles, Baltimore orioles, tree swallows, downy woodpeckers).

Amphibians (American toads, spring peepers) and reptiles (snapping turtles, painted turtles, garter snakes), and an incredible number of insects also depend on this 20-acre island of green in the midst of the city.



Top to Bottom: Muskrat; Canada Goose; Cabbage White Butterfly; Tree Swallow; Red Fox.



More than one hundred species of birds can be observed at the Barrett Street Marsh over the course of a year. Here are just a few, clockwise from the top: mallard ducks, song sparrow, red-bellied woodpecker; downy woodpecker, cedar waxwing, phoebe.



(A) The groundwater that drains from Child’s Park now is piped under Woodlawn and Prospect Street and enters the marsh at the end of Adare Place. The drainage pipe, however, is in terrible condition. It is also surrounded by a mass of non-native plants, including big patches of Japanese knotweed. (B) Trash is present in the marsh, but it is not a big problem. These bottles were tossed off the boardwalk.



(C) An informal boardwalk behind the Pheasant Hill Apartments off Barrett Street leads through the woods and connects to the bike trail. (D) People experiencing houselessness occasionally camp on the small peninsula not far from Coachlite



(E) Some of the marsh’s most important functions are stormwater detention, flood storage, and improving water quality. In this image, the surface oils are probably natural organic compounds, but plenty of salt, sand, and lawn runoff also flow into the marsh. (F) High groundwater is a problem at the Pheasant Hill apartments, where a series of pipes discharge water from the basements into a drainage ditch that leads to the marsh. In addition to a higher water table caused by beavers, excess water cannot soak into the ground easily in this part of Northampton because it is underlain by glacial Lake Hitchcock clays.

Recommendations

This conservation area has great potential, but is currently underappreciated and overlooked. It is easily accessible and probably has the highest concentration of animal life found in any conservation area in the city. Yet, the existing boardwalk is falling apart and it has never been well-marked. It also doesn't lead to anything—there is no view or other path. I would strongly recommend renovating the old boardwalk and connecting it to a new boardwalk that loops back to the bike path and includes a wildlife platform. In addition, if a dozen red maples were cut down along the bike trail, the view of the marsh would be terrific.

In terms of the invasive plants, aside from Japanese knotweed and purple loosestrife, my recommendation is to do nothing unless or until a group of active volunteers is willing to get involved in the marsh's long-term management. The invasive plants are so widespread and abundant that control is not an option, unless biological controls are discovered.



If 6-12 red maples were cut along the bike trail, the view of the marsh throughout the entire year would be spectacular and possibly encourage more people to explore this conservation area.



The boardwalk has lost some of its edge rails and is listing in places. In addition to making these repairs, it would be a great time to build a wildlife viewing platform for observing wildlife. The new blind could be built closer to Stop & Shop and connect to this boardwalk via a loop trail. This marsh could become part of a downtown walking tour.

This report was made possible with funding from the Community Preservation Act.

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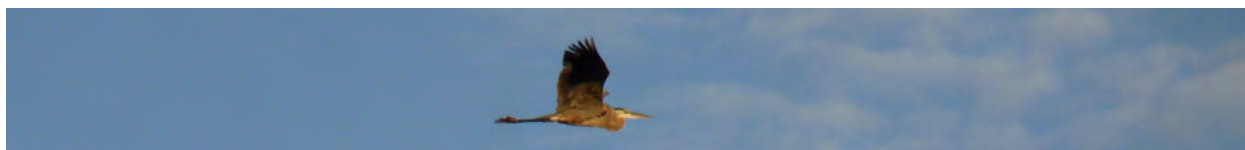
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All photographs by Laurie Sanders.



2 A Natural History of the Beaver Brook / Broad Brook Greenway



Prepared by Laurie Sanders, M.S.
December 2014





The Natural History of Beaver Brook / Broad Brook

Preface

Since the City first expressed interest in acquiring this 102-acre property in 2009, several studies have been conducted on the property. Beginning in 2009, O'Reilly, Talbot and Okun conducted an environmental site assessment of the six-acre strip along Route 9, while Molly Hale evaluated the entire property for vernal pools and forester Mike Mauri developed a Forest Management Plan for the land. The City closed on the property in January, 2010 and two months later the Broad Brook Coalition's Stewardship Committee voted to work jointly with the City on the property's long-term management.



The Beaver Brook/Broad Brook Conservation Area (labeled here as Broad Brook Fitzgerald Lake Greenway) viewed in relation to other protected properties, with green representing conservation land, blue as watershed land and the pink area being the Beaver Brook Golf Course. *From MA GIS.*

Over the course of the next year, BBC's stewardship committee organized an on-site meeting with representatives from the US Fish & Wildlife Service, the City's Office of Planning and Sustainability, and Chris Polatin, an invasive species expert. Later that same year, Molly Hale returned to the property and completed additional work on the property's vernal pools.

In 2011, BBC provided a list of recommendations for the property's short and long-term management to the Conservation Commission. In 2012, Charles Eiseman prepared a baseline documentation report on behalf of the Kestrel Trust, which holds the conservation restriction on the property.



The locations of potential vernal pools on the property.

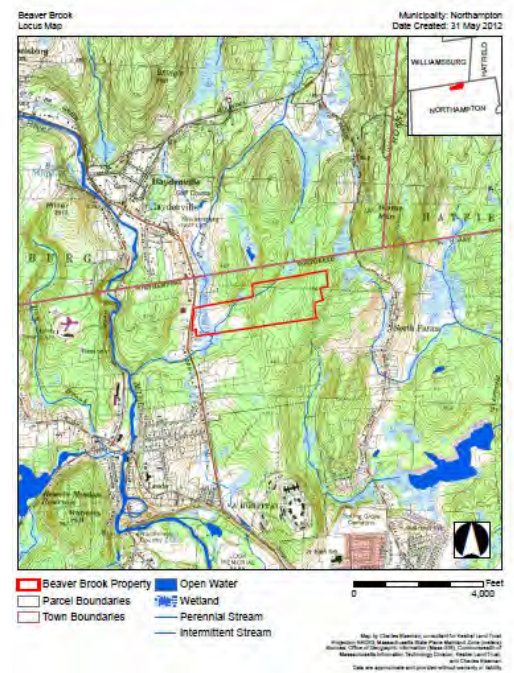
The following write-up takes advantage of all of these earlier reports (available on-line in Northampton's Public File Cabinet) and also includes my own observations from site visits conducted during 2013 and 2014.

Overview

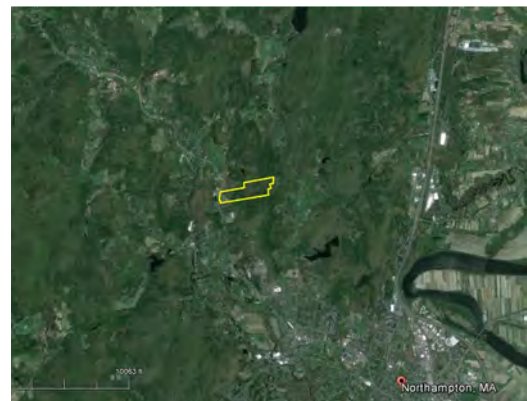
Located on Northampton's northern border with Haydenville, the Beaver Brook/Broad Brook Conservation area represents one of the largest acquisitions by the City during the last decade and offers both exciting opportunities and long-term management challenges.

The conservation area's current name (such as it is) reflects the fact that it is physically split between two sub-watersheds, with 77 acres draining to Beaver Brook and 25 acres draining to Broad Brook. Somewhat confusingly, these two watersheds both flow into a Mill River, but not the same one. Beaver Brook flows west into Northampton's Mill River, and Broad Brook flows northeast, via Fitzgerald Lake and Running Gutter Brook, into Hatfield's Mill River.

Of the two watersheds, the 77-acres within the Beaver Brook watershed are the most diverse, and boast a beaver pond, an old farm pond, open marsh, swamp forest, abandoned field, early successional forest, and extensive up-land woods. Its larger size contributes to its overall diversity, but even more important is the fact that its land use his-



Map Courtesy of Kestrel Trust baseline documentation report, 2012.



The property, outlined in yellow, shown in context to other forested land and its surroundings (Fitzgerald Lake, Connecticut River, Route 91, downtown Northampton).

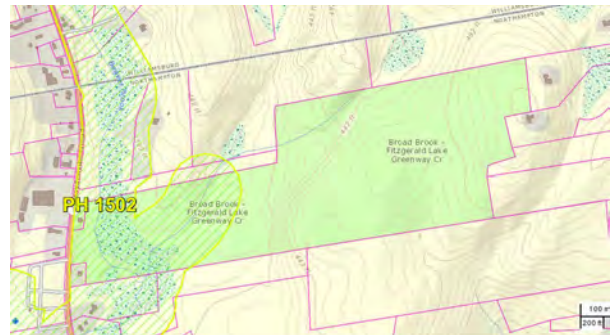
tory is varied and its hydrology and topography are more complex. In contrast, the Broad Brook sub-watershed is mostly uplands and has been forested for a century or more.

Ecologically, the property's wetland habitats and forested uplands connect to hundreds of acres of additional forest land, which makes them even more valuable for wildlife. In addition, Beaver Brook is designated a coldwater fishery and the brook along with its bordering wetlands fall within the estimated habitat for a rare species (wood turtle). The brook is also one of the few in Northampton where the freshwater pearl mussel, *Margaritifera margaritifera*, can be found. Although not a state-listed species in Massachusetts, it is protected in neighboring Connecticut and Vermont.

Unfortunately, but not surprisingly, this conservation area also has many of the most troublesome invasive plants. Japanese knotweed, garlic mustard, Morrow's honeysuckle, Asiatic bittersweet, swallowwort, glossy buckthorn, multiflora rose, Japanese barberry are all there. The only good news about the invasive plants is that nearly all of them are found within the property's former hayfields and along the old home sites, which means that they are concentrated in the western third of the property.

From a recreational perspective, this property could be a delightful picnic area and a prime place to watch wildlife. It has one of the largest marshes in Northampton and its proximity to Route 9 makes it an ideal place to build a wildlife blind where visitors could watch beavers, ducks, kingfishers, and much more. In addition, because the property is almost level along Route 9, there is an opportunity to build a handicapped accessible trail and boardwalk across the marsh to the adjacent uplands.

At present, other than getting your feet wet, there is no easy access across the marsh. There is, however, a well-maintained snowmobile trail/foot path that runs north-south across the property about half a mile east of Route 9.



The wetlands and waterways within the conservation area all fall within a Priority Habitat for Rare Wildlife, as designated by MA NHESP. From MA GIS.

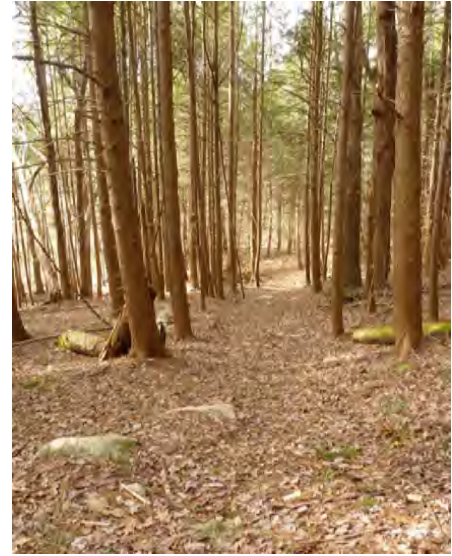


Human History

Although no native settlements are known in this area, the MA Historical Commission's report suggests that there probably were native trails along Beaver Brook that connected the Mill River in Northampton to the Mill River (then known as Capawonk) in Hatfield. There were probably small encampments along the brook too, but these would have been seasonal and none have actually been found. It is expected that this area, like so much of the flat land along rivers, would have been burned periodically by intentionally set fires.

Although the English settled in Northampton in 1654, a century passed before the first settlers established themselves in what is now Williamsburg and its villages. The first reference to Beaver Brook is in 1770, when a sawmill was erected somewhere along it, possibly downstream where bedrock is exposed. In the 1800s, as Williamsburg and its villages (Searsville, Skinnerville and Haydenville) industrialized, agricultural operations expanded into the Beaver Brook valley, so that by the time the 1831 map was prepared, two houses are shown along Route 9 in the vicinity of this conservation area, including one that looks like it is within it.

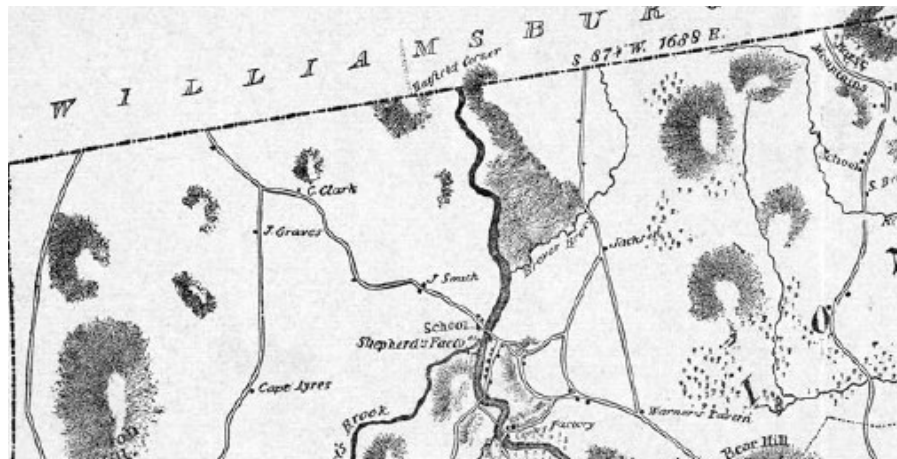
Based on stonewalls, barbed wire, and the presence of large black locust, all of the upland areas were evidently cleared and used for pasture during the 1800s. In contrast, the more level, low-lying areas along Beaver Brook and its small tributary were kept open as hayfields. Mike Mauri estimates that most of the



A small stretch of the snowmobile trail maintained by the Burgy Bullets crosses the property and along a slope dominated by hemlock, all of it dying. Scattered across the slope are several large black locust. The presence of this species demonstrates that the hillside was cleared in the past.



Strands of barbed wire are easy to find on the property, especially along its southern boundary.



The 1831 map shows only two homes to the north of Beaver Brook Conservation Area.

upland forests began growing back in the late 1890s, but the hayfields were kept open until at least the mid-1960s. The owners then were John and Gertrude Starkus. The Starkus family had bought the land in 1949 and based on historic photos, it is a good guess that they were the ones who mowed the fields. Sometime after 1965, however, they stopped haying the land and during the last fifty years, the former fields have reverted to scruffy forest and marshy wetlands. Meanwhile, the old bridge that they used to get to the land on the other side of Beaver Brook has collapsed and washed away; the only evidence today is a higher berm that extends into the wetlands and some stones along the northern boundary line. More recently, beavers have returned and their dams along Beaver Brook have further expanded the wetlands.

John Starkus died in 1993 at the age of 85 and two years later, his wife Gertrude passed away at age 88. After their deaths, the two houses on the property, which were already in rough shape, fell further into ruin.

By the time a group of investors purchased the property from the estate a decade later, the houses were tear-downs. The investors' intention was to timber the property, but in 2006, the same year they bought the land, their forest cutting plan was rejected by DCR, apparently due to the extensive wetland crossing (Mike Mauri, Forest Stewardship Plan). At that time, forester Lincoln Fish estimated that there was 1,205,500 board feet of harvestable timber on the property (pers. comm., Lincoln Fish).

In 2009, the City began negotiating to acquire the land for conservation purposes. As part of the potential sale, an environmental assessment was done. The assessment turned up an underground storage tank, which was removed before the sale. Another condition of the sale was the demolition of the two severely dilapidated houses.



This aerial image from the 1965 shows that nearly all of the land was cleared behind the former house. It also shows an old cart road crossing the brook. These former clearings are now the areas most impacted by invasive plant species.



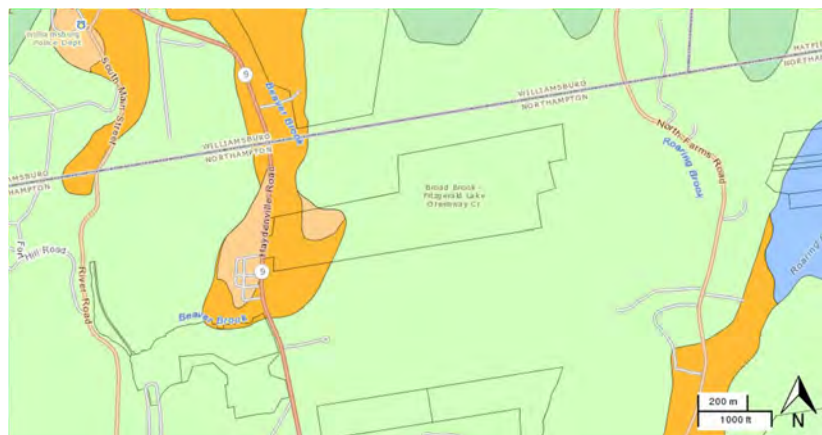
In this photo from the 1950s, it is easy to see the Starkus home and the other activities taking place on the land near Route 9.

Today the remnants of the foundations can still be found, along with the scattered rusty equipment left behind by John and Gertrude Starkus. Their living legacy, however, are the plantings, which include a grove of black walnuts, a thick row of Japanese yews, and come spring time, swaths of snowdrops and daffodils.

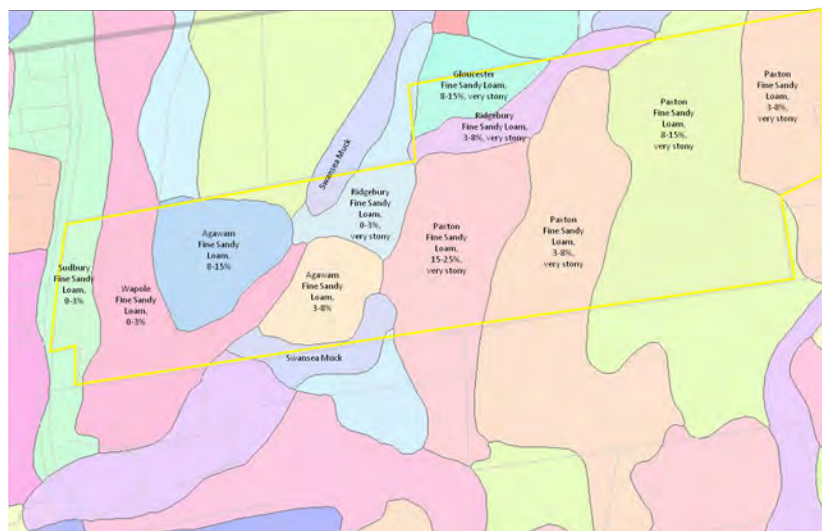


Geology

This entire property is covered with a thin lens of rocky till, which in the Beaver Brook valley, was subsequently covered with glacial outwash. Sometime later, the outwash was covered by river terrace deposits, left behind by a glacially-charged river. These water-sorted sands and gravels explain why earlier residents chose the land across the street for a cemetery. Not only are the sands easier to dig in (no stones!), they are also well-drained and the groundwater table is lower. That's a good combination when it comes to burying bodies—the coffins and bodies are much less likely to “float” back to the surface due to high groundwater.



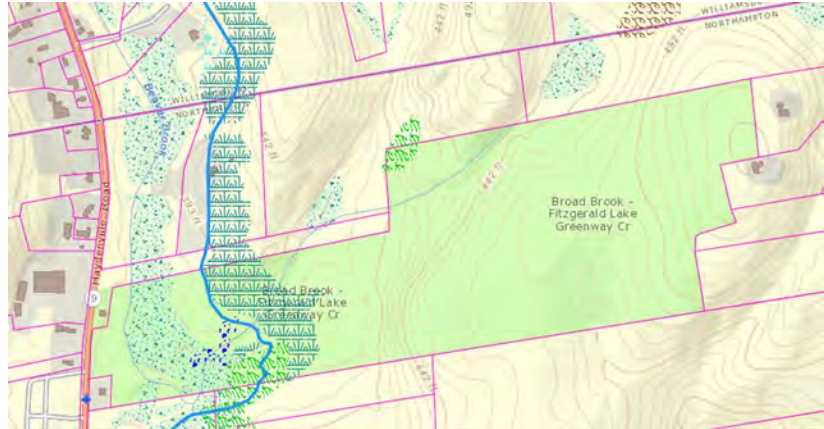
This graphic shows the surficial geology, with most of the conservation area covered with a thin lens of till. The land along Beaver Brook includes both stratified outwash sediments (dark orange) and more recent, post-glacial sandy river terraces (lighter orange).



Fine sandy loams dominate the property, but vary depending on angle of slope and their degree of stoniness.

Topography

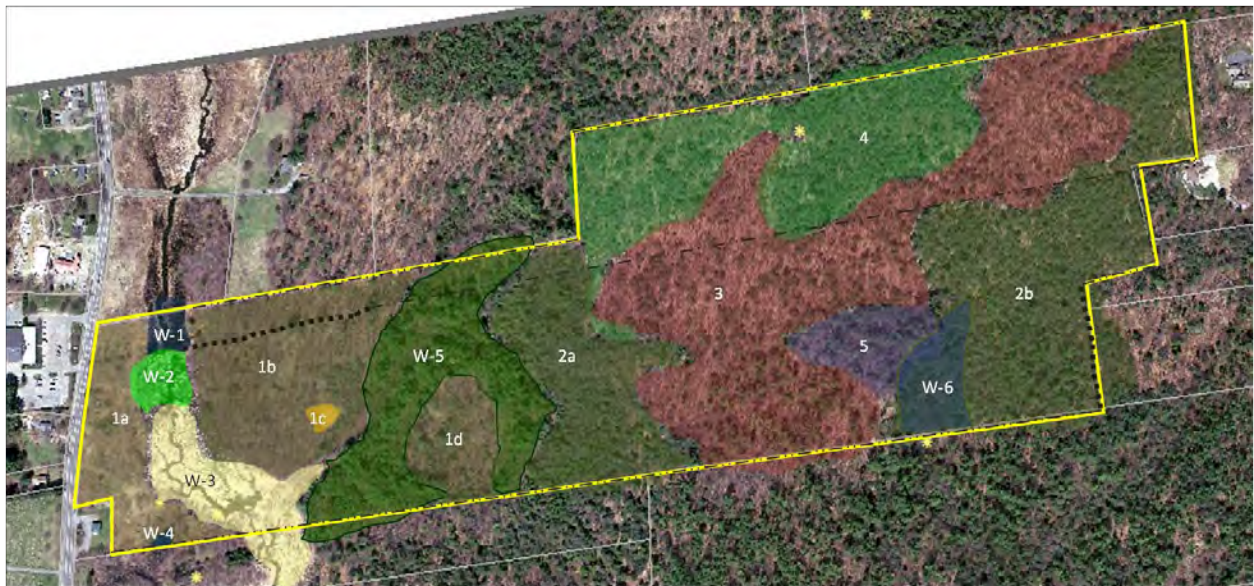
This conservation property is long and linear. From the frontage on Route 9, the property dips gently to Beaver Brook and its wetlands and then rises very gradually to the east. About half a mile east of Route 9, there is a short and steep hemlock-



dominated slope and then the land flattens out again, before gradually and steadily climbing to the east. All told, the elevation changes about 160 feet, from 383 to 544 feet above sea level. In the upland areas, rocks regularly appear at the surface.

Vegetation Patterns

Within this large conservation area, the vegetation shifts repeatedly, with changes in composition reflecting shifts in the soils, topography, hydrology and land use history. Looking broadly, it is possible to identify six major upland “communities” and six wetland “communities” (Vegetation Map). Descriptions of the different areas follow:



Uplands

1a: This area encompasses about five acres and includes the old home sites and outbuildings. The composition varies depending on where you are. Behind the DPW’s Corrosion Control Facility, the old field habitat is fairly open and includes lots of black locust, white pine, black walnut, and red ma-

ple, clusters of silky dogwood, speckled alder and winterberry, and an understory loaded with goldenrod, spotted touch-me-not, sensitive fern, lady fern and reed canary grass. Near the old home sites, the canopy is different and dominated by a mix of sugar maple, black cherry, black walnut, and a few scattered catalpa. The understory also differs, and is a tangled mix of natives and non-native species. The native plants include jumpseed, goldenrod, Virginia creeper, boneset, hedge bindweed, clearweed, bedstraw, grasses and sedges, while the non-natives include celandine, coltsfoot, and weakened, but recovering Asiatic bittersweet, multiflora rose, Japanese barberry, and Japanese knotweed. These plants were all sprayed and/or cut and sprayed in two passes during 2013. A row of Japanese yew is used as shelter by deer in the winter. A reminder of the Starkus' flower garden shows up each year close to the old home site—snowdrops, daffodils, daylilies and phlox.

Near the Haydenville line, the vegetation pattern shifts again. The site is more open, with grasses and goldenrods. A grove of black locust occurs here, but many of the trees were killed accidentally during the herbicide application in 2013.

As the BBC Stewardship Committee recommended, a small portion of this part of the property could be converted to a parking area and a picnic site could be created. This is also an ideal spot for a wildlife blind. Although there is the backdrop of traffic noise, looking out on the marsh feels like you're in a much wilder area. And even better, the open water of the beaver pond is a great place to actually see wildlife—otters, beavers, muskrats, wood ducks, Canada geese, performing woodcock, chorusing green frogsand much more.



An open field, here dominated by boneset, adjoins the area where the homes and other buildings once stood, but is now enclosed by young forest.



A pathetic-looking patch of Japanese knotweed, with withered leaves, is unfortunately recovering in 2014 after getting herbicided in 2013. Although it is greatly reduced and only half its original size, note that it is flowering!

1b: Slightly higher in elevation, this area is a former hayfield and is now dominated by black locust, with red maple and black cherry as lesser components. Bay-



A grassy mix (with plenty of young bittersweet) grows in the shade below the a young red maple forest. The bittersweet vines and other invasives in this area were seriously knocked back by the herbicide work in 2013, but many seedlings are present. In this same area, a small patch of swallowwort (other photo) has established and unless controlled, it will spread throughout this field and even into the shade below the maples.

state Forestry's efforts to kill the invasives were mostly successful, but the weakened plants are rebounding. Asiatic bittersweet, Morrow's honeysuckle, privet and glossy buckthorn are all common here. In addition, I found a small patch of swallowwort.

Other native plants include winterberry, young elm, sugar maple, young pine, and in the understory water horehound, Indian tobacco, clear weed, sedges, goldenrods, raspberry, dewberry, pokeweed, and boneset.

Bear sign was abundant, and a porcupine was spotted in one of the trees.

1c: A patch of open field dominated by goldenrod.

1d: Part of a former field, this area is still mostly open and dominated by goldenrod with a grove of dead black locust (due to herbiciding in 2013). The clearing is enclosed by



Goldenrod in an old field that was also taken over by black locust, another non-native species that was intentionally introduced from the southern United States during the 1700s. The locust trees were killed during the herbicide application. It would be great to get a brontosaurus in this area and clear this whole site back to an open field/shrub habitat.

young white pine, which have an understory of clearweed. In other areas, the former field has grown into white pine and red maple.

2a: A steep slope dominated by dying hemlock. It has no understory, but includes scattered red oak, old black locust and some red maple. There are scattered rocks and the boundary is marked by barbed wire.

2b: Located in the highest part of the conservation area, a thin till layer covers the bedrock below. Most of this area drains to Broad Brook and is almost exclusively covered with hemlock, all of it dying.

3: The topography levels off and then gradually ascends to the east. The forest here is a beautiful mix of hardwoods with occasional clusters of white pine and hemlock. The hardwoods are mostly white oak (many of them good-sized), red oak, black birch, red maple and scattered sugar maple. Witch hazel is common. The understory vegetation is generally thin, but where present includes Canada mayflower, starflower, partridgeberry, Pennsylvania sedge and patches of hayscented fern. There are no non-native plants growing here.

4: Hemlock dominated, but with an abundance of red oak and large patches of mountain laurel. This is a seepier, shadier part of the conservation area. Molly Hale confirmed that the “potential vernal pool” is too small and does not function as a vernal pool.



The steep slope dominated by hemlock (2A), which is growing on stony till. It is located immediately above a seepy swamp forest and before the topography levels off. A well-maintained snowmobile trail bisects these woods.



A short stretch of stonewall marks the property's eastern boundary. The conservation land is on the right hand side of the wall and dominated by hemlock with a mix of oak (2B).



A typical woods within the area marked #3 on the vegetation map. Note the lack of slope and frequency of good-sized trees.

5: This knob of higher ground includes impressive red oak, white oak, white pine, hemlock and beech. These are very big, old trees! If a trail is built, it should pass through this special spot.

Wetlands & Beaver Brook

Beaver Brook: With its headwaters in Whately and Williamsburg, Beaver Brook's watershed includes a mix of forested land and open agricultural areas. Its drainage passes through Northampton's Mountain Street Reservoir, which means that it also includes water from Conway, Hatfield and even more distant areas of West Whately.

Just upstream from the conservation area, the brook winds through the highly manicured Beaver Brook golf course and then, after passing under a private driveway, re-wilds and enters the conservation area. In this section, it flows through a series of beaver ponds and marshes before it bends west under Route 9, then continues along a rocky stretch for nearly half a mile before joining the Mill River in Leeds.

Within the conservation area, the channel is mostly narrow (less than ten feet across) and surrounded by grasses, silky dogwoods and other plants. The bed of the brook is sandy-bottomed. The only exceptions are in quiet water pools where muds and organics have accumulated. Willow herb, burreed, water hemlock, swamp milkweed, and small amounts of purple loosestrife grow in this section. Another "thing" you can find along the margins of the brook and in the sands are dozens of golf balls!



A knob of upland (#5) has some very impressive-sized trees. If a future trail is created, it would be nice to have it loop through this area.



The open marsh surrounding Beaver Brook is one of only a few large, open marshes in Northampton. (The only others within the City of significance are located at the Fitzgerald Lake Conservation Area, Barrett Street Conservation Area, upper Marble Brook, stretches along Bassett Brook, and Arcadia Wildlife Sanctuary).

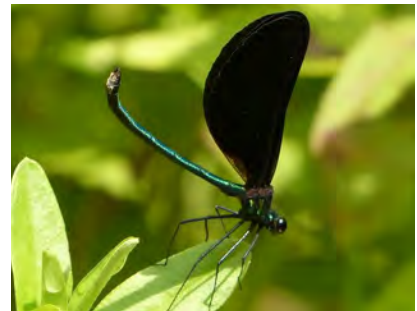
According to the Massachusetts Historical Commission's Reconnaissance report for the town of Williamsburg, the brook's name was used in the 18th century when beavers were trapped here by a man named John Miller.

The brook provides habitat for all kinds of wildlife--dragonflies, damselflies, fish, frogs, three species of freshwater mussel, reptiles, amphibians and much more—and, as mentioned earlier, is within the estimated habitat for a rare species.

W-1: Sometime during the last twenty (or so) years, beavers returned to the area after a two hundred year absence. Taking advantage of the remains of an old stonewall and bridge crossing, the beavers built a dam across Beaver Brook, which created a pond and expanded the width of the wetlands to the north. This is an excellent place to watch for wildlife—both on the water and on the dam itself, which is used by animals as a cross-over path. A wildlife camera captured deer and turkeys using the dam, and fresh otter sign was observed nearby. This is an excellent place for people to visit because the bank is low, making it easy to explore the shoreline.



This section of Beaver Brook has the highest concentration of young crayfish that I have ever seen.



Dragonflies and damselflies, like this River Jewelwing, are common to see on the vegetation along the brook.

W-2: A shrub marsh dominated by silky dogwood, with reed canary grass, scattered willows, meadowsweet, northern arrowwood, and occasional Morrow's honeysuckle and glossy buckthorn. Other plants include Joe Pye Weed, spotted touch me not, blue vervain, water horehound, swamp milkweed, tearthumb, virgin's bower and various sedges, rushes, bulrushes and grasses.



W-1



W-2

A wildlife blind could be built on the uplands near the beaver pond (W-1) to look out over the open water and marsh (W-2), much of which is dominated by reed canary grass, goldenrod, Joe Pye weed and a mix of shrubs.

W-3: Similar to W-2, but dominated by reed canary grass.

W-4: A shallow (8" deep), old farm pond underlain by muck, covered with duckweed and surrounded by red maple. In her 2010 investigation of vernal pools, Molly Hale confirmed that this pond functions as a vernal pool. She found both wood frog and spotted salamander egg masses here.

W-5: This is an extensive area of forested seeps and intermittent streams, which feed into Beaver Brook. In areas with more sunlight, you can find red maple, elm, silky dogwood, winterberry, tussock sedge, viburnums, spotted touch-me-not, spinulose woodfern, royal fern, and a variety of sedges and grasses—as well as scattered Japanese barberry and glossy buckthorn. In shadier settings, these plants are joined by hemlock, yellow birch, mountain laurel and high bush blueberry. Where sphagnum moss is common, cinnamon fern, crested fern, goldthread, wood horsetail, tearthumbs and violets are common.

W-6: This small, intermittent stream flows through a wash of moss-covered rocks and is surrounded by a hemlock corridor. It is located at the headwaters of Broad Brook.



W-5



W-5



W-6

Recommendations

1. Work with BBC, Leeds Civic Association, National Grid and other local organizations and businesses to clean-up the upland strip along Route 9, construct a small (5-6 cars) parking lot, brush-hog this area and keep it more open, create a picnic area, and build a loop trail to access the beaver pond. The trail should be six feet across; this area has a lot of deer ticks.
2. Install a kiosk explaining the site's geological, cultural and natural history.
3. Build an elevated wildlife blind (similar to the one in Cooke's Pasture) near the edge of the upper beaver pond.
4. Consider installing a handicapped-accessible boardwalk to access the marsh as well as the land on the other side of Beaver Brook.
5. Consider using a brontosaurus to clear the former fields on the eastern side of Beaver Brook.
6. Spot control invasives along Route 9. Control glossy buckthorn and Morrow's honeysuckle in the marsh, and continue periodic control of other non-native plant species.



Garlic mustard leaves....plus thousands of seedlings! Without control, this species and many others will spread and take over large areas of the former clearings and continue to invade into the marsh and wetland edges.

This report was made possible with funding from Northampton's Community Preservation Fund.



Changes in the Land: Then & Now



3 A Natural History of the Broad Brook Greenway and Fitzgerald Lake



Chapter Table of Contents

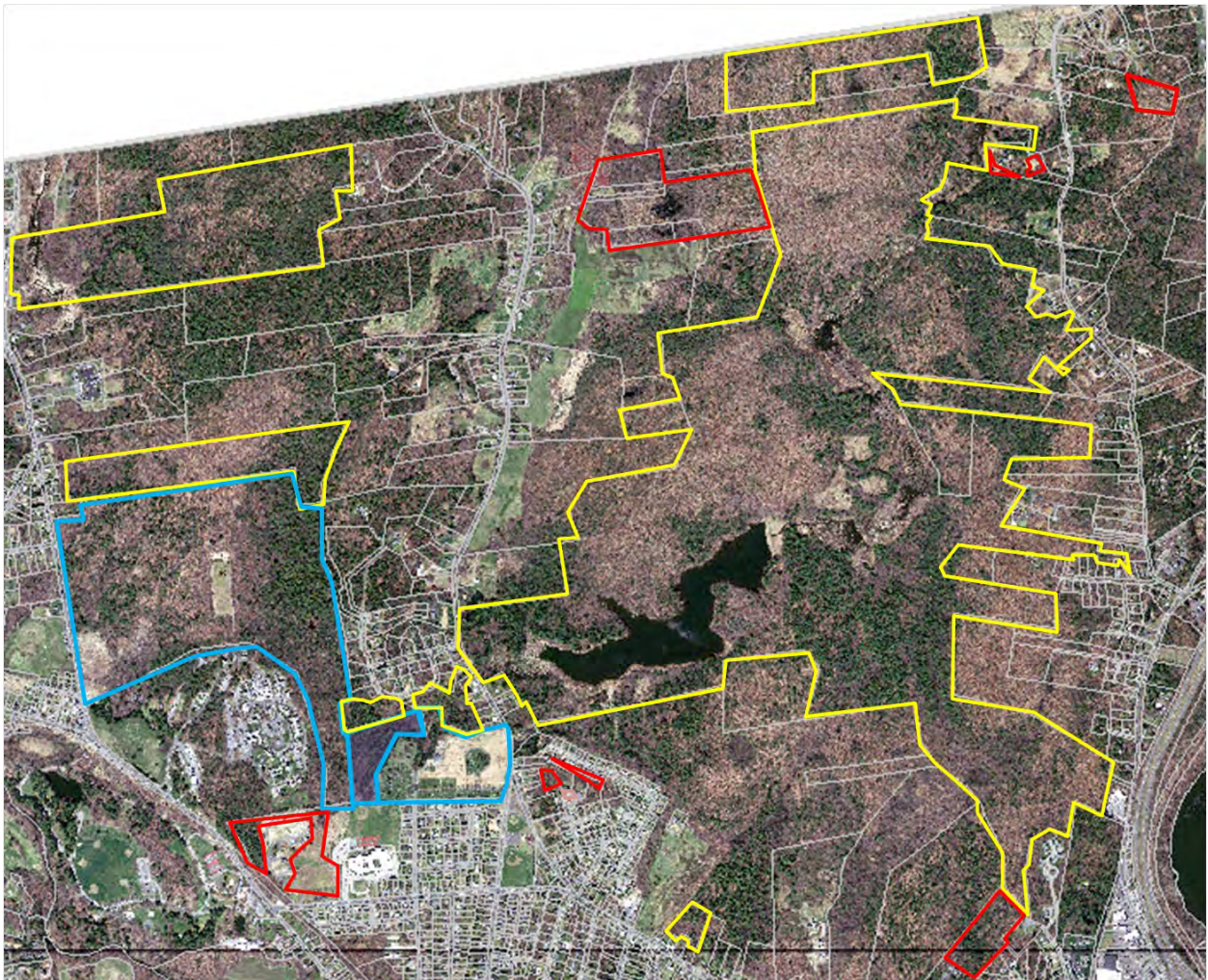
	Page
Overview of Broad Brook-Fitzgerald LakeGreenway	3-1
Bedrock Geology	3-6
Glacial Lake Hitchcock	3-8
Surficial Geology	3-9
Ecological Value	3-10
Vernal Pool and Rare Species Habitat	3-12
Special Habitats within FLCA & Broad Brook Greenway	3-13
Wildlife Value	3-14
UMASS CAPS	3-19
Recreation Value	3-20
Water Quality & Groundwater Recharge	3-21
<i>Appendix</i>	3-22
<i>Section 1: Fitzgerald Lake</i>	3-23
Pines Edge	3-24
Elizabeth Rock	3-26
Forest Legacy Lands	3-29
Marian Street	3-32
Broad Brook Gap (formerly	3-35
Kubosiak) 408 Bridge Road	3-43
<i>Section 2: Broad Brook Greenway</i>	3-47
Burke	3-48
Sullivan (2 parcels)	3-53
Girl Scout	3-59
<u>Tables</u>	
Table 1: Recommendations	3- 3
Table 2: Natural Communities	3-10



The Natural History of the Broad Brook Greenway and Fitzgerald Lake

Overview

With more than 900 acres, the Broad Brook/Fitzgerald Lake Greenway is the largest conservation area in Northampton, and, thanks to a long-standing partnership between the City's Conservation Commission and the Broad Brook Coalition (BBC), it is the best managed. Since 1990, the two groups have jointly managed this expanding area, with most of the funding for large capital expenses provided by the



The protected properties in the Broad Brook-Fitzgerald Lake Greenway that are owned in fee are out-lined in yellow, while those held under private conservation restriction are outlined in red. Other nearby municipally-owned land (Smith Vocational, JFK Middle School's forested land, and Spring Grove Cemetery) are outlined in blue. When all of the permanently protected land in this area is combined, it totals more than 900 acres.

City (through grants, CPA funds, and budget allocations) and the bulk of the labor provided—free of charge—by BBC volunteers. During that time, an impressive number of tasks have been completed—from repairing the dam and restoring Cooke’s pasture to trail maintenance and invasive species control.

For the last ten years, the decisions about what projects to tackle next within the Fitzgerald Lake Conservation Area (FLCA) have been guided by a management plan that was written not by an outside consultant, but by BBC’s Board. Although initially prepared for just 2005-2010, the original management plan was so well done that it continues to be the primary document guiding the property’s future management and stewardship activities. More recently, the highlights of the plan have been incorporated into the City’s latest Open Space & Recreation Plan for FLCA.

One consequence of such a great plan and such committed volunteers is that, in spite of the large size of this conservation area, I have relatively few recommendations to add. My suggestions (Table 1) pertain either to new and neighboring properties, or in a few cases, simply reiterate and reinforce some of the action items that have been previ-



This aerial photo from the 1950s shows a portion of what is now the Fitzgerald Lake Conservation Area before the dam and pond were built. The pond now covers what were cleared fields and pasture near the center of this image. Due west is Spring Grove Cemetery and southeast of the future lake is Harold K. Fitzgerald’s Cloverdale subdivision, a portion of which is being cleared for new homes along Rick Drive. Fitzgerald had the pond built in 1965. The places in this photo that were open fields then and are now forested are also the areas where invasive plants, especially multiflora rose and Asiatic bittersweet, have taken off.



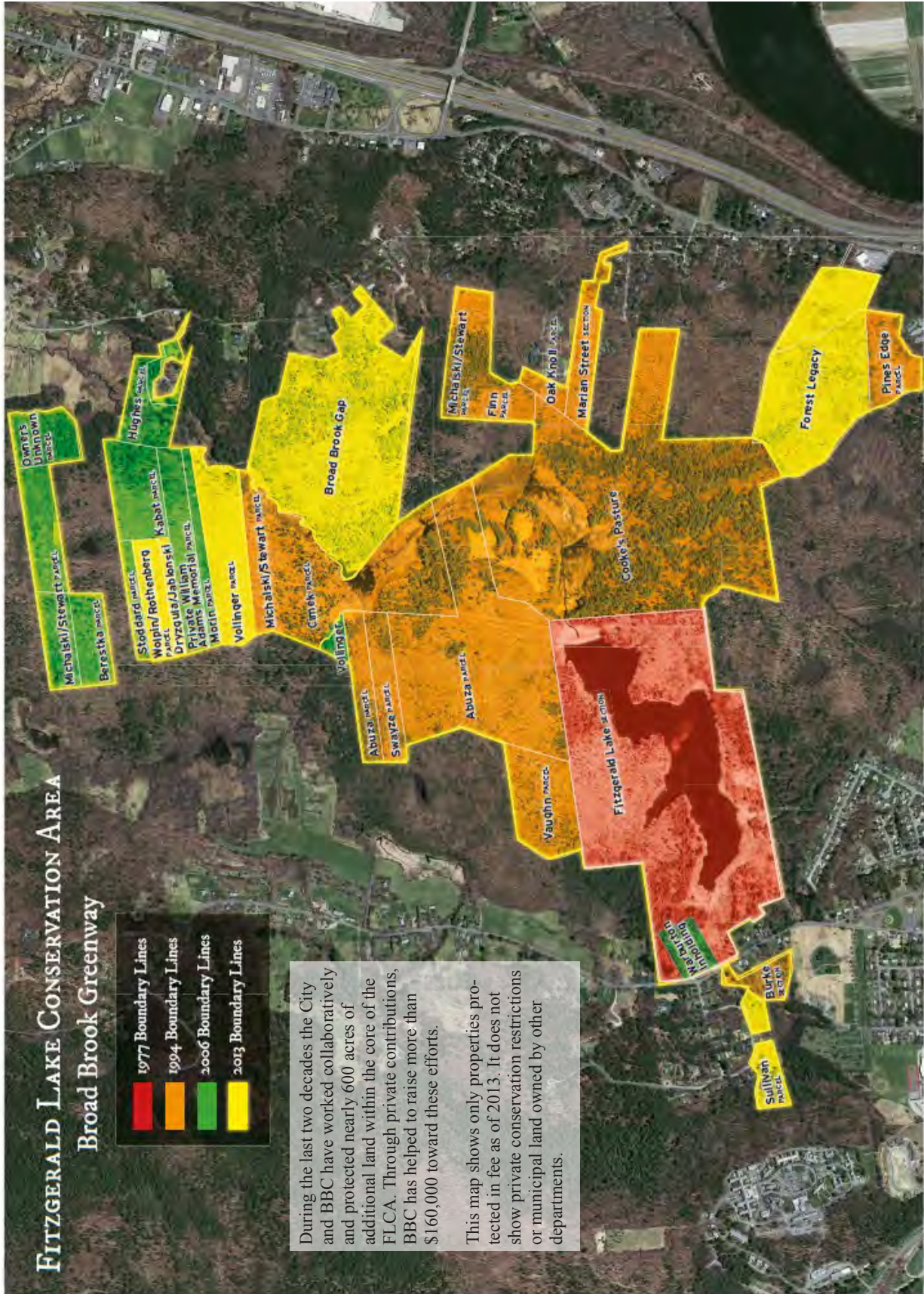
BBC volunteers remove water chestnut in 2007 from Fitzgerald Lake. Photo courtesy Bill Williams.

Table 1: Recommendations for Broad Brook/Fitzgerald Lake Greenway

- Continue to follow the recommendations of the Management Plan, including invasive species control, especially in more unusual habitats (e.g. wetland areas).
- Work with Smith Vocational to:
 - (a) protect their land,
 - (b) provide access to the “Girl Scout” trails,
 - (c) develop a forest management plan that protects the old trees in the Broad Brook Valley, and
 - (d) inventory the old trees on the Smith Vocational land and adjacent “Girl Scout” conservation area.
- Notify and work with the VA to:
 - (a) correct a drainage problem that is causing erosion and damaging the Sullivan property and wetlands near Broad Brook,
 - (b) provide access and parking to trails behind the VA, and
 - (c) address invasive species issues on their property.
- Work with the City DPW to
 - (a) control the spread of Japanese knotweed near the Burke Conservation Area,
 - (b) address other invasive plant problems within the grasslands in the cemetery (i.e. knapweed, swallowwort) and manage this special habitat, which supports at least three state-listed and/or uncommon plants and animals (bees, butterflies), and
 - (c) restore one of the natural springs below Spring Grove cemetery, which was filled in to control an erosion problem in the early 1990s.
- Work with the Lathrop Community to address invasive species problems along Pine Brook (barberry, Japanese knotweed, etc.)
- Work with abutting private landowners to control invasive species.
- Try to secure public access from the Cloverdale Subdivision.
- Inventory all of the plants and animals within the Broad Brook/Fitzgerald Lake Conservation Area.
- Re-construct the boardwalk and canoe launch.
- Continue land acquisition efforts, in particular in the Horse Mountain Area, and in collaboration with Williamsburg and Hatfield.
- Gain permission from abutting landowners to access existing trails in the conservation areas in the upper Broad Brook drainage (i.e. Girl Scout property, Beaver Brook/Broad Brook, Sullivan, Burke).

ously identified, but either remain undone (e.g. inventory of the plants and animals) or are on-going (e.g. control of invasive plants). And of all of my recommendations, invasive plant control remains the most nettlesome, requiring constant monitoring and attention.

The good news is that the situation within this large greenway is much better than in most of the City’s conservation areas. It turns out that this quiet corner of the City is mostly free of invasive plant species. What’s more, where invasive plants do occur, they are often in relatively low numbers and they are found fairly consistently in three main areas: (1) along trails and roadside edges, (2) within sections of



past disturbance (i.e. pastures, old wood roads), and (3) along the margins as well as within wetlands.

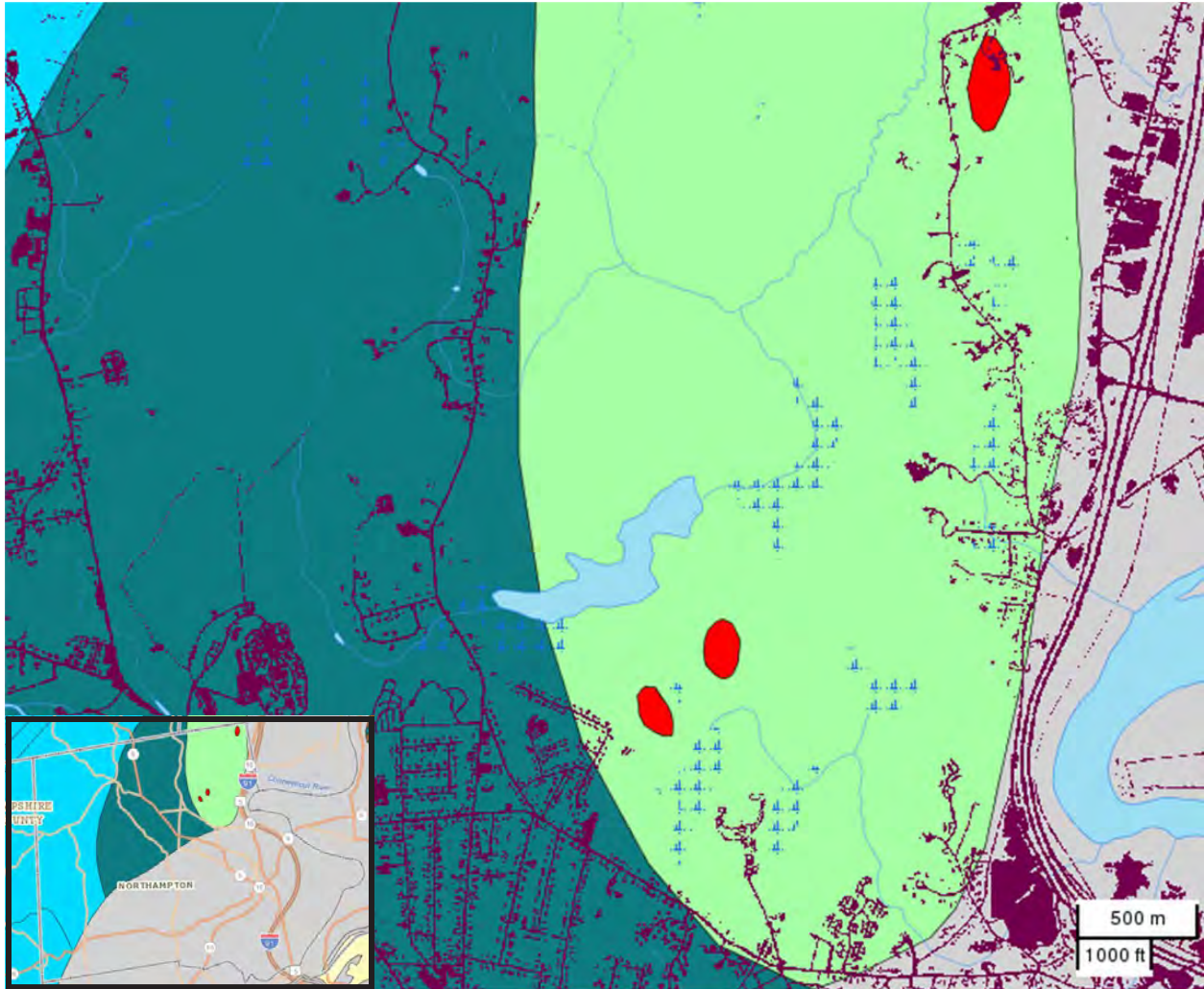
These generalized locations are already well-known to BBC, which has been working on the control of invasive plants since the mid-1990s. During that time, they have worked on knocking back spotted and black knapweed, *Phragmites*, multiflora rose, glossy buckthorn, autumn olive, Asiatic bittersweet, Japanese knotweed, Morrow's honeysuckle, swallowwort, lesser celandine, garlic mustard and since its discovery in 2005, water chestnut. In some cases, the group has hired professional licensed applicators to spot-control the most problematic and worrisome species (*Phragmites*, knapweed, glossy buckthorn, and Japanese knotweed), but in others they have relied on volunteer labor (e.g. water chestnut, swallowwort, lesser celandine, etc.). As part of a comprehensive effort, BBC volunteers created a preliminary base map of invasive species locations in 2006, and in 2012, the stewardship committee invited botanist Matt Hinckler to survey the lake. He confirmed that water chestnut was the only invasive aquatic species in the pond. So far, it is free of Eurasian milfoil and other unwanted plant pests.

That said, in spite of these efforts, the Fitzgerald Lake Conservation Area has some potentially serious invasive species problems. Young stems of Asiatic bittersweet are common (especially near the wildlife blind) and winged euonymus is spreading along the main entrance trail. Glossy buckthorn has taken off during the last two decades and is now commonly encountered bordering the pond and marshes below Cooke's Pasture.

In addition, all of the conservation properties within the Broad Brook drainage have invasive plants—some extensive—and several abutting private properties have sizeable and/or worrisome invasions of non-native plants, a few of which threaten the conservation area's more sensitive habitats. For instance, two of the Greenway's more unusual wetlands (Burke, Sullivan & Kubosiak) are at risk from the spread of Japanese knotweed from nearby yard waste/stump dumps. In addition, the former pasture areas behind Rick Drive are loaded with multiflora rose, Asiatic bittersweet, and autumn olive, and the western portion of the Boggy Meadow Road wetland (now a beaver pond) includes impressive patches of multiflora rose. The forest/former pasture adjacent to this wetland also includes lots of multiflora rose below a stand of large catalpa.



Wood anemone (*Anemone quinquefolia*) is a common spring wildflower in the FLCA.

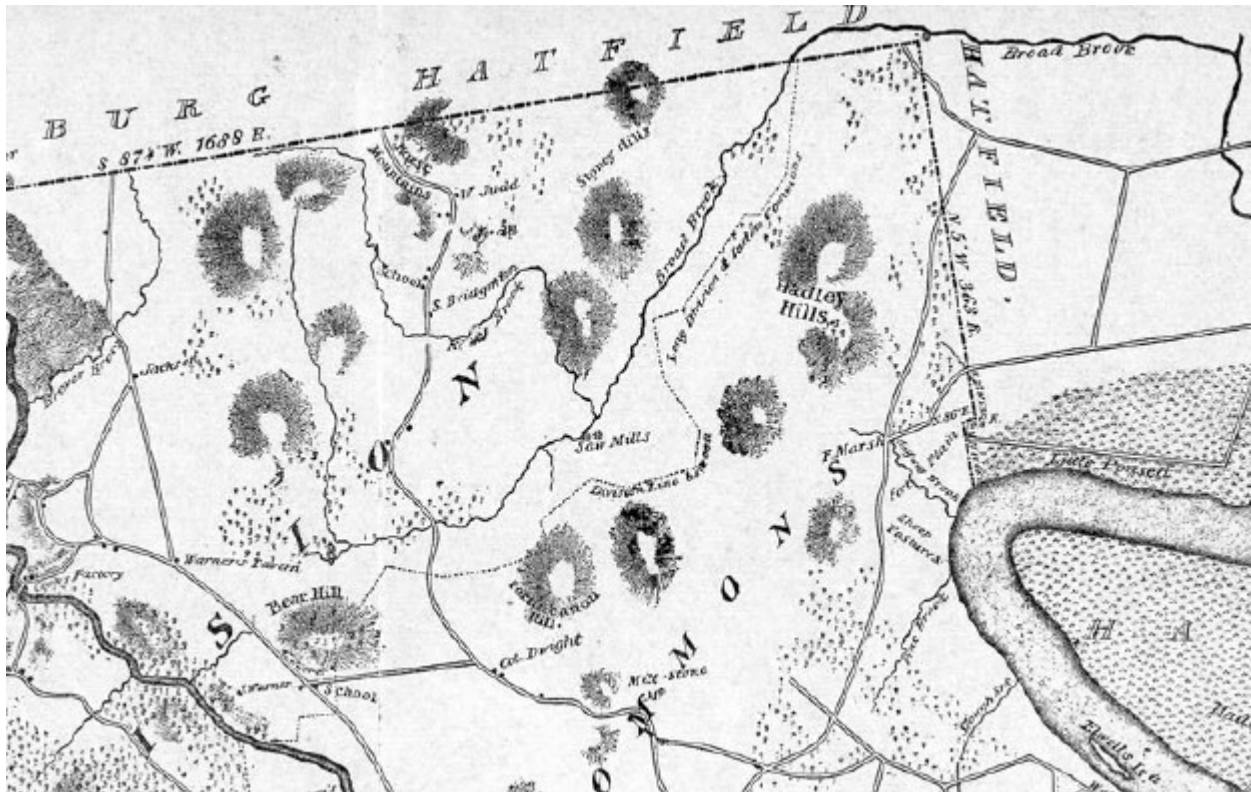


Bedrock Geology

The Broad Brook-Fitzgerald Lake Greenway are underlain by two different kinds of bedrock. Moving from west to east, the bedrock below the Broad Brook Greenway is a band of ancient metamorphic rock (*teal*), which formed when an island arc crushed against the margin of a proto-North American continent some 460 million years ago. It is composed of schist, gneiss and quartzite.

In contrast, most of the Fitzgerald Lake Greenway is underlain by a slightly younger (420-360 million year old) igneous rock (*green*). Known as monzodiorite, it is coarse-grained and composed of a combination of feldspars, biotite, hornblende, and a small amount of quartz. It formed as a pluton, a giant mass of magma which intruded the metamorphic rock and then slowly cooled and crystallized below the earth's surface. The pluton was, in turn, intruded by even later intrusions of magma (red), which are classified as granodiorite and have a slightly different composition than the lighter-colored monzodio-rite. All of these rocks were once deeply buried below the earth's surface and have been exposed after 400+ million years of erosion and weathering.

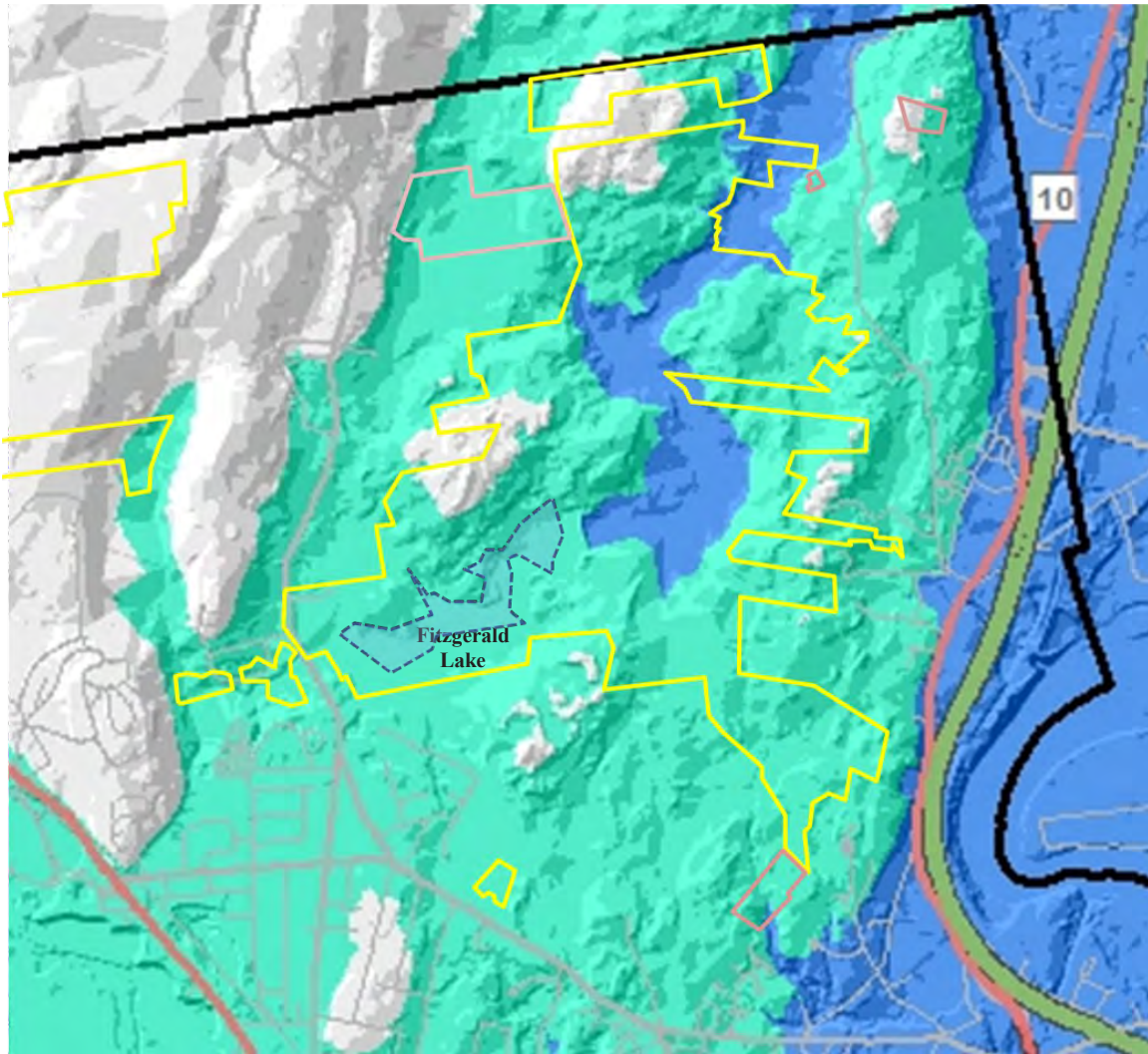
To the east are much younger (~200 million years ago) sedimentary rocks known as sandstones (*gray*), which formed when the giant supercontinent of Pangaea split apart and caused the incipient rift valley that created the Connecticut River Valley.



Early settlers took advantage of the bedrock resources within the city's northeast corner and frequently quarried small amounts of stone for building. The most prominent knobs earned local place names and by the time this 1831 map was created, the largest were known as Millstone Mountain, Fortification Hill, Stony Hills and Hadley Hills. Many other smaller bedrock outcrops were also quarried during the 18th and 19th century and evidence can still be found by poking around many of these sites. On this map, the Hadley Hills were named so because of the great views that they provided to the east over the Connecticut River and to the meadows in Hadley. By the 1920s, one prominent knob, known as Elizabeth Rock, had become a popular picnicking spot. It was located above the city's largest rock quarry, which is where the River Valley Market is now located. The City operated the quarry during the late 1800s and early 1900s, until selling the land in the late 1920s. By then, that section of the City had become known as Rockland and the plan was that it would become a fancy development, not unlike the homes in Holyoke's highlands.



Workers at the North King Street Quarry in the 1890s.
Courtesy Images of America, Northampton, by James Parsons. P. 66.



Glacial Lake Hitchcock

During the era of Glacial Lake Hitchcock (15,400-12,600 YBP), most of the land in the Fitzgerald Lake Conservation Area was covered by water. At its maximum height (aquamarine color), the lake's shoreline skirted the edge of what's now North Farms Road and the base of Bear Hill and Horse Mountain. At that time, the highest hills in and near the Greenway were small islands (grayish/white).

After a glacial-debris dam at Rocky Hill, CT let go, the lake dropped to a lower level (darker blue). At that point, the lake bottom sediments—fine silts, sands and clays—began eroding off the newly exposed land into the long, narrow inlet that now makes up the extensive cattail marshes and beaver ponds along Broad Brook.

After Glacial Lake Hitchcock completely disappeared, erosion continued and most of the thin veneer of silts and sands in the uplands eroded away, adding even more fines to what are now low-lying wetlands. This explains why FLCA's wetlands are more fertile and almost circumneutral. It also accounts for the pockets of sugar maple and patches with yellow violet, miterwort, trout lily, bloodroot and other species that only occur in fertile soils.

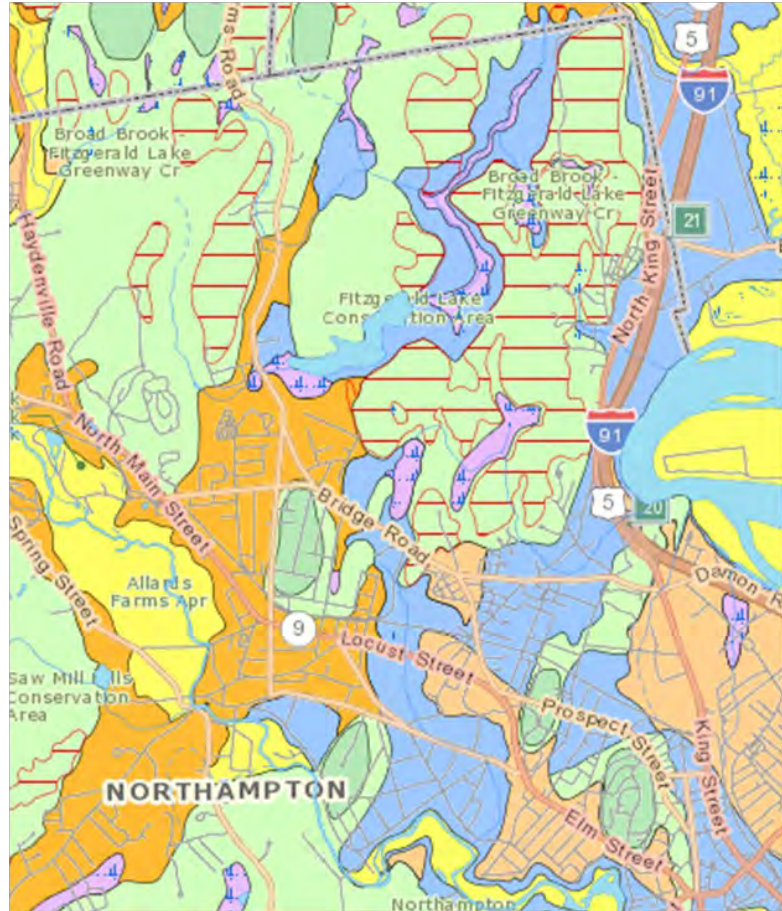
Had Glacial Lake Hitchcock with its accompanying fine sediments not covered this area, the flora within the FLCA would be much less diverse and much more similar to that found in the Sawmill Hills.

Surficial Geology

In addition to understanding something about the underlying bedrock geology and the historic location of the lake, it is also helpful to be familiar with the surficial geology. This image shows how the sediments left behind by the glacier and glacial lake have changed after 10,000 years,

For instance, most of this landscape is now covered with till (light green) or has bedrock close to or at the surface (red hatching). The fine silts and clays that were deposited during the time of Glacial Lake Hitchcock (light blue) have mostly eroded away, re-vealing till or bedrock. The ~~Glacial Lake Hitchcock sediments are now~~ ~~eroded~~ farmland (near and including the Zimmerman conservation restriction along North Farms Road) or part of the series of beaver ponds and marshes below the Fitzgerald Lake Dam. In addition, some of these have been covered by more recent muck and organic debris (pink). The other important component are those areas represented in orange, which includes water-sorted sediments deposited in the early post-glacial period. Within the Fitzgerald Lake area, these include remnants of the lake's sandy beach and deltaic deposits from a glacially-charged Mill River. JFK Middle School and Spring Grove Cemetery are both located on the edge of the Mill River's glacial delta, and the Burke and Sullivan Greenways are geographically positioned at the inter-section of till deposits, glacial lake silts and the same sandy delta. As groundwater percolates down through the delta sands, it intercepts the impermeable clay layer and gushes up as springs—hence the name, “Spring Grove”

cemetery. One of the larger springs was covered with riprap in the 1990s, but could be restored. Meanwhile, the groundwater-fed wetland that lies within the Burke and Sullivan Conservation Areas is very unusual and includes several plants that occur nowhere else in Northampton, including larch and alder-leaved buckthorn.



(A) Most of the conservation area is covered with thin till and bedrock outcrops and supports a forest dominated by oaks and red maple. (B) Along North Farms Road, a remnant beach deposit from Glacial Lake Hitchcock is now covered with little bluestem and other species tolerant of droughty, nutrient poor sands. This site, which is just outside of the conservation area, is an important nesting site for turtles.

Ecological Value

In addition to the artificial lake, the variations in geology, topography, hydrology and land use history within the Broad Brook/Fitzgerald Lake Greenway have led to a remarkable diversity of natural communities (Table 2). These areas, in turn, provide habitat for thousands of plants and animal species—some of which are exceedingly rare.

What follows are some images of a subset of these different habitat types.



Acidic talus forest/woodland



Hemlock ravine



Oak Hemlock White Pine Forest

Table 2: Natural Communities in and around the Broad Brook/Fitzgerald Lake Greenway*

1. Acidic Rocky Summit/Rock Outcrop
2. Acidic Rocky Cliff
3. Sandplain Grassland (Spring Grove & Horse Mountain)
4. Acidic Talus Forest/Woodland
5. White Pine-Oak Forest
6. Oak-Hemlock-White Pine
7. Successional White Pine Forest
8. Hemlock Ravine
9. Mixed Oak Forest
10. Ridgetop Chestnut Oak Forest
11. Oak Hickory
12. Northern Hardwoods-Hemlock-White Pine
13. Hemlock Hardwood Swamp
14. Red Maple Swamp
15. Black Gum –Pin Oak-Swamp White Oak Perched Swamp
16. Black Ash-Red Maple-Tamarack Calcareous Seepage
17. Deep Emergent Marsh
18. Shallow Emergent Marsh
19. Wet Meadow
20. Shrub Swamp
21. Woodland Vernal Pool

* Follows MA NHESP Classification of Natural Communities (Kearsley and Swain, 2005)



Successional white pine



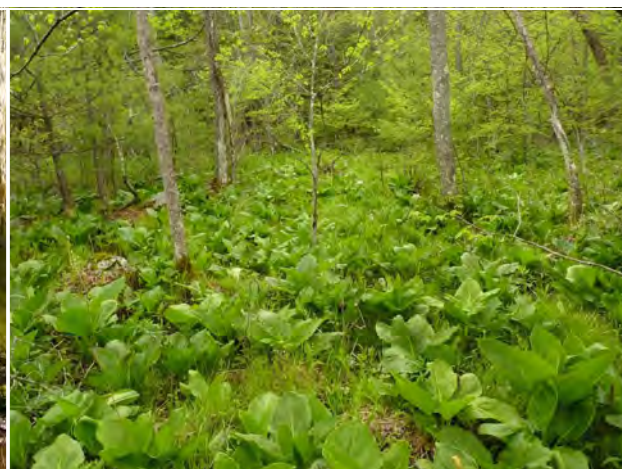
Sandplain/Cultural Grassland (Spring Grove Cemetery)



Northern Hardwoods White Pine.



Black Gum-Pin Oak-Swamp White Oak Perched Swamp



Black Ash-Red Maple-Ironwood Circumneutral Swamp



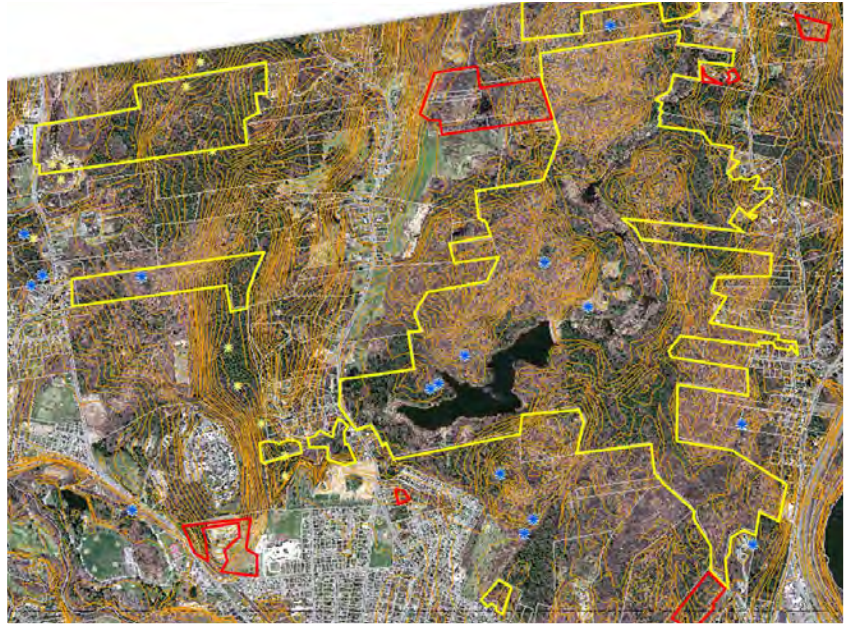
Forested Vernal Pool



Deep Marsh

Vernal Pool Habitat

Twelve of Northampton's certified vernal pools are found within or near the Broad Brook-Fitzgerald Lake Greenway and eleven others have been mapped by MA NHESP as potential vernal pools. In addition to these, at least two others (that do not appear on any maps and are functioning as vernal pools) occur in the area—two in the 408 Bridge Road property and another within Pines Edge Greenway. All of the certified pools occur in either shallow, bedrock depressions or are located in small kettleholes.

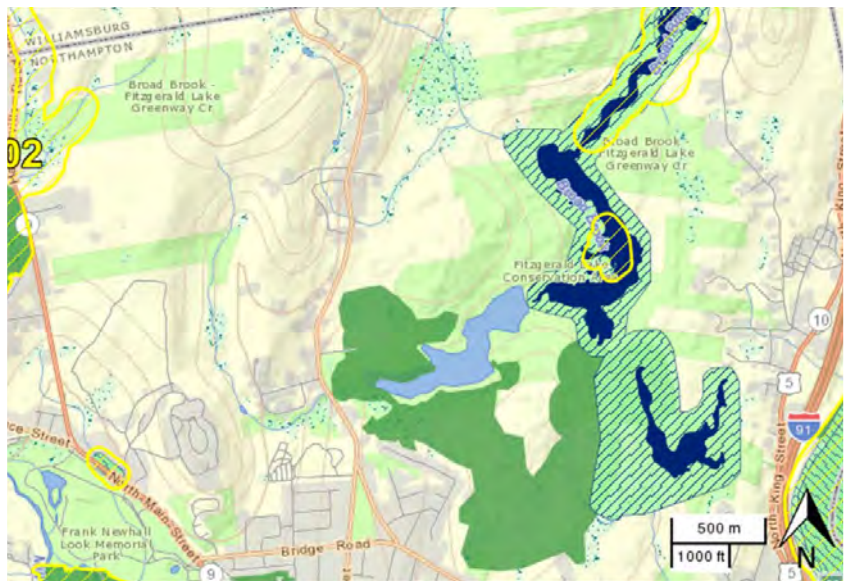


At Fitzgerald Lake, most of the pools support wood frogs and spotted salamanders, but at least one pool just beyond the current conservation area supports marbled salamanders.

In addition, the pool (right), which lies just off the trail, is the only known breeding site for the largest dragonfly in Massachusetts, the Hero Darner (*Epiaeshna heros*), a magnificent insect that measures nearly four inches in length. It is also one of two ponds used regularly for natural history programs on vernal pools.

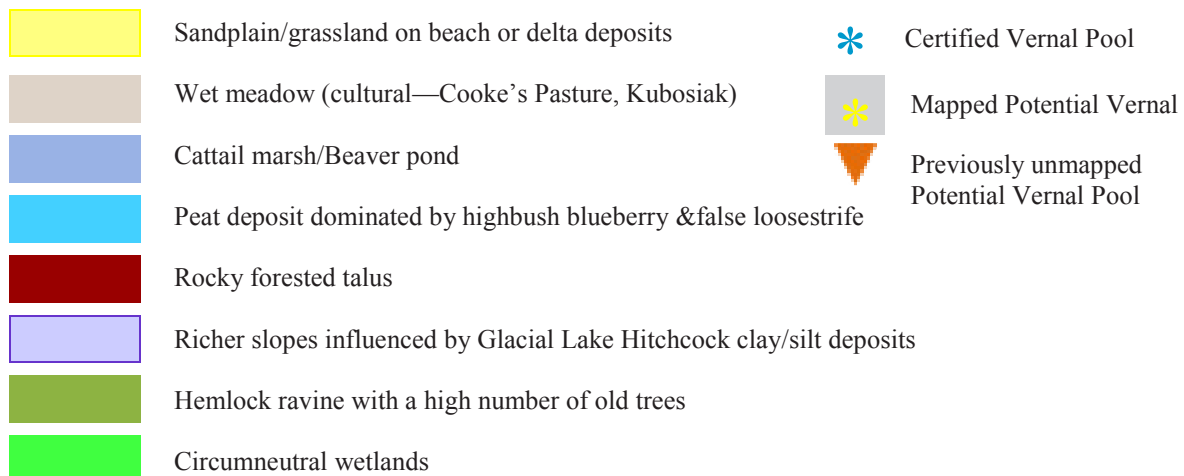
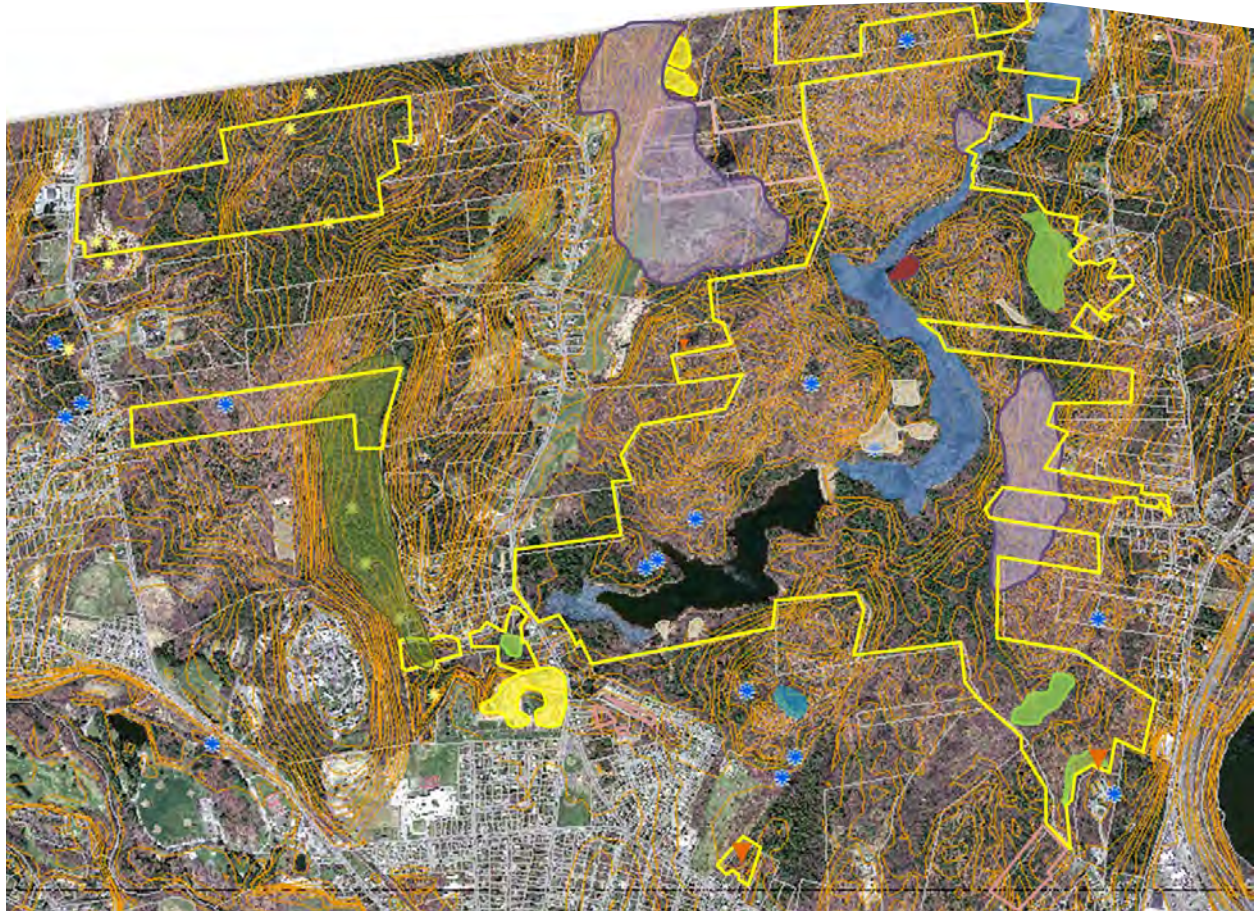
Rare Species Habitat

In addition to vernal pools, this area also contains habitat for rare species (yellow outline with hatching). At least one endangered plant species (Bush's sedge, *Carex bushii*) is found within this area, and several state-listed animals, including a federally endangered freshwater mussel. As the GIS map reveals, much of FLCA also falls within BioMap Core Habitat for Species of Special Concern (dark green), Core Wetlands Habitat (dark blue), and Critical Natural Landscape Upland Buffer of Wetland Core (hatched green). These ecologically valuable areas occur on both city-owned conservation land and nearby private property.



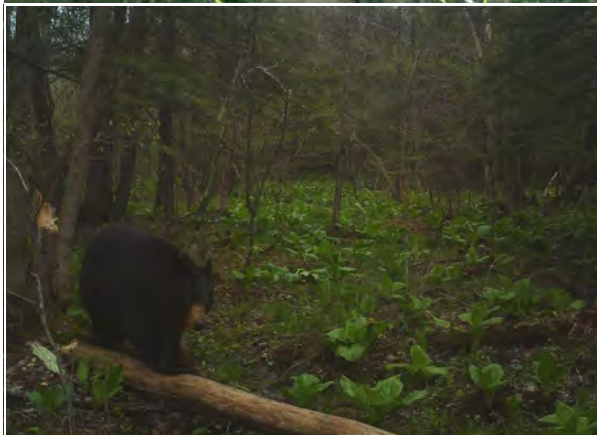
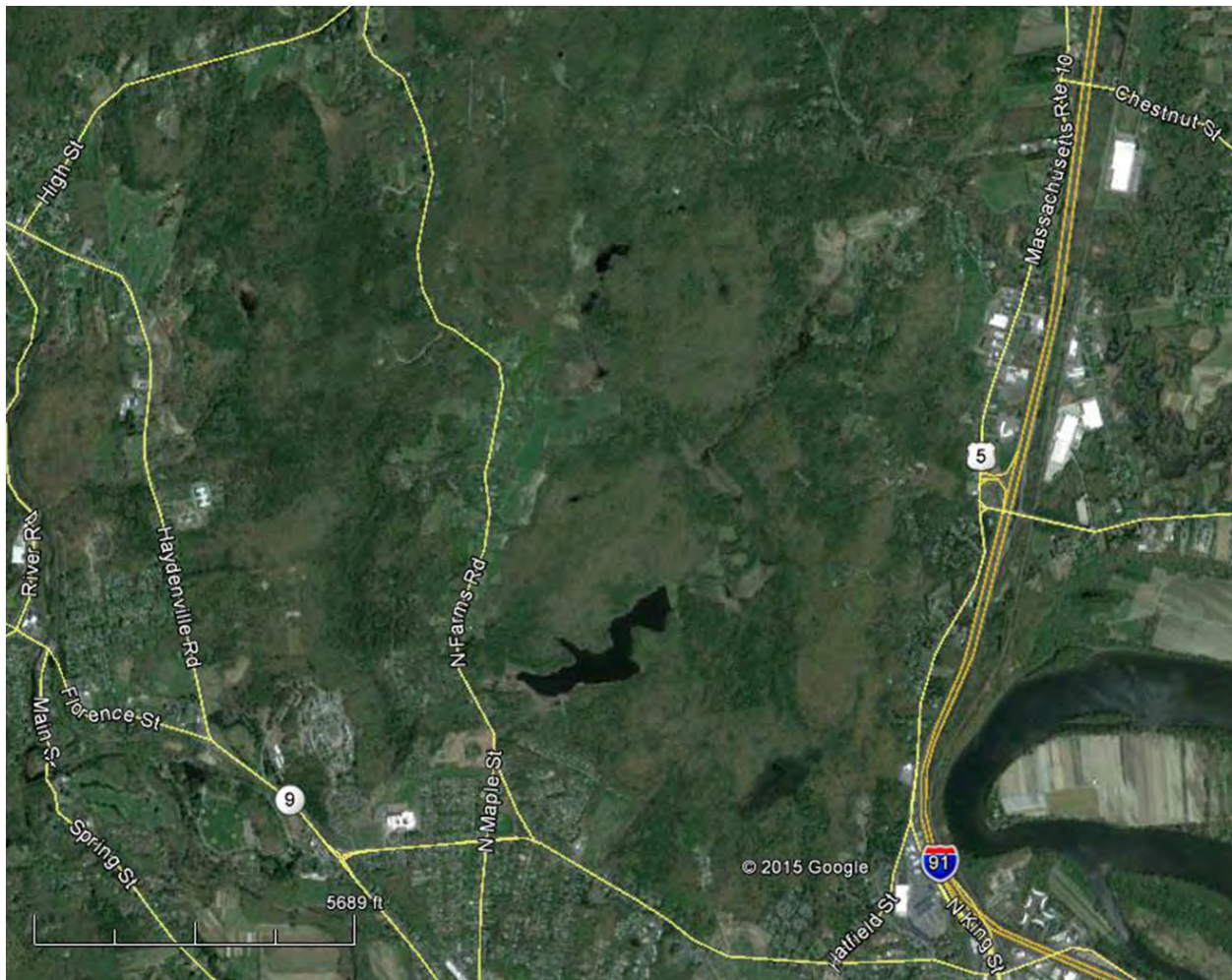
Special Habitats Within & Near the Broad Brook Greenway

Because of differences in topography, surficial geology, hydrology and land use history, there are several locations within this large area that are interesting from a biodiversity perspective and worthy of further investigation. These include vernal pools, marshes, richer wetlands, wet meadows, cultural grasslands (old beaches & deltas), rocky talus slopes and richer pockets in the uplands. Within the conservation lands, most of the areas that are not highlighted are either rocky, oak-dominated uplands or wetter areas dominated by hemlock-hardwoods.



Wildlife Value

With nearly 2 ½ square miles of undeveloped land in and around Fitzgerald Lake and another square mile in the Broad Brook/Beaver Brook drainage, the northeast corner of Northampton remains one of the least fragmented. Its proximity to the Connecticut River and continuity with additional forested land to the north makes it excellent habitat for animals that depend on large, uninterrupted tracts of forest. Furthermore, because of its mix of wetland and upland habitats, thousands of different animal species depend on this area, either transitionally or permanently.



Bushnell

05-09-2014 10:33:37



Black bears and barred owls are two species that benefit from the large block of uninterrupted habitat that this area provides.



Fitzgerald Lake, looking west from the dam, is one of the largest bodies of water in Northampton. The vast marshes below the dam and along Broad Brook look like a scene from a remote, wild place and not the scene you'd expect just 15 minutes from downtown Northampton. During the last 20 years, glossy buckthorn, Morrow's honeysuckle and other non-native shrubs have become more common in these marshes and along the edges.



King's Brook (above) is one of the main tributaries of Broad Brook and located in the more remote northern portion of the FLCA.

Wet pockets like the one below occur in many places in the FLCA. They often have occasional multiflora rose or Japanese barberry bushes.



Intermittent streams like this one near the North Farms Road entrance are important tributaries to Fitzgerald Lake and Broad Brook and provide habitat and corridors for wildlife.



Dry oak woods, underlain with till, cover most of the upland areas. These areas are free of invasive plants.





The telephone line, seen in this aerial image that pre-dates the creation of Fitzgerald Lake, once formed a prominent north-south clearing through the conservation area. Today, this long-abandoned route has grown in and although some of it still is used as a trail, other sections are now so forested that the old line is hard to recognize, especially in the northern portion of the conservation area that was logged before its acquisition.



A section of young forest that is growing up after a logging job that occurred prior to this land's purchase.



A section of old barbed wire reveals the old pasture history of this land near North Farms Road.



This hemlock forest is located near the main entrance on North Farms Road. Unless a pathogen for hemlock woolly adelgid is discovered, all of the trees in this grove will decline and die within the next few decades. When their shady canopy is gone, this area will be more vulnerable to invasion by Asiatic bittersweet and other non-native plants. Warming temperatures through climate change are also expected to further the spread of invasive species.



Prior to the arrival of the chestnut blight, American hemlock was a much more important component of the forests within the upland portions of the Broad Brook Greenway.

Swamp milkweed grows along the shoreline of Fitzgerald Lake and is a favorite nectaring plant of the Dion skipper, a small butterfly known from only three locations in the state, one of which is Fitzgerald Lake.



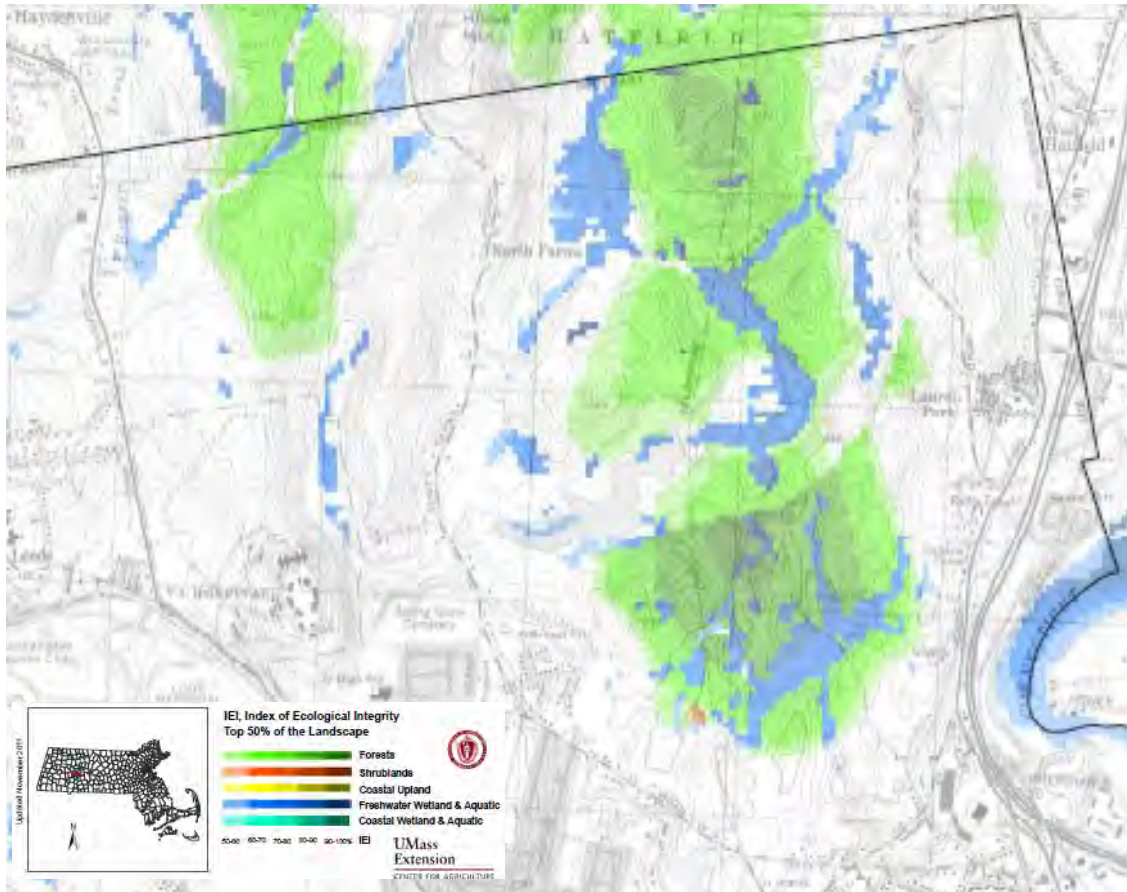
The silts and clays left by glacial lake Hitchcock have made some of the soils sweeter. This added fertility increases the area's overall botanical richness and creates conditions that allow for maidenhair fern (*above*) and this whopper, multi-stemmed hackberry to grow (*right*). This is the second largest hackberry in Northampton; it grows on land protected by Bob Zimmerman, who is in the image.



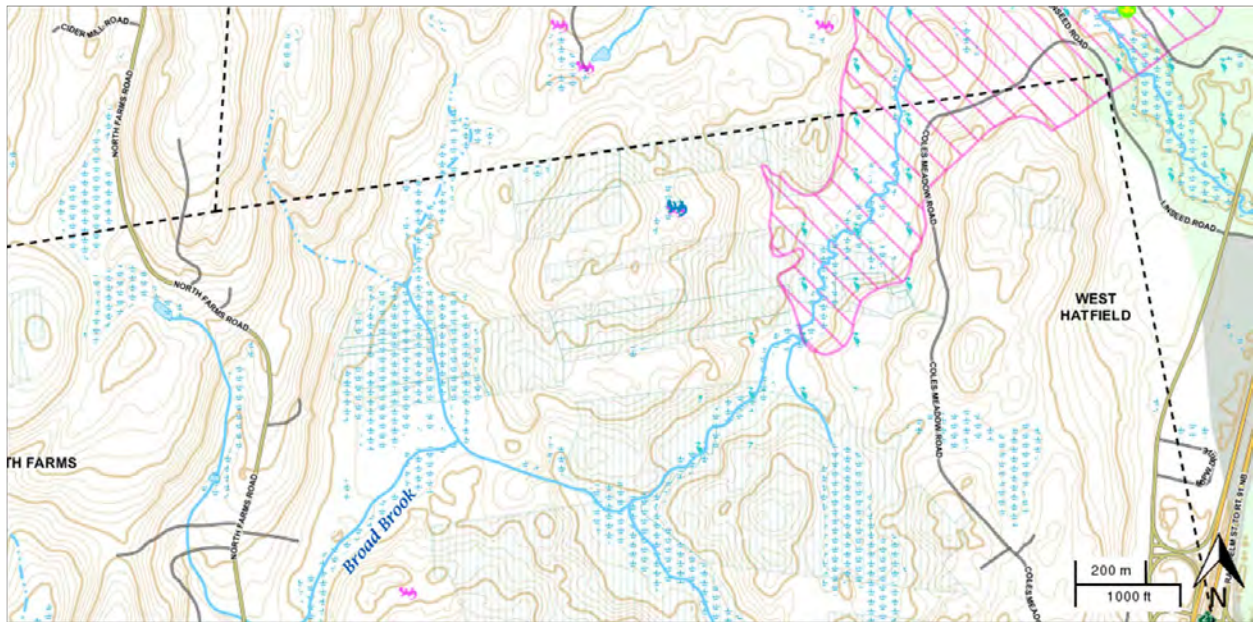
UMASS Conservation Assessment Prioritization System (CAPS)

During the last decade, researchers at UMASS have developed computer software (CAPS) that analyzes the landscape and prioritizes land based on its ecological integrity and long term sustainability. Based on this analysis, the Broad Brook/Fitzgerald Lake Greenway is one of a few areas in Northampton that rank high in terms of its ability to sustain ecosystem processes and maintain biodiversity over the long-term. CAPS is another way of measuring the land's "value" and it provides a strategy for acquiring property.

In this image, the colored areas are better than average, with blue representing aquatic habitats, red for shrub and grassland, and green shading for forest. The darker the color, the higher the conservation/biodiversity value. White areas are below average based on CAPS.



CAPS is another tool to narrow and refine priorities for acquisition, in this case based on biodiversity value and long-term sustainability, which helps safeguard ecosystem processes and special and common habitats.



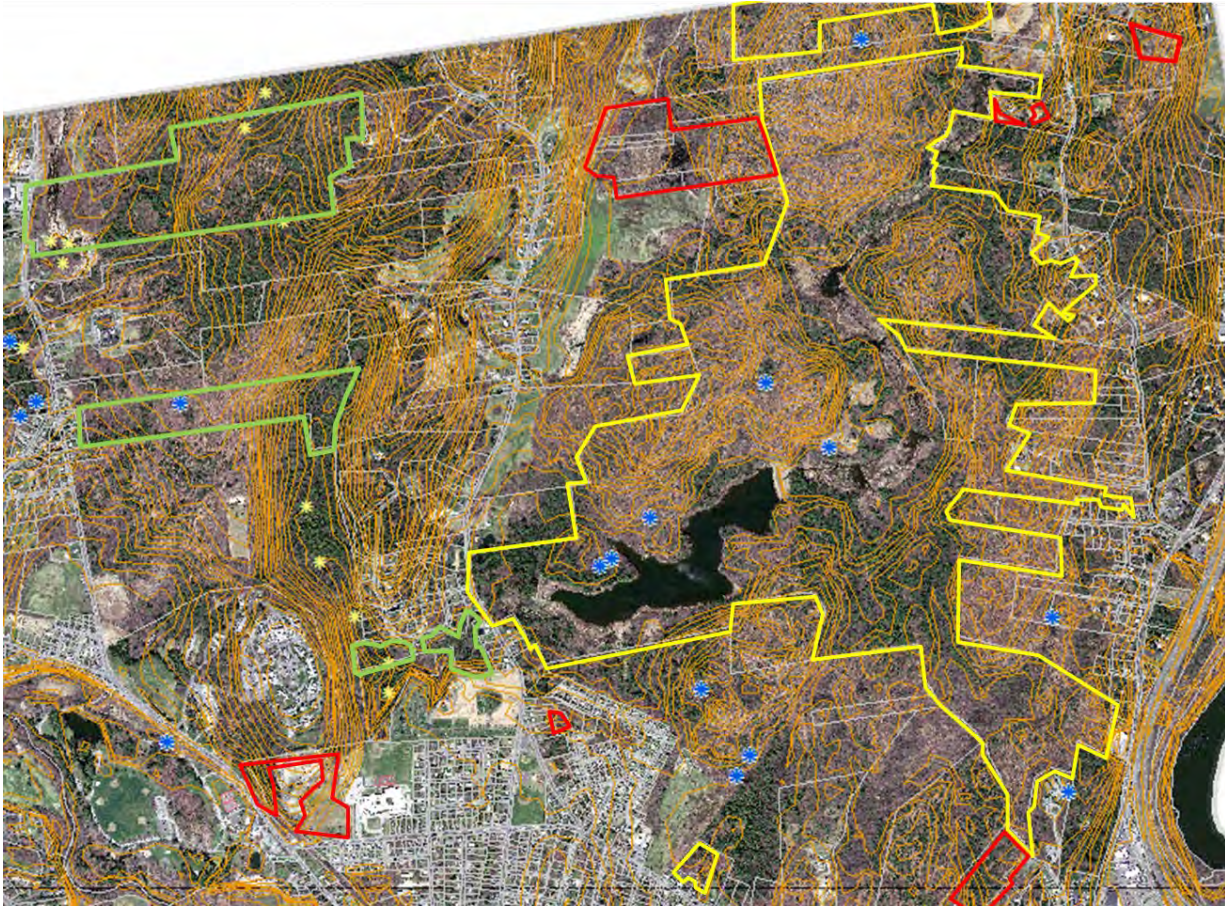
Water Quality & Groundwater Recharge

The final reach of Broad Brook is part of a DEP-delineated Zone II (pink hatching). A Zone II protects and helps to recharge a public drinking water supply. In this case, it is part of the aquifer for Hatfield's nearby public wells.



Aside from their habitat value, vernal pools like this one within the FLCA also help contribute to groundwater recharge.

Appendix



This appendix includes updates of selected parcels, some of which were described in the 1993 version of *Rediscovering Northampton*, others that have subsequently been inventoried and a few entirely new conservation holdings that were investigated in more detail during 2014.

Properties (outlined in yellow) are described in Section 1, while parcels in the upper Broad Brook drainage (outlined in green) are described in Section 2.

Parcels outlined in red are under private conservation restriction and are not described, but are shown here for context.

Section 1: Broad Brook - Fitzgerald Lake Greenway

Featuring more detailed profiles of:

Pines Edge
Elizabeth Rock
Forest Legacy Lands
Marian Street
Kubosiak
408 Bridge Road



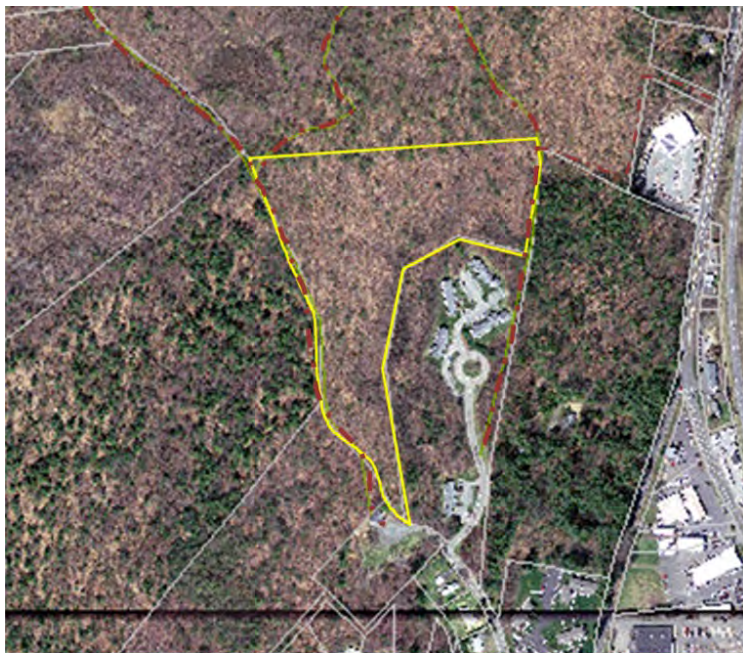
Large bedrock outcrops are common within this conservation area, especially within the Fitzgerald Lake portion. This one is near the intersection of King's Brook and Broad Brook. The dog is included for scale.

Pines Edge (15 Acres)

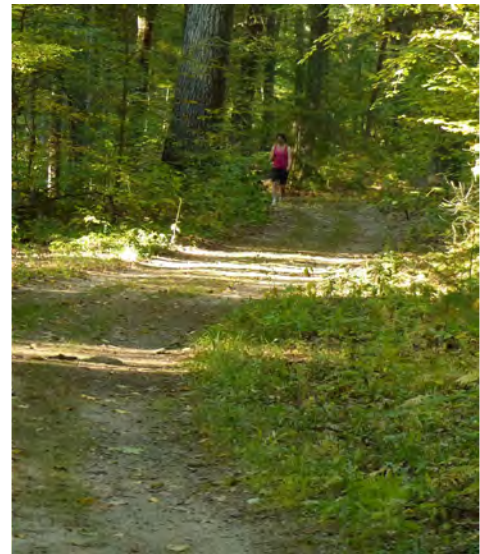
Donated as part of a cluster subdivision in 1989, the 15-acres that wrap around Pines Edge Condominium Complex have changed very little since they were first surveyed in 1993. In the intervening years, only three invasive plant species --privet, Asiatic bitter-sweet, Morrow's honeysuckle—have become established and they were in such low numbers that I removed all of them by hand-pulling. That said, it will be important to monitor this area, not only for more of those three species, but also because there is more bittersweet growing along the forest edge near the Moose Lodge and there are patches of garlic mustard along the edge of the condominium clearing.



The most significant “change” at Pines Edge is that this once isolated conservation area is now contiguous with nearly 800 acres of protected land. In 2009, the 12-acres of upland woods to the north and east around the former city quarry/now River Valley Market site were protected and in 2012, 36 acres to the north were purchased using Forest Legacy funds.



To explore Pines Edge, you can park near the Moose Lodge at the end of Cooke Avenue and go in via Boggy Meadow Road. You can also follow a trail that begins near the northern most condominium units. This connects to a trail that leads to the edge of the former City Quarry above what is now the River Valley Market.



Although hundreds of people now regularly pass Pines Edge, either walking along Boggy Meadow Road (*above*) or on Middle Trail, few of them ever venture into this conservation area. That's not really so surprising as there are no footpaths leading through it, and most of the upland forest is similar to the oak-pine mix found throughout most of the FLCA.



(A) About 2/3 of the property is uplands, with well-drained soils and bedrock outcrops. These areas are covered with a mix of oaks (red, scarlet, white oak), as well as shagbark hickory, ironwood, red maple and scattered pine. Below the canopy, the shrub and herb layers vary—sometimes sparse, sometimes patchy. Among the more common shrubs are mountain laurel, shadbush, maple-leaved viburnum, American hazelnut, huckleberry, and low-bush blueberries. The wildflowers include wood anemone, Canada mayflower, spotted wintergreen and asters. (B) A strand of barbed wire along the eastern boundary reveals that the property to the east was once used as pasture, maybe when this land was part of the Cooke Farm.



(C) Although its oak-pine uplands are similar to much of Fitzgerald Lake, its wetland is an unusual natural community within Northampton and classified as a black gum-pin oak-swamp white oak “perched” swamp. What’s more, in the spring, the wetland’s deeper pools function as vernal pools and are used for breeding by both wood frogs and spotted salamanders. (D) The wetland has much higher diversity than the surrounding uplands. Sensitive fern (seen here) is widespread, but several other ferns are common (cinnamon, interrupted fern, spinulose woodfern, and Christmas fern).



The wetland also supports a variety of wildflowers, including blue flag iris, jack-in-the-pulpit, wild geranium, fringed loosestrife, partridgeberry, starflower, and Canada mayflower (seen here on this moss-festooned log). High bush blueberry (flowering here) grows on the hummocks along with meadowsweet, lowbush blueberry, three kinds of viburnum, pinxter flower, silky dogwood, ironwood, winterberry and spicebush. In the canopy, aside from red maple and swamp white oak, are occasional pin oak, hemlock, green ash, hop hornbeam, pine oak and black gum. The diversity of this wetland is higher because this area has soils derived from Glacial Lake Hitchcock sediments, making the soil's chemistry is closer to neutral.

Elizabeth Rock (Formerly Merrimack Mortgage)

This 12-acre property wraps around the long-abandoned city quarry, now known to most people as the site of the River Valley Market. It is almost entirely upland, and without question, its best feature is the impressive view from the rim above the old quarry where you can look out toward the Connecticut River and Hadley Meadows.

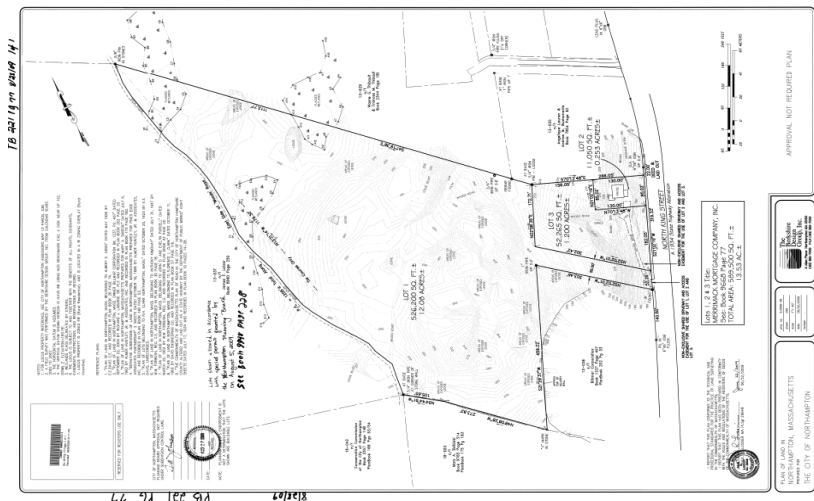


The parcel in context to other protected land, Route 5/10, Interstate 91 and the Connecticut River.

The traffic noise from the interstate is constant along the quarry edge, but fades as you head into the interior of the property. This area, which is mostly level with only modest ups and downs, is dominated by oaks (red, white, black, scarlet, chestnut), with red maple and scattered patches of white pine. Parts of this area were logged in the mid-



2000s, mostly likely in anticipation of an 88-unit condominium project, which was first presented in July 2006. The cluster development was going to be built on about ten acres and as part of the cluster equation, another 29 acres were going to be donated to the City as open space. Given the size of the project, the tough site conditions and neighborhood opposition, the project went through numerous iterations before it was finally approved—with 47 conditions(!)—in November 2007. By then, however, the economy had collapsed and that was the real deal breaker. The developer, who had purchased 13 acres for \$525,000 the year before and had options on another 30+, was unable to find financial backers and became overextended. In 2008, he put the entire project up for sale for \$2.4 million. With no takers and unable to make his mortgage payments, he lost the property to foreclosure. The mortgage company assumed ownership in 2008 and sold 12 of the 13 acres to the City's Conservation Com-



mission for \$75,000 the following year. (The remaining acreage includes a home along Route 5).

Since that time, it appears that few people have explored the interior portion of the property. Two trails skirt the property's boundaries, one begins at the edge of the Pines Edge Condominiums and the other, Middle Trail, forms the property's western boundary and connects to Boggy Meadow Road. Within the property, the old logging roads are easy to find and the borders have been blazed.



Middle Trail, seen here, forms one boundary of the conservation area.

The forest is mostly open, with a patches of mountain laurel, low bush blueberry and scattered maple-



(A) Typical rocky uplands; (B) Mountain laurel mix with oak, pine and hemlock. (C) Woolly adelgids on hemlock. (D) Juvenile's duskywing, a common early season butterfly in forested woodlands.

leaved viburnum. The herb layer is also mostly absent in these dry, rocky woods, with winter-green, bracken, Canada mayflower, partridge-berry and Pennsylvania sedge.

Near the property's northern boundary, nestled between two bedrock exposures, are the headwaters of a wetland that drains north. Nearly all the vegetation is native, but this wetland does include a few barberry and multiflora rose.

In general, however, this property has very few invasive non-native plants. The only other location with just a few is on the rocky slope that forms the access path on North King Street. The two species present—common buckthorn and garlic mustard—are low in number and could easily be controlled.



In spite of its small size, this small wetland supports about as many plant species as the 11+ acres of wetlands. Of particular interest in the wetland is the presence of red trillium, white baneberry, ironwood, jack-in-the-pulpit and wood anemone—all species that require sweeter soils to survive. This wetland drains directly to the Connecticut River.



One of the other small wetlands on the property, seen from a distance and then up-close. This area, in spite of its capacity to hold water, does not appear to be functioning as a vernal pool. Middle Path can be seen in the first image, skirting the edge of the property.

Forest Legacy Lands (36 Acres)

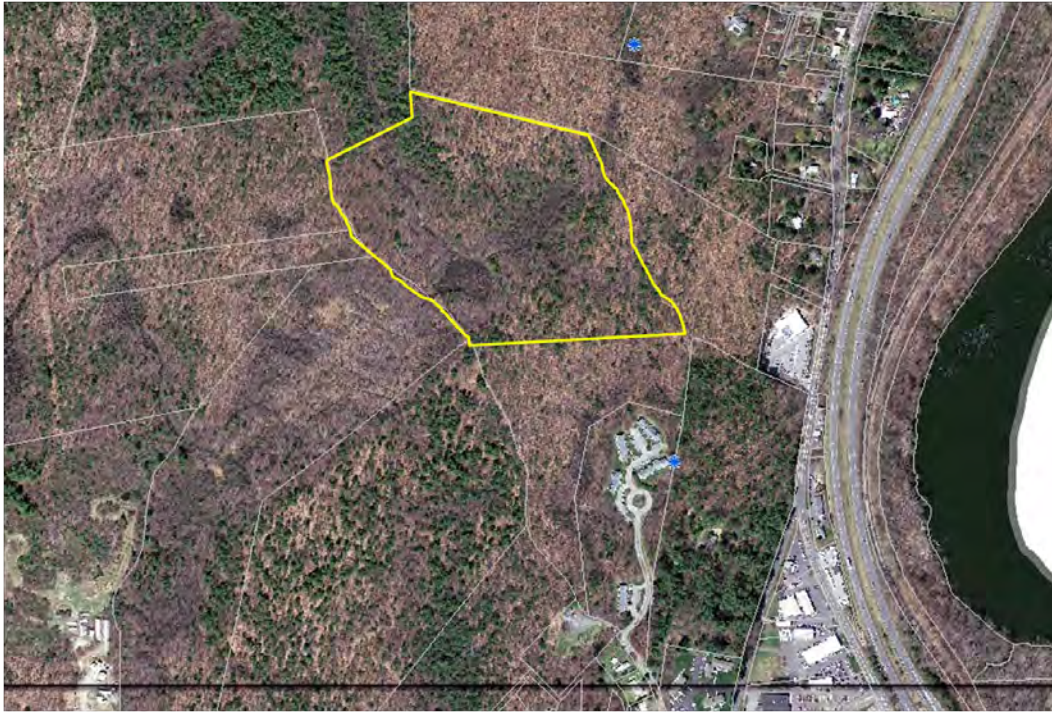
Bordered by Middle Path on the east and Boggy Meadow Road on the west, this 36 acre parcel was protected in 2012 using USFS Forest Legacy funds. Much of it is wetland, especially now that beavers have

invaded the former red maple swamp on the west side of Boggy Meadow Road, causing an even slightly higher water table in this 36-acre tract.

As elsewhere in the Fitzgerald Lake Area, this wetland includes a few scattered barberry and multiflora rose bushes, which could be removed in a single day.



(A-C) Views of the wetlands within the Forest Legacy Tract, including dense winterberry thickets and more open water. (D) The beaver impounded area, covered with a lens of pollen in the early spring. This wetland to the west of Boggy Meadow Road is still privately owned. During the last several decades, it developed into a red maple swamp, but all of the flooded red maple are dying now. There are some seriously large multiflora rose bushes growing in its western end.



This wetland eventually drains to the Connecticut River, first through Boggy Meadow, then into Pine Brook that runs behind the Lathrop Community. The blush of green in this image is a mix of hemlock and white pine.



The line of Boggy Meadow Road can be seen running north-south in this early aerial image. The wetland to the west is the “boggy meadow” that gives the road its name. How long it was ditched is unknown, but in 1902 forty-two acres were purchased by W.A. Bailey of Brown & Bailey Bricks. His workers did some ditching here and harvested the organic material to burn in the brick kilns, which were located near the present day high school and also nearby along the Connecticut River.

Marian Street

In 1984, when people in the Marian Street neighborhood banded together and purchased this 12-acre property, their hope was that one day it would connect with the Fitzgerald Lake Area, which at the time was 152 acres. Frankly, that hope seemed farfetched then or even in 1993 when I first surveyed this property. But in 1994, the 147-acre Cooke's Pasture property was purchased by the City and that long-

held vision of connectivity became a reality. Today, this once isolated outpost is connected to even more conservation land, and is now just one of many parcels that form the outer edge of the 800± acre Broad Brook Greenway.

& Vicinity (12+ Acres)



In 1984 the 12-acre Marian Street parcel (outlined in yellow) was isolated from the 152-acre Fitzgerald Lake property (also outlined in yellow). All of the land shaded in light orange is now protected, but was then still in private ownership and open to the possibility of development.

On the ecological front, there have also been changes during the last twenty years, most of them positive. Most important is the improvement in the overall health of the forest. During the 1993 survey, a major gypsy moth infestation was underway. Chewed bits of oak leaves littered the ground and the sound of dropping caterpillar frass was ever-present. By then, gypsy moth out-breaks had plagued Northampton's wood-lands for nearly a century. But sometime in the 1990s, a non-native pathogen that targets only gypsy moth caterpillars arrived in the area and virtually eliminated the gypsy moth problem. Ever since, gypsy moth populations have been reduced to very low levels.



The Japanese knotweed patch in early spring has been dramatically reduced. A few lone sprouts still persist and require additional control.

Another positive is that the patch of Japa-

nese knotweed, which was present in 1993, has been severely reduced thanks to a multi-year herbicide effort and BBC volunteers restoring native vegetation in the affected area. Elsewhere on the property, non-native invasive plants remain few and far between. Some garlic mustard and gill-over-the-ground have become established on the trail at the end of Marian Street, a patch of pachysandra has spread along the brook and a few barberry have established in the wetland near the property's western border. All of these could be removed by a small work party in less than a day.



Pachysandra mingles with skunk cabbage along the wetland bordering the brook within the conservation area.



(A) The narrow footpath begins at the end of Marian Street and connects to the network of trails. (B) At the beginning of the trail is a patch of violets, a species that prefers richer soils and may either be an indicator of sweeter soils from the clays of Glacial Lake Hitchcock or some fertilizer dumped by neighbors long ago. This is also where garlic mustard has become established. (C) The distinctive leaves of the orchid known as rattlesnake plantain, one of Northampton's more common orchids. It prefers the mildly acidic soils that dominate so much of this conservation area.



Although the 12-acre Marian Street property is dominated by dry, rocky uplands, near its eastern edge is a small wetland and Halfway Brook. The brook originates a few hundred meters to the north in a large, hummocky red maple swamp just west of Laurel Park. After flowing through this conservation area, it bends sharply to the east, and then flows under Route 5/10 and Interstate 91. On the other side of 91, the brook has cut a steep ravine, exposing overtopping deltaic sands from layers of varved clays laid down during Glacial Lake Hitchcock. It enters the Connecticut River near the Hatfield line.



A pipe from a nearby property owner's sump pump extends to the brook.

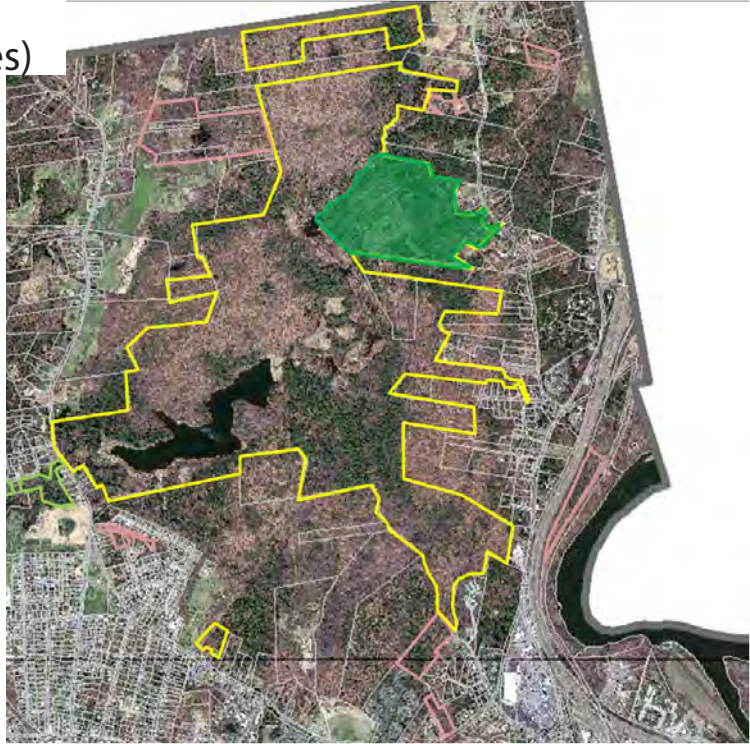


Silt and clay layers left behind during the era of Glacial Lake Hitchcock can be seen in Halfway Brook, which flows through the property.

Broad Brook Gap (formerly Kubosiak) (88 Acres)

Protected in 2012, the Kubosiak parcel was the largest acquisition since the 1994 purchase of Cooke's Pasture (147 acres). The property had long been viewed as a priority acquisition, not only because of its size and strategic location, but also because of its recreational value and ecological attributes.

When this parcel was acquired, it already included an existing network of trails within the property, which connected to the larger trail system. In 2013, the trails were augmented when BBC's trail committee built a new trail from Coles Meadow Road. The new trail links to the existing trails and also creates another entry point to the property. What is also nice about the existing trails is that they pass through or by many of the property's interesting habitats. All told, seven broad habitat types occur here, including one of the most unusual swamp forests in Northampton and a long section of Broad Brook. The property includes some of the best black bear habitat in the Commonwealth, important marsh habitat and it lies immedi-



The Kubosiak parcel in green.



Habitat Summaries

1. Rocky, upland, oak-dominated forests, with broad patches of dense hemlock stands (67 acres)
2. An extensive swamp forest (~14 acres)
3. Marsh along Broad Brook (~3 acres)
4. Broad Brook (~1 acre)
5. Rocky outcrops and boulder fields (~ 1 acre)
6. Perennial streams exiting the swamp forest (< 1 acre)
7. A small field maintained for wildlife (1 acre)

ately upstream from the known habitat of three state-listed freshwater mussels, including the Federally Endangered Dwarf Wedgemussel.

Another positive about this property is that, as of now, it has relatively few long-term management issues. ATV use is minimal and invasive plants are in low numbers. There are also only a few species, including scattered Japanese barberry and multiflora rose in the unusual swamp forest, Asiatic bittersweet along some of the trails, and glossy buckthorn and multiflora rose along the edge of the marsh bordering Broad Brook. One of the biggest concerns in terms of non-native plants is actually just off the conservation area.



An old yard waste dump lies just off the conservation area. At the edge, the scruffy margin are dead stems of Japanese knotweed. Several other non-native plants are in this area too, including Morrow's honeysuckle and autumn olive.

Growing on an old stump dump on the property that the Kubosiak's still own is a large and expanding patch of Japanese knotweed. If possible, it would be great to work with the current landowner to control it. This would require repeated treatments. In contrast, the other non-native plants on the conservation land could probably be controlled in a single day with a small crew of people cutting and spot-treating the stems.

Rocky Uplands

The vast majority of the property is dominated by dry, rocky woodlands dominated by different types of oak. The metamorphic rocks lie just below or at the surface, and the terrain is hilly, with occasional knobs and large rocky outcrops. In the upland areas, the soils are fairly shallow, well-drained and acidic—a fairly tough combination, which makes this habitat



Typical forest within the former Kubosiak property.



Rocky outcrops are common and provide good denning sites for porcupines.



suitable for a relatively small suite of plant species. In the canopy, the most common trees are red oak and chestnut oak. Red maple is also abundant and throughout the forest, you can find scattered white oak, white pine, black birch, and less commonly, beech. In areas where the soils are slightly moister, the oak forests give way to extensive stands of hemlock. These are easily visible on the aerial photo; hemlock forests cover nearly 30 acres of



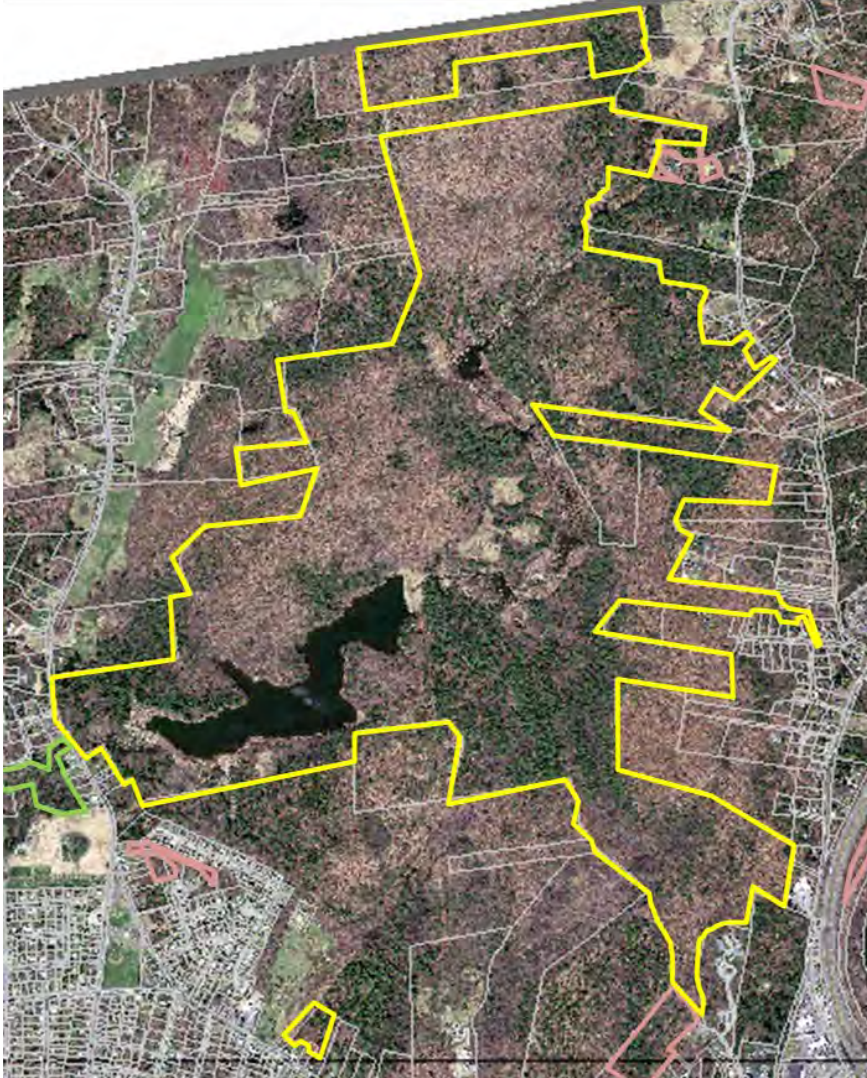
Pink lady's slippers can occasionally be found in the dry, acidic uplands. They bloom in mid-May.

the uplands.

The shrubby understory is similarly depauperate, and includes

mountain laurel, witch hazel, maple-leaved viburnum, low-bush blueberry, and occasional sassafras and ironwood. The understory vegetation is also limited in its diversity and virtually absent below the hemlocks and oaks. In the small, scattered openings, mountain laurel and witch hazel are common plants in the shrub layer, while the herb layer is mostly absent. When present, it includes wild sarsa-

In addition to a few impressive rock outcrops, this property also includes an large boulder field, bigger than any other known in Northampton, MA. The canopy includes a variety of deciduous trees (red maple, black birch, striped maple, mountain laurel, and witch hazel). There are few shrubs and the herbs are sparse. Canada mayflower, starflower, red trillium and shining club-moss, however, are commonly seen. In addition, the rocks are frequently covered with mosses and polypody fern. All of the larger outcrops and the boulder field had porcupine dens.



This aerial shows that stands of hemlock and white pine are along the borders of the lake and along the edge of the marsh. While pine has invaded the old pasture land, hemlock is mostly along the margins of the wetland areas. What will replace hemlock as the trees die from hemlock woolly adelgid is uncertain.

The images below show a wood road surrounded by hemlock near the clearing on the former Ku-bosiak property and a thick stand of hemlock along the edge of the marsh and Broad Brook. Note the absence of vegetation growing below.



parilla, hay-scented fern, bracken, Christmas fern and occasionally trailing arbutus and pink lady's slippers. All of this forest has been logged repeatedly.

Circumneutral Swamp Forest

In the central part of the property is a 15-acre swamp forest. Underlain by glacial silts and clays, this swamp forest supports an unusual flora. Underfoot, the ground is dominated by broad swaths of grass-like sedges (*Carex bromoides*) and skunk cabbage. In addition to more common species like sensitive fern, touch-me-not, marsh marigold, and goldthread, you can also find trout

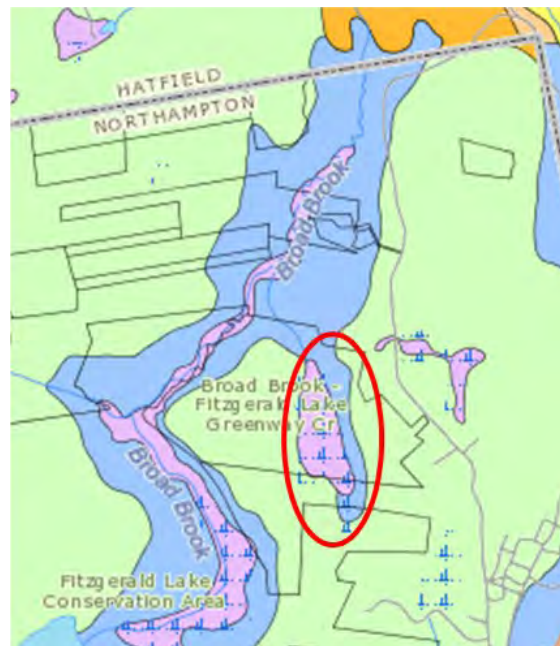


A small, quiet water stream flows through the wetland and ultimately enters Broad Brook.

lily, foam flower, common toothwort, miterwort, water avens, dwarf ginseng and even wild leeks. The few shrub species that do occur are common (ironwood, spicebush, mountain laurel on hummocks) and the canopy consists of scattered yellow birch, red maple, black ash and on slightly drier margins, hemlock.



A patch of miterwort (*Mitella diphylla*), a species found in rich mesic woods and known from only a few other locations in Northampton, grows in the rich swamp within the Kubosiak property.



The swamp's botanical richness is due to the underlying surficial geology, which includes fine silts and clays left behind by Glacial Lake Hitchcock (light blue). More recent organic materials (lavender) have been deposited on top of the silts and clays.



Foamflower (*Tiarella cordifolia*), another species that only occurs in rich soils, flowering in May in this unusual swamp. A nest of American woodcock, a species in decline, with two of four chicks.



The swamp forest is important habitat for forest-dwelling animals, like this barred owl. It is also a favorite haunt of black bears, especially in the early spring when the swamp's tender shoots of skunk cabbage provide an abundant food source. In some areas, almost every skunk cabbage plant shows signs of being nibbled and bear poop is common.



Unlike most swamp forests, the lack of a prominent shrub layer allows long-distance views and creates an almost park-like effect.

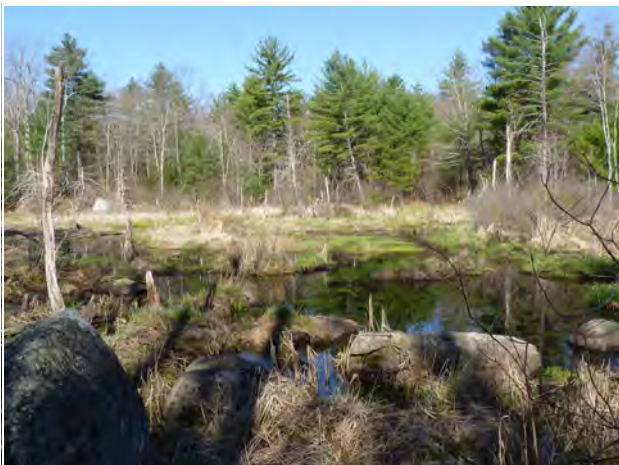
Although no rare plant species have been found yet, it is possible that future surveys will reveal unusual sedges or other plant species of significance.

Deep Marsh & Broad Brook

The marsh along Broad Brook includes a variety of wetland microhabitats. Along the wetted perimeter, there is a thicket of vegetation, including meadow-sweet, alder, silky dogwood, beaked hazelnut, dew-berry, multiflora rose, glossy buckthorn, poison ivy, and a mix of sedges, grasses and wildflowers. Further out from the shoreline, the vegetation varies depending on water depths—in the seepy muds grow forget-me-not, sedges and rushes, while on slightly higher hummocks, there are broad tangles of silky dogwood, steeplebush and meadowsweet. Closer to the open water, there are stands of cattails. Red maple is also common here, and along the margins, black birch, hemlock and yellow birch are frequent. Big boulders are also abundant.



These marshy wetlands extend well beyond the Kubosiak property's boundaries, continuing both upstream and downstream, and create an important habitat for migrating and nesting waterfowl. Wood ducks, mallards, kingfishers, tree swallows, bluebirds, song sparrows, Canada geese, and swamp sparrows are common to see and for many years, a small, great blue heron rookery (1-4 active nests) could



be found here. The herons abandoned the area in 2014, but they may return. It is also possible that American bittern, a state-listed species, would also use the marsh as a breeding ground.

In addition to birds, lots of wildlife use this area. Signs of otters, beavers and muskrats are easily found, and many frogs breed and live in these marshes. At least three state-listed freshwater mussels, including dwarf wedgemussel (Federally Endangered) occur downstream in Broad Brook and Running Gutter Brook. These surveys were conducted by Dave McLain between 1998-2002. The FLCA marshes help protect the water quality for the mussel habitat downstream.

Stream Habitat

Two perennial streams flow out of the swamp forest, one to the south, and the other (shown here) to the north. The northern stream, after meandering through the swamp forest, flows down a somewhat steep gradient, revealing small cobbles in the underlying till layer. False hellebore, marsh marigold, and trout lily grow along its banks along with a variety of liverworts and mosses (*Gnium*, *Thuidium*, *Climacium*). The stream provides habitat for two-lined salamanders, crayfish and a variety of aquatic insects.

Wet Meadow

The final habitat within this 88-acre parcel is a one acre clearing (seen here), which was maintained by the previous owner for hunting and wildlife observation. It would be great to keep the meadow open and possibly build a wildlife blind. At this time, there is no easy or approved



The channel of Broad Brook loses its definition in the section bordered by the former Kubosiak property.



This manmade clearing is a wet meadow, with sphagnum moss and a variety of wetland plants that depend on open sunny locations. Turkeys, bear, deer and many other animals pass regularly through.

access to the site that would allow for brushhogging. Goats might be another option.

408 Bridge Road (3.5 Acres)

Located behind a row of homes and a small condominium complex on Bridge Road, this small property is completely undeveloped—and even lacks a path leading in. Even more awkward is that the public access isn't clearly marked, which means that parking (and exploring) feels more like trespassing at this point. The parcel, however, is open to the public and for a certain kind of visitor—and especially for the immediate abutters—the small property has its charm.

After parking at the condominium, you just head from the edge of the paved parking lot into the woods. The site, as small as it is, is a patchwork of habitats. And although it is mostly level, it also includes a couple of rocky knobs (one of which was used historically as a very small quarry) and two small former farm ponds (now functioning like vernal pools).

The composition of the woods when you first enter the site includes a mix of hardwoods with scattered white pine. In this section, the hardwood species include sugar maple, black birch, hickory, white oak,



This small parcel is currently isolated from the rest of the FLCA holdings.



1: White pine stand
1b: White pine and old quarry site/rock knob
2: Mixed hardwoods
(red maple, sugar maple, black birch, black locust, white oak, hickory)
vp: Vernal pool (unmapped by MA NHESP)



Sixty years ago, the property was mostly forested.

and black locust, the latter a clue to the property's pasture history. In this part of the property, the forest floor included mostly leaf litter, but also true solomon's seal and Canada mayflower. There is also some winged euonymus growing near the edge of the property.

Moving to the rocky knobs, the vegetation shifts and includes some red oak, elm, black birch and beech. In the thin acidic soils on the rocks and nooks in between grow low blueberry, partridgeberry, Virginia creeper, marginal shield fern, spinulose woodfern, hay-scented fern, poison ivy and a few sedges (*Carex swanii*, *C. gracillima*).



Today the former clearing on the property's northern border, along the Fitzgerald family's pasture, is dominated by red maple in the canopy and a carpet of fern in the understory.

Beyond the rocks, the ground levels out and old cut stumps tell a tale of a past logging. The plants here include big swaths of hayscented fern (typical after logging), scattered hemlock, young black birch, witch hazel, and some small patches of mountain laurel. Other herbaceous plants include New York fern, starflower, wintergreen, Canada mayflower, ground pine and a small amount of Asiatic bittersweet.

In the property's northeastern corner, there is a grove of white pine, with little vegetation below. Not far away are the two small former farm ponds, which are now functioning as vernal pools. Their margins include a mix of wetland plants, including red maple, winterberry, meadowsweet, wild sarsaparilla,



The rocky outcrops, part of the long north-south trend of underlying mafic rocks, appear at the surface within this conservation area.



Above, the open forest below the mix of white pine, red maple and birch. Right, an impressive red oak near one of the bedrock outcrops.



3-40

sitive fern, marsh fern and cinnamon fern. A dug drainage ditch forms the boundary between the conservation area and pasture owned by the Fitzgerald family.

Within the pine grove, there is the thread of an old footpath. This leads back to the end of the pasture and presumably connects to the trail system that crosses the Fitzgerald property and connects to the larger network of trails.



One of the two small depressions that hold water and function as vernal pools.

Invasive Plants

In spite of its history as farm land, more recent logging, and abundance of edges, this small property has only three invasive plant species: Japanese barberry, winged euonymus and Asiatic bittersweet. All are in low numbers on the property. Some of the nearby woods (i.e. behind the Fitzgerald pasture) includes more Asiatic bittersweet.

Recommendations

- Certify vernal pools
- Discuss a connecting trail with BBC
- Clarify parking
- Hand remove invasive plants



Fingernail clams like these found in a different vernal pool may also be found in the small pools at 408 Bridge Road.

Section 2: Upper Drainage of Broad Brook

Featuring more detailed profiles of:

Burke
Sullivan
Girl Scout Property

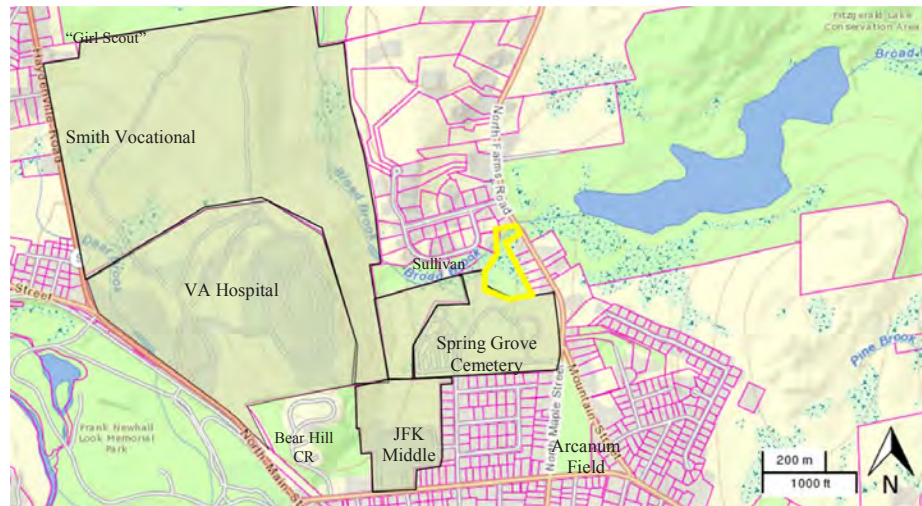
* For information on the Beaver Brook/Broad Brook Parcel
see the files on the Mill River Greenway

Burke

In the twenty years since I first explored the Burke Property, several changes have occurred, most of them slow and subtle.

The sand/compost pile on the neighboring Spring Grove Cemetery property that was eroding into the wetland two decades ago has continued to erode and today the lens of sediment extends slightly further into the

wetland. Similarly, the patch of Japanese knotweed that was growing on this same compost mound in 1993 has also spread, although not quite as far as might be expected given this species' capacity. In addition, the thickets of multiflora rose in the swamp and along the roadside are now bigger and more abundant, and so are the tangles of Asiatic bittersweet and Morrow's honeysuckle. Meanwhile, a few other non-native plants—moneywort, Japanese barberry, and coltsfoot—have also become established. Another troubling change is the arrival of hemlock woolly adelgid, which is slowly killing the prominent



Donated by Dorothy Burke in the 1980s, the 5-acre Burke Property is near several other properties that are either fully or semi-protected from development, including a few that are owned by the City (Spring Grove Cemetery, Arcanum Field, and JFK Middle School). In addition, the land to the north and west is owned by Smith Vocational and the Veteran's Administration. During the last twenty years, four more properties in the upper Broad Brook drainage have been added to the conservation roster (Sullivan, Girl Scout, Beaver Brook/Broad Brook Gap).



Japanese knotweed spreads out into the wetland, creeping out from the pile of sand, grass clippings and other organic waste.

stand of hemlock that dominates the surrounding slopes. So far, the hemlocks are all still alive, but they are thinner and in decline.

But not all the news is negative. On the positive side of the equation has been the protection of several properties adjacent to and in the vicinity of this property, including two parcels formerly owned by the Sullivan family, the CR on the Bear Hill development, the Girl Scout property, Beaver Brook/Broad Brook Gap, and many more parcels in and around Fitzgerald Lake.



What vegetation will replace the hemlocks and fill in the now-shady understory as these trees die?

Although controlling hemlock woolly adelgid in and near Burke is probably out-side of the realm of possibility, addressing the erosion problem and knocking back the invasive plants is do-able and important. Why? Because when compared to wetlands throughout the City, this site is unique. From a botanical perspective, it supports both common wetland plants as well as small populations of two plants that are rare in Northampton: alternate-leaved buckthorn (*Rhamnus alnifolia*), a shrub seldom found in the Pioneer Valley, and larch (*Larix laricina*). At present, the Burke area is the only known Northampton location for this native buckthorn, which typically grows in cold bogs and swamps further to the north or at higher elevations. It is also only the second-known, naturally occurring site in Northampton for larch, which also prefers cold peaty soils.

In addition to these two “northern” specialists, this seepy swamp also supports three other plant species typically found in



(A) A mix of white pine and larch in the wetland canopy. (B) Alternate-leaved buckthorn in full-bloom. Note its stunning, heart-stopping flowers.



colder settings—Canada yew, bluebead lily and mountain maple. The unexpected presence of these plants in Northampton is the result of the site’s geology. Several cold, clear springs flow out at the base of the sandy slope below the cemetery. The year-round cold temperatures of these springs prevent the soils from warming even during the summer, and thereby essentially simulate climate conditions that are more typical of higher elevations and latitudes.



(A) Skunk cabbage and sedges are common in the swamp forest. (B) Broad Brook flows through the conservation area. Stones and hunks of cement once created a small dam, now completely fallen apart. (C) Although much of the swamp forest is hummocky, there are open, wetter areas where seeps emerge that occur along the toe of the slope. (D) A steep slope, with the wetland below. Note the Canada yew growing in the understory.

The flat terrain to the south of Burke, including the cemetery, are a small lobe of an ancient sandy delta that formed when the Mill River flowed into glacial Lake Hitchcock 15,600-12,400 years ago. These sands were deposited over an older, impervious clay layer (also deposited during the tenure of Lake Hitchcock) and now, when ground water intercepts this clay layer, it is unable to percolate further down. The water instead flows along the top of the clay, emerging at the bottom of the slope as seeps and springs (hence “Spring Grove”).



The two plants shown here—marsh horsetail and a type of gooseberry—only occur in moist, circumneutral soils.



Saturated soil conditions lead to shallow root systems, making trees more susceptible to wind throw. Three trees can be seen in this image.

Burke from the air in 2014 and highlighted in yellow looks like nothing special. Wrong!

Note the compost pile for the cemetery (red arrow) looks like a small clearing in the forest. It has existed in this same spot for decades.





The spring was located just below and to the northwest of the stormwater drainage headwall and diagonally opposite the Parsons Crypt. Due to erosion along the hillside's western edge a large amount of riprap was deposited here in the 1990s. Unfortunately, so much traprock was put down that it covered the springs. Until then, you could go to the toe of the slope and see groundwater gushing up through the pure white sands. The springs could easily be restored by volunteers, assuming the proper wetland permits were received and the project was approved by the DPW.

PRELIMINARY CHECKLIST TO THE PLANTS OF BURKE

Woody Trees & Shrubs

White pine
Hemlock
Larch
Canada Yew
Red maple
Sugar maple
Striped maple
Mountain maple
Slippery Elm
Green ash
Yellow birch
Black birch
Poison sumac
Ironwood
Hop hornbeam
Witch Hazel
Mountain Laurel
Common elderberry
Speckled alder
Silky dogwood
Witherod
Northern Arrowwood
Winterberry
High bush blueberry
Pinxter flower
Chokeberries (*Aronia melanocarpa*; *A. arbutifolia*)
Serviceberry (sp.)
Spicebush
Multiflora rose
Morrow's honeysuckle
Asiatic bittersweet
Japanese barberry

Ferns

Cinnamon fern
Interrupted fern
Christmas fern
Clinton's Shield fern
Marginal Shield fern
Hayscented fern
Sensitive fern
Lady fern
Field horsetail
Marsh horsetail
Scouring Rush

Herbaceous Plants

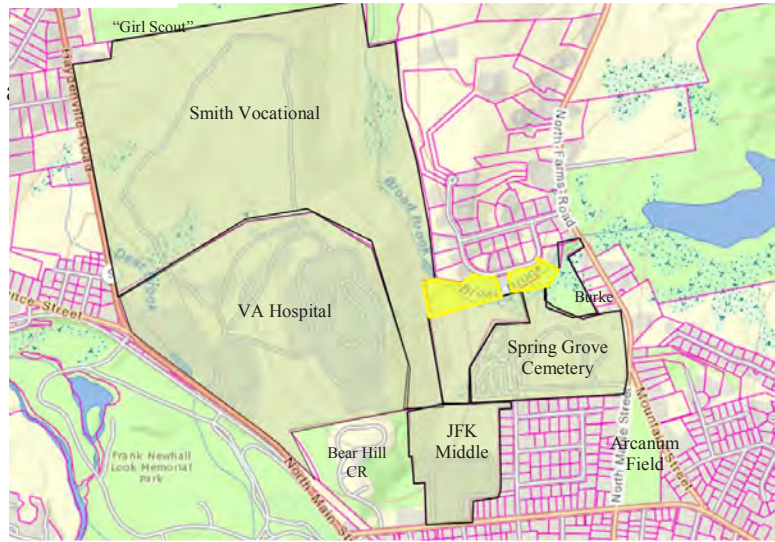
Sedges (various)
Skunk cabbage
Jack-in-the-pulpit
Foamflower
Hellebore
Canada mayflower
Bluebead lily
Starflower
Swamp dewberry
Marsh marigold
Toothwort
Goldthread
Bindweed (sp.)
Forget me not
Common meadowsweet
Water avens
Virginia creeper
Bedstraw (sp.)

Partridgeberry
Spotted touch me not
Swamp saxifrage
Golden saxifrage
Turtlehead
Moneywort
Fringed loosestrife
Purple-flowering nightshade
Rough-leaved goldenrod
Coltsfoot

Sullivan (total 6.14 Acres in 2 properties)

Abutting Burke is a 2-acre parcel that was acquired in 2011 and not far away, a 4.14-acre piece that was acquired by the City in 2008. Both properties were purchased from the Sullivan family, which had owned the land since 1975.

Both parcels are fairly small, but they had been listed in the City's Open Space & Recreation Plan for a decade as "high priority." Not only were they within the Broad Brook greenway, but the larger parcel also includes part of a beautiful loop trail that begins behind the JFK Middle School. Furthermore, their protection also filled in the two remaining pieces within a jigsaw puzzle of otherwise municipally-owned land.



The land, formerly owned by the Sullivan family, is highlighted in yellow and surrounded by other city-owned land, including property held by the JFK Middle School, Smith Vocational, Spring Grove Cemetery, and the Burke Conservation Area. Although the City's ownership doesn't necessarily confer open space protection for the other properties, it does provide some additional control over the future uses of these abutting parcels.

That said, the properties are not without their management issues. Invasive plants present the greatest long-term challenge and include the usual cast of characters: multiflora rose, Asiatic bittersweet, Japanese knotweed, and garlic mustard. In the short-term, there are two places where neighbors are dumping lawn clippings and yard waste, which should stop. There is also a drainage outfall on the Veteran's Administration property that has created a large, eroding gully and is washing sediments across the Smith Vocation land into the Sullivan property and reaching Broad Brook.

Ownership History & Ecology

The former Sullivan land represents three separate lots that were once part of a 1960 subdivision known as Brookwood. When it was approved, the subdivision included 47 lots on 50-acres, but in the intervening decades, many of the lots were reconfigured and only about two dozen homes were ultimately built.

Prior to the land's development, this area was part of a farm that had operated since at least 1900 (and

probably earlier). Interestingly, between 1901-1933, the Abercrombie Farm, as it was then known, was co-owned by Wallace Allen. Allen owned several farms in the area, including the 350-acre spread that he sold in 1935 to Harold K. Fitzgerald and now forms the core of the Fitzgerald Lake Greenway.

In the 1950s, the larger of the two Sullivan lots was a mix of pasture and forest, while the smaller lot was mostly wooded. Both lots abutted a much larger pasture. By 1965, by the time the first road (Country Way) was punched in, that clearing was beginning to grow in, and today, as is true elsewhere in Northampton, that spot

and adjacent wetland have significantly more invasive plants than the land that was wooded in the 1950s and 60s.

Vegetation Patterns

Of the two parcels, the four-acre property is the most diverse and includes a mix of former pasture/young forest, circumneutral swamp, a stretch of Broad Brook and upland woods.

Beginning at the edge of Morningside Drive, there is an edge of young trees, wildflowers and ferns—as well as a sizeable pile of lawn clippings. The bordering trees include sugar maple, red maple, white ash, tulip tree, cottonwood, white pine, and no





surprise, some invasive plants—namely, Asiatic bittersweet, multiflora rose and a few stems of Japanese knotweed.

Entering the forest, the land drops off from the roadside into what was a clearing fifty years ago. The trees are still young enough here that the understory is quite shaded, and the plant composition changes in response. Now instead of jumpseed and lady fern, the most abundant species are Christmas fern, Virginia creeper, and unfortunately multiflora rose and Asiatic bittersweet. In fact, the forest floor is awash with bittersweet seedlings! In contrast to the understory plants, the canopy mix are similar to those along the roadside edge and include big-toothed aspen, red maple, white pine, black cherry, red oak and an occasional tulip tree. Ironwood is common in the shrub layer, as is some poison ivy.

Continuing to the west and skirting the edge of the wetland, the forest composition shifts dramatically as the old clearing is left behind and the older forest begins with an impressive grove of white pine. On the other side of the brook, the land slopes upward and hemlock mixes with white pine to form a shady glade. This area also includes occasional, but good-sized red oak and yellow birch. The understory here

is sparse, but includes foamflower in wetter areas (especially near the brook) and partridgeberry. The till soils are right at the surface and the slope is very rocky. Witch hazel and mountain laurel are scattered in the shrub layer. The walking trail that begins behind JFK Middle School passes through this section, parallels the edge of the wetland and Broad Brook, and then loops back to the school.

West of the Sullivan parcels, the forested hillside is owned by Smith Vocational and at the top of the hill, by the Veteran's Administration. Although entirely forested with hardwoods, this area has been damaged in recent years from excessive erosion caused by a drainage outfall from the VA. The pipe empties out onto the Smith Vocational property and over the years, it has scoured and eroded the hillside. This scouring has opened up the area to a number of non-native plants, including Asiatic bitter-sweet, Japanese knotweed, winged euonymus, and privet. In addition, it appears that sediments from the erosion are actually reaching the conservation area, and during periods of intense overland flow, probably entering the Broad Brook. By redirecting some of this water, the problem might be abated. Left untended, the problems of both erosion and invasives will increase.

Returning downslope, the land bordering Broad Brook is part of a larger, seepy wetland that extends into Burke. This portion of the wetland, however, is more open and dominated by grasses (*Glyceria striata*, *G.*



The gully, with giant till boulders exposed, looking down gradient across Smith Vocational property and toward the Sullivan Greenway



The manhole cover above the headwall for the drain from the VA.

canadensis), silky dogwood, sensitive fern, and spotted touch-me-not. Other common wetland plants in this area: speckled alder, red maple, and yellow birch in the overstory, and horsetails (*Equisetum arvense*, *E. sylvaticum*), cinnamon fern, crested shield fern, a variety of sedges, skunk cabbage, turtlehead, fringed loosestrife, swamp candles, joe pye weed, goldenrod, and asters.

Fifteen thousand years ago, both of these parcels were underwater but close to the shoreline of Glacial Lake Hitchcock. Much of this area was buried by a lobe of sand, part of the northern edge of a large delta that was deposited in the glacial lake by the Mill River.

Since the lake's disappearance 12,000 years ago, Broad Brook has eroded away most of those sands and now flows across and on top of the glacial silts and clays. There is still enough deltaic sand within this area, some of it still slowly eroding off the hillsides to the south, that in this stretch Broad Brook has sandy swales and point bars.

This series of images shows different views of the wetland, including the sandy point bars and Broad Brook, which isn't very broad at this point!



In 2011, the City had sufficient funds to acquire more land from the Sullivan family. Originally two separate lots, this piece encompasses a little more than two acres. Since its purchase, it has been put under conservation restriction, which is held by the Kestrel Trust. In 2012, the Kestrel Trust hired biologist Charley Eiseman to complete a biological inventory and provide baseline documentation. Little can be added to Eiseman's well-done report, which is briefly summarized here.

During the construction of Morningside Drive, the land close to the road was extensively altered and still bears the telltale signs of disturbance, with mounds and uneven topography. In this zone, the canopy "is dominated by early successional tree species such as big-toothed aspen, cotton-



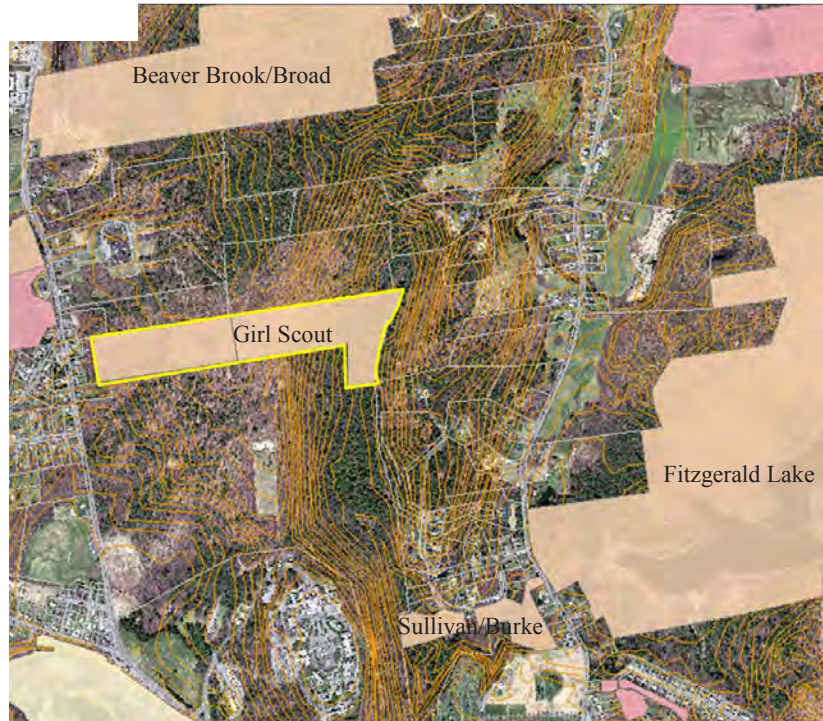
wood, black locust, paper birch, black birch, white pine, red maple, and black cherry. Near the west end, red and white oaks with a patchy hemlock understory hint at what a more mature forest would look like here. There are two large tulip trees at the southwest corner (Eiseman, 2012). This is the part of the property that also has the most invasives, and like the larger Sullivan parcel, it also has multiflora rose, Asiatic bittersweet, Japanese knotweed, plus Norway maple, privet, honeysuckle, garlic mustard, celandine, and even a variety of escaped garden plants (daffodils, myrtle).

From the upland area, the land dips gently to the wetland. This swamp is part of the same wetland previously described and a small section of Broad Brook wiggles through it before entering Burke. Its flora is similar, not only in terms of the native vegetation, but also the non-native species. In this section, multiflora rose is particularly nasty and abundant.

“Girl Scout” (40 Acres)

Protected in 2011, this wooded conservation area is almost equally split between two different Mill River watersheds, with the western half draining to the Mill River in Northampton and the eastern half draining to the Mill River in Hatfield. The eastern portion is part of the Broad Brook watershed and the valley of Broad Brook is hands-down the most beautiful part of the property. In this section the stream meanders quietly through a wooded floodplain, bordered by a steep ravine with towering

hemlocks and mature hardwoods. The forest continues like this for nearly half a mile downstream, extending from the Girl Scout property and into land owned by Smith Vocational, where the most spectacular trees occur. Old growth and big tree expert Bob Leverett calls this stretch of woods a “jewel.” Although it does not qualify as “old growth,” Leverett considers it a “mature forest” and according to his measurements, it has the greatest concentration of old trees in Northampton. Many are 150 years old and some are even older. These include tulip trees, oaks, and of particular note, black birch. Leverett says that this part of the Broad Brook Valley has the greatest quantity of mature black birch that he has seen in western Massachusetts. Many of the black birch exceed 100 feet in height, and the tallest black birch in the Connecticut River Valley is found here.



The long, linear “Girl Scout” property, seen here in relationship to other city-owned conservation land, measures about 500 feet wide and more than 3,000 feet long. Note the steep, hemlock-dominated ravine along Broad Brook.

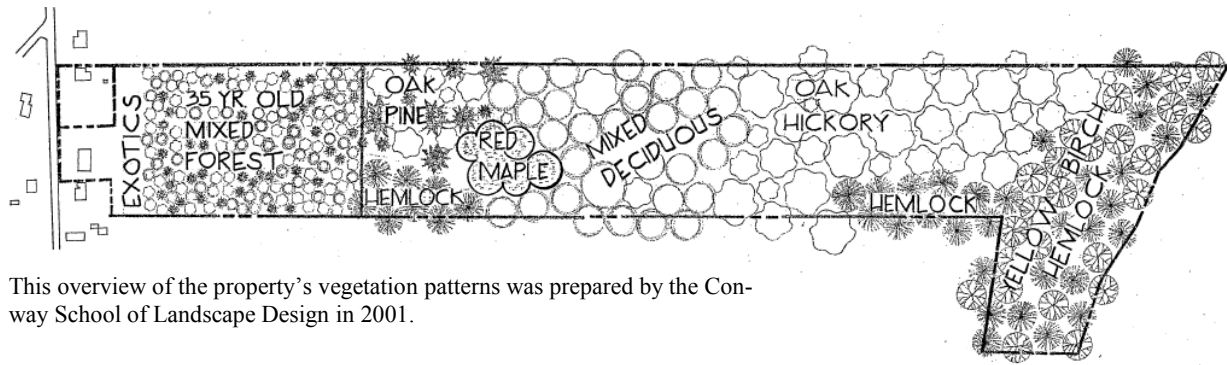


A footpath leads through the impressive forest that borders Broad Brook.

Beyond these age and measurement distinctions, this forested valley is visually one of the most remarkable natural areas I have explored in Northampton. So far, no rare species have been found here, but the area has been mapped by MA NHESP as “Living Waters Critical Supporting Watershed.”



(A) Broad Brook winds through a narrow, flat floodplain that is often wet and swampy. This area was part of a long narrow inlet when Glacial Lake Hitchcock was here, which helps explain the richer flora, including species like toothwort, trout lily, foamflower and patches of sedge meadows. (B) As a large block of forest, this area is valuable for wildlife. In addition, this deep ravine functions as a deer yard in winter. As a result, these stems are heavily browsed. (C) Another view of Broad Brook near the property’s northern boundary. As part of a large block of uninterrupted forest, it is valuable to wildlife. The ravine is a winter deer yard and the stream corridor is used by a variety of animals. So far, however, no rare species have been found and at this point, none of the property is within any kind of priority habitat as delineated by the MA NHESP. (D) Although this area seems remote and wild, a well-used trail lies just to the east and remnant strands of barbed wire indicate that the land nearby was once cleared and used for pasture. A tiny piece of Broad Brook can be seen behind the tree.



This overview of the property's vegetation patterns was prepared by the Conway School of Landscape Design in 2001.

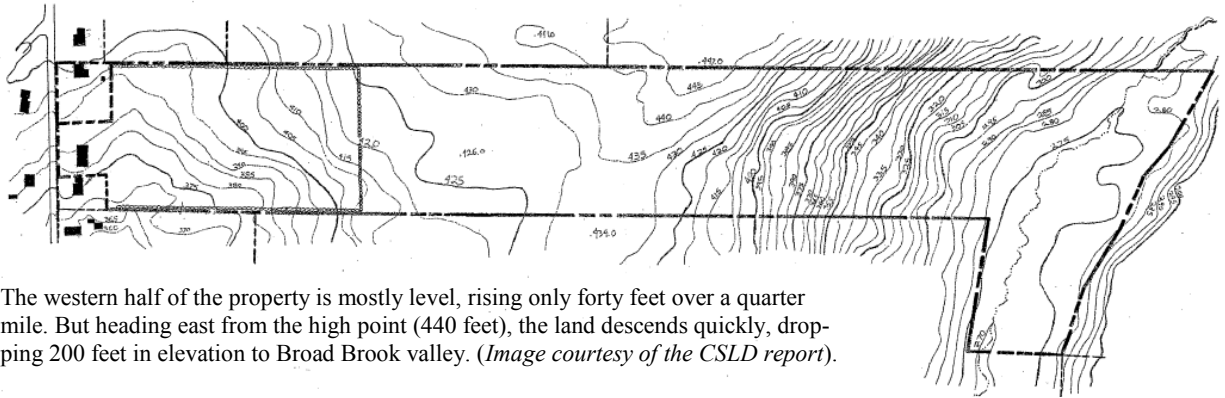
In comparison to the Broad Brook valley, the remainder of the property is a bit underwhelming. As you climb out of the valley and move from east to west, the land flattens out and the woods are younger and not as diverse. The canopy is dominated by hardwoods (oaks, hickory, black birch, and red maple) as well as a couple of hemlock stands (*see vegetation map above*). According to the Conway School of Design's master plan, the patch of woods dominated by "oak and hickory" burned in 1978. More recently, that patch, as well as the area shown as "mixed deciduous" was logged and today there are lots of resprouts and cut stumps. Fortunately the timber job did not continue into the Broad Brook valley.

Near the center of the property, in the area shown as "red maple," is a single, isolated certified vernal pool. It is small (~50' wide) and shallow and used by wood frogs, spotted salamanders, spring peepers and other vernal pool species. The vernal pool is located on the west side of the watershed divide so its waters flow to the Mill River in Northampton.

Continuing to the west is an impressive stone



(A) Looking down in to the Valley of the Broad Brook. This forest was thinned in the past. (B & C) Cut stumps and resprouts are common in the uplands above Broad Brook.



wall that measures 5-6 feet across, four feet high and is several hundred feet long. It marks an historic property boundary and the forest on the other side is dramatically different.



(A) A view of the vernal pool and (B) an image of a portion of the impressive wall.

Although this westernmost end of the property is now entirely wooded, sixty years ago, it was still open hayfield/pasture. By 1965, the field had been abandoned and was beginning to grow in with white pine. Aside from old aerial photos (next page), the evidence of that former use is obvious in the landscape. Not only are the trees younger, but the species composition—a mix of red maple, white pine, gray birch, big-toothed aspen and black birch—also reveals that the land was cleared in the recent past. What's more, this is the part of the property where most of the invasive plants are found. Young Asiatic bitter-sweet is the most abundant and widespread, but there are also a few Japanese barberry, multiflora rose, and privet as well as small patches of Japanese knotweed and garlic mustard.

In 1952, the western quarter of the property was still a cleared field, but by 1965, it had been abandoned and began to grow in with brush and pine. The triple fields to the north are now occupied by Linda Manor. South of the property is the large field owned by Smith Vocational. In both images, the trace of wood roads is evident.





Two views of the young forest in the western part of the property.



Northern running pine, a type of clubmoss, covers large areas of the forest floor in the former hayfield/pasture.

An healthy stand of tall white pine occur along the property's south-western boundary .

The intermittent stream/wetland drainage near the property's west-ernmost boundary.

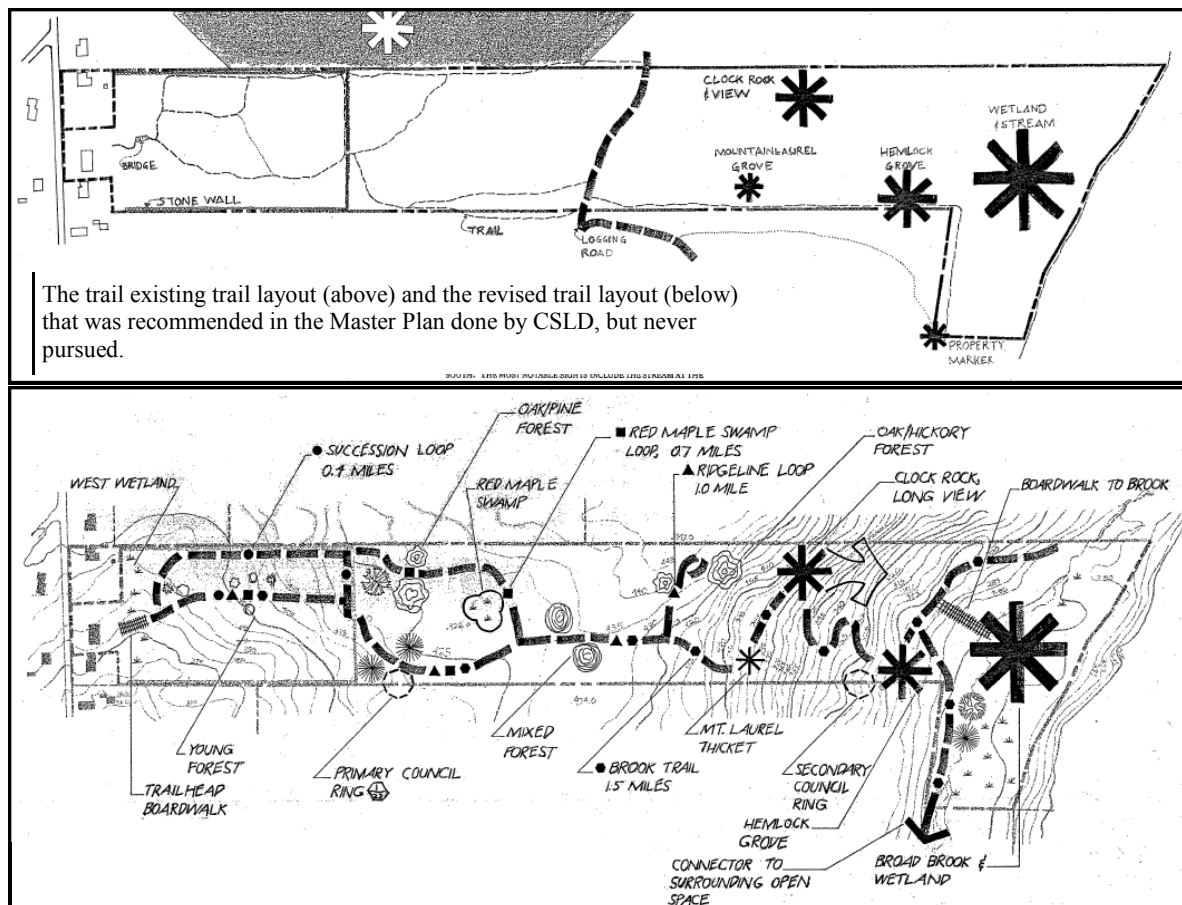


A strand of barbed wire provides another hard clue about the site's land use history.



Ownership History

The Girl Scouts of Western Massachusetts (GSWM) acquired the property in 1966 from the Moodie family, which had owned the land since the 1940s. The site became the GSWM's regional headquarters and in 2001, the organization purchased the abutting home in order to expand their office space. That same year the GSWA hired the Conway School of Landscape Design (CSLD) to develop a master plan for the wooded acreage (the "Back 40"), which by then already had a well-established network of trails (see below). The subsequent plan from CSLD included a slightly new trail design layout (see below) and a "cottage" for outdoor programming and meetings. These ideas, however, were never implemented and in 2009, the GSWA consolidated its central and western Massachusetts operations and relocated its headquarters to Holyoke. After selling the house and lot that it had acquired in 2001, the non-profit subdivided the property, carving out the former headquarters and two acres of land and selling forty acres of now backland to the City for conservation (23 acres for \$23,000 in 2011; 17 acres for \$17,000 in 2012). A conservation restriction was subsequently placed on both parcels. It is held by the Kestrel Trust, which prepared a baseline monitoring report in 2012. (This document, along with the master plan prepared by the CSLD, is available electronically in the City's public file cabinet.) In June 2014, the GSWM sold its former headquarters to a private family, ending 50 years of ownership in Northampton.



Access

Because of the way the land was subdivided, the conservation area now truly is the “Back 40,” meaning that there is no longer any public access to the property without crossing private property. At least not yet. There are, however, three options, all of which involve the cooperation of Smith Vocational.

Smith Vocational School received this land in 1958 from the VA Hospital in order to use it for its demonstration forestry program. The land wraps around the VA hospital buildings and also includes a large chunk of woods to the north, which borders the Girl Scout land and includes road frontage on Route 9. One of the potential access routes begins opposite the driving range. It is an old wood road that joins another trail that passes through the Girl Scout property. This may be the simplest and easiest access, in part because it includes the best parking option.

Two other wood roads begin behind a set of VA buildings; one heads due north, skirting a field owned by Smith Vocational and connecting to an older, well-maintained trail that passes through the middle of the Girl Scout property and continues north. A second wood road branches off to the east. This wood road drops down a hillside, passes a dammed pond on Broad Brook and then loops north. This trail borders the eastern edge of the Girl Scout property and is a good option for exploring the ravine and winding Broad Brook. ATVs and snowmobiles use portions of this trail.



Vegetation Patterns

Based on past land use, hydrology and topography, the property can be divided into seven different vegetation zones, four upland and three wetland. The following descriptions coordinate with the vegetation map.

Upland Areas

1a. The property's former hayfields (~ 5 acres) are now covered with a mixed canopy of white pine, hemlock, black birch, red maple, big-toothed aspen and occasional black cherry and white ash. An abundance of young white pine occurs in the understory, and ironwood, gray birch and chestnut are also common. The ground cover is often lacking, but there are broad patches of northern running pine, as well as Canada mayflower, starflower and wild sarsaparilla. Asiatic bittersweet (mostly small) is found in this portion of the property, especially near the wetland and trail head behind the former Girl Scout headquarters. A small patch of Japanese knotweed (about 100 stems) and a few Japanese barberry and multiflora rose grow near the trailhead and may be on the abutting property (former headquarters). These non-native species should be removed ASAP as they are still possible to control.

1b. Straddling a tumbled down stonewall, this patch of woods is also located in the former hayfields but includes only hardwood species and no white pine. A nature trail wiggles through this section of the property and loops through 1a.

2. A grove of white pine mixed with hemlock borders the property line and bends along the impressive north-south running stone wall. Almost no understory plants grow in the deep shade. A few scattered sugar maple occur in this area. Along the southern boundary are the remains of another stonewall and barbed wire.

3. Nearly level, this area was cut during the two decades as a shelterwood cut. It is dominated by red oak and red maple, with an abundance of white oak, black oak, pignut hickory, black birch and occasional white pine and big-toothed aspen. Some of the oaks have spreading crowns, indicating that they began growing up in an old pasture. The trees are mostly young. The shrub layer is sparse, with low-bush blueberries, hazelnut, and maple-leaved viburnum. The herb layer is also scant and includes Pennsylvania sedge, bracken, partridgeberry, and wintergreen. There is also some flowering dogwood, sassafras and small patches of mountain laurel.

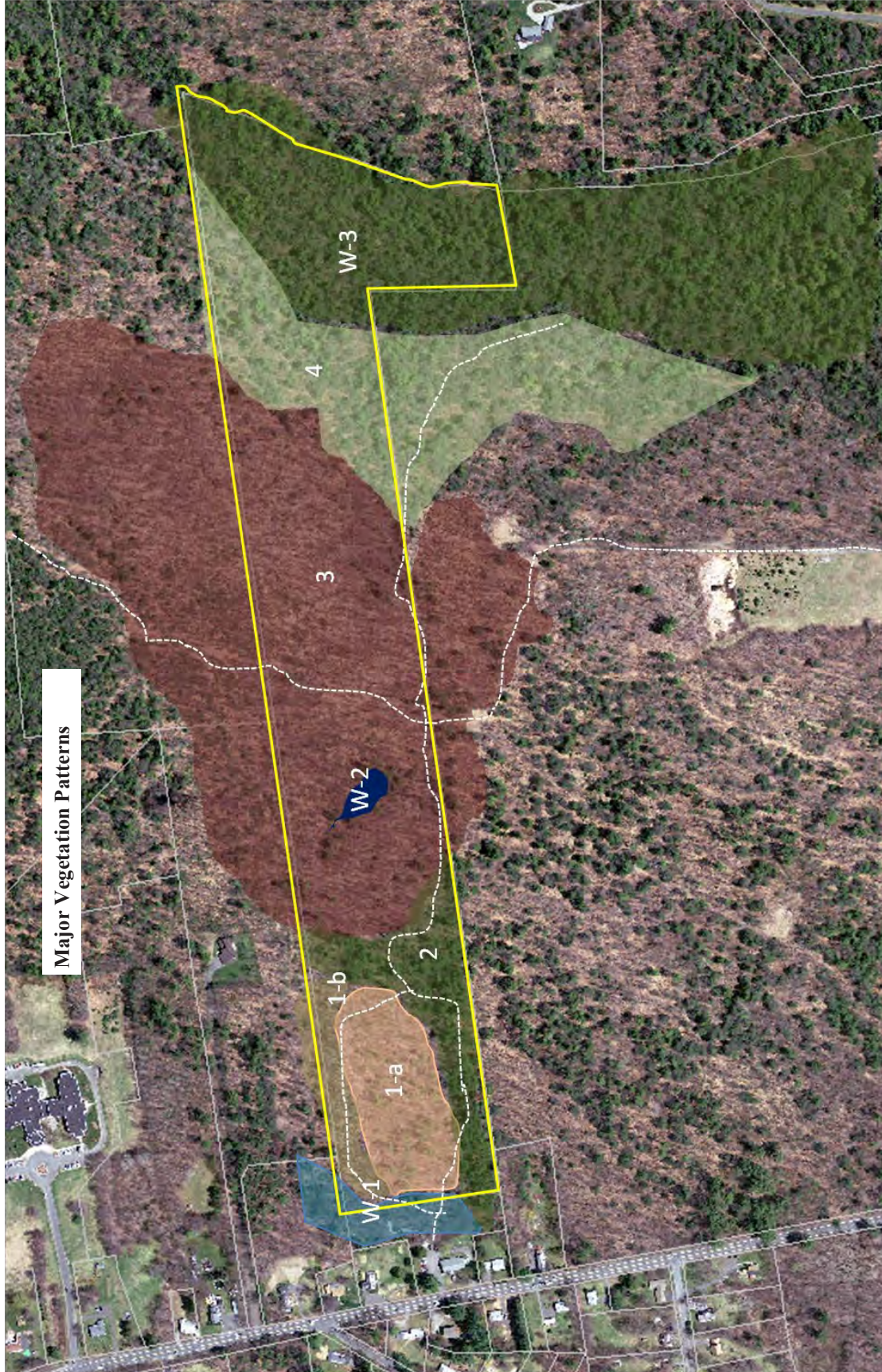
4. A transitional forest on the steep slopes that includes a mix of hemlock, red oak, hickory, white pine and red maple in the canopy. Mountain laurel and witch hazel form a dense understory. This area, like the one above, was logged in the past. There are some rocks and occasional seeps along the slope. The ground layer is thin, but in wetter areas and seeps there is sensitive fern, cinnamon fern and Christmas fern. A few sugar maple too.

Wetland Areas

w-1: A seepy/stream that emerges along the northern boundary line and forms the headwaters to Deer Brook, which ultimately flows through Look Park and into the Mill River. The rocks are moss covered, with Virginia creeper and poison ivy common in the understory. Above red maple is the dominant species, but elm is also common. Where the Girl Scout trail crosses this wetland is the patch of Japanese knotweed.

w-2: This perched wetland is a certified vernal pool. It is surrounded by red maple, with hemlock, white pine and scattered winterberry, mountain laurel and high bush blueberry. Mossy hummocks topped with goldthread are common. It is only about ten inches deep at its maximum, and mostly only a few inches deep. Only wood frogs were observed. The fauna here is depauperate, probably because of the pond's small size and hydrology.

w-3: The jewel of the property is the forested wetland along Broad Brook, which meanders back and forth, and is joined by springs. It's verdant and glade-like, with moss-covered boulders and towering hemlocks. Red maple and black birch are also common in the canopy, and the shady understory includes scattered patches of mountain laurel, poison ivy, goldthread, spinulose woodfern, Christmas fern, partridgeberry, and foam flower. It feels like another part of the country. Moving east from the stream, yellow birch and spicebush are common and there is a lot of mountain laurel. There are grassy, sedgy seeps with cinnamon fern and gold thread and white oak, red oak, yellow birch, and tulip trees grow on margins of the swamp. A broad trail is located along the border and the abutting property has been recently logged. Moving back to the stream and heading north to the property's border, the hemlocks give way to a more open hardwood swamp, with a diverse understory of herbs. Within this hemlock swamp forest and along the stream, Japanese barberry, multiflora rose and moneywort are occasionally found.



Major Vegetation Patterns

- | | | |
|--|--|--|
| 1-a: 50 year old forest with abundant pine, invasives present | 1-b: Young hardwoods along old stonewall | 2: White pine & hemlock |
| 3: Young, cutover hardwoods (oak, hickory, red maple) on level terrain | 4: Oak, hemlock and red maple on slope | |
| w-1: Red maple drainage | w-2: vernal pool | w-3: hemlock and yellow birch dominated forest, with abundant mountain laurel. |

Recommendations

- Work with Smith Vocational and/or the VA to provide for public access point(s) to this property.
- Work with the new owners of the former Girl Scout headquarters to control the Japanese knotweed and other invasives in and along the property's western edges.
- Develop an agreement with Smith Vocational to set aside the ravine as a no-cut zone.
- Consider treating some of the larger hemlocks to protect them from woolly adelgid.
- Conduct a more detailed natural history inventory along the stream corridor for rare species (esp. dragonflies).
- Organize a field walk to the Broad Brook valley.

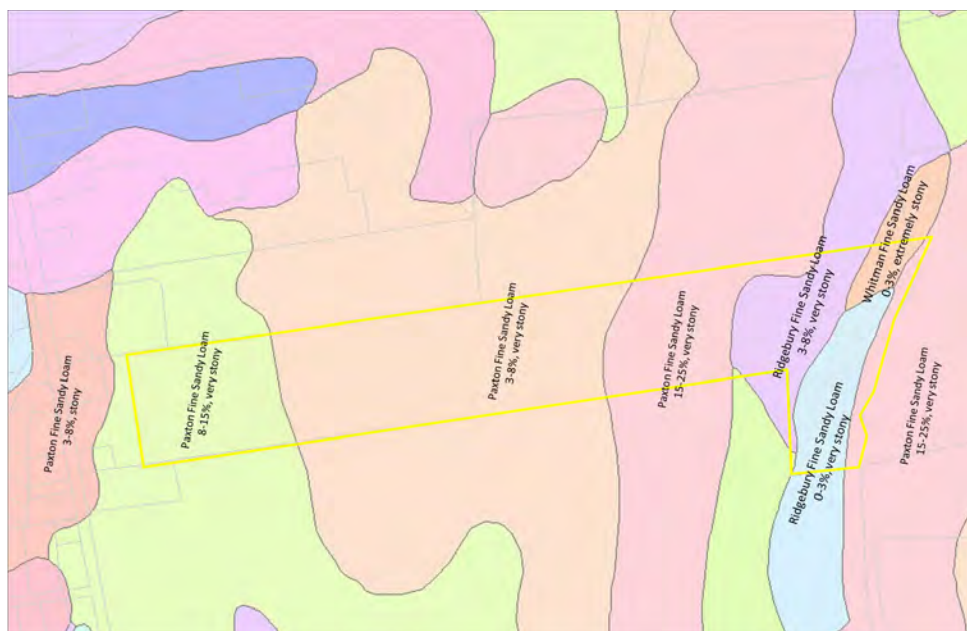


Massive burls on an oak in the deciduous forest that was heavily logged. My clipboard rests on one of the burls for scale.

Sources:

Levine, J. and A. Schlechter. Conway School of Landscape Design, 2001, Back 40 Master Plan. 36 pp.

Eiseman, Charles. 2012. Baseline Documentation for Kestrel Trust. 31 pp.



All of the soils on the site are sandy loams (stony to extremely stony) and were derived from till. Bedrock is close to the surface in the eastern/central part of the property.



A few final images from the Broad Brook-Fitzgerald Lake Greenway

4 A Natural History of the Burts Bog Greenway





Overview of the Burts Bog Greenway

Were it not for the wetlands associated with this conservation area, this would be one of the least valuable and most abused properties within the City's conservation holdings. Even now, forty years after the last bulldozer left, the 15-acres that make up the core parcel still appear altered and beat-up, with filled-in wetlands, rocks in jumbled piles, mounds of dirt, and a powerline cutting along one edge. What's more, the scruffy vegetation—including many invasives-- that has since grown up doesn't make it a very inviting patch of woods and the configuration of the conservation area is such that you're always in view of homes. When all of these factors are combined, it's not surprising that only few of the neighbors have gotten involved in the property's management since the City took it over as conservation land in 1990.

On the other hand, what makes this conservation area interesting—and important—are not the strips of land between Florence Road, Ellington Road and Crestview Avenue, but the 20-acre wetland complex to the south. Two acres of this wetland were included in the original 1990 acquisition, and since then, another 5-acre parcel was donated. Aside from its important ecological value, this wetland complex has a complicated geologic history and a fascinating human story—and so far, both are still unfamiliar to most Northampton residents.

What follows is the natural history story of this conservation area, along with an update on the changes since 1993.



One of many mounds of fill and topsoil that were pushed around the property and then abandoned. The powerline transmission pole is in the background, while Asiatic bittersweet and Morrow's honeysuckle are visible in the foreground.



From the top of the mound in the photo above, you can look south over the vast wetland, seen here in the fall 2014.

Since 1993

Since examining this property twenty years ago, several important changes—some positive, others negative—have taken place at Burts Bog.

On the positive side, thanks to a donation of land, this conservation area is now five acres bigger and even more important, the donation includes the core of

Northampton's only bog—the most ecologically significant part of the adjacent wet-

land complex. Although the parcel is not contiguous with the original 15 acres and has no public access, it supports plants and animals that are found nowhere else in Northampton and a few that are also regionally uncommon.

In addition, during the last two decades, field work by others has revealed the importance of the adjacent western woodlands for wildlife. A private study on the population size and movements of box turtles in the vicinity was conducted, and three vernal pools were certified. Because of these findings—along with the 1993 discoveries of unusual species in the bog—the entire conservation area and much of the surrounding land now fall within “Estimated Habitat for Rare Species.”

Another positive change was the restoration of an acre of wetland habitat at the end of Ellington Road. This northern edge of the wetland had been seriously degraded during the 1970s by the subdivision's developer. In 1999, with the help of a



The original property taken in lieu of back taxes wraps around the development, while the new donation is located further south. The bright blue asterisks further west are certified vernal pools.



The entire conservation area, as well as land to the east and west, are within “Priority Habitat for a Rare Species”, as created and defined by MA Natural Heritage & Endangered Species Program. Data from MA GIS.

USFWS grant, roughly 1,400 tons of rock and fill were removed and the wetland was returned to a mix of marsh and open water.

In conjunction with that project, the city came up with a long-term solution to alleviate the excessive flooding caused by beaver activity in the marsh. Beavers had moved into the wetland in the early 1990s and their dam, built near the outlet at the end of Ellington Road, had raised both surface water and groundwater levels. The home next to the wetland, which had always suffered from high groundwater problems, began to experience even more serious flooding. In 1992, the City DPW had tried to solve the problem by installing a pipe through the beaver dam. This lowered the pond level, but only briefly because the beavers kept plugging the pipe with vegetation and debris. In 1999, the City installed a different device called a Clemson beaver pond leveler. Unlike a solid pipe, a Clemson Leveler uses a cage around a pipe that has been drilled with dozens of 2-inch holes. When installed, the water flows through the holes, but because the intake area is spread out along the pipe (versus a single entry), the beavers don't hear the sound of running water or detect the flow of the current. This reduces their dam-building response, and in fact, flooding has not been an issue since the Clemson Leveler was installed (pers. comm., Ellington Road resident Peter Soderberg)—even now when beavers are active in the wetland.

On the negative side of the equation—and there are some serious negatives—invasive plant species have taken off on most of the property. Back in 1993, only



The wetland area, as seen in 1999 prior to restoration, and in 2001, following the removal of rocks and fill and planting with native wetland vegetation. *From 2001 report submitted by New England Environmental to the City of Northampton, and available at: <http://city.northampton.ma.us:8080/weblink8/0/doc/485927/Electronic.aspx>*



The pipes for the Clemson leveler eventually outlet on the other side of a fence into a dropped inlet. From here the water flows underground through a pipe until it is briefly daylighted near the intersection of Brookwood Road and Crestview Avenue, before flowing back into another pipe that angles across the road to Indian Hill, where it joins the waters of Sandy Hill Brook.

three species—Morrow’s honey-suckle, multiflora rose, and purple loosestrife—were present. Today all three are more common, the purple loosestrife especially. In 1993, it was found almost exclusively within the marshy stretch below the powerline right-of-way, now it has spread throughout the right-of-way, into the cattail marsh, throughout the restored wetland area and is even growing on the periphery of the bog mat. Although 10,000 (or so) leaf beetles (*Galerucella pusilla*, *G. calmarien-sis*) were released as a biocontrol at this site in 2005, it does not appear that the beetles have had much, if any, effect.

What’s more, Morrow’s honey-suckle, multiflora rose, and purple loosestrife are no longer the only problems. About 14 years ago, someone—perhaps a well-intentioned neighbor—planted half-a-dozen (or more) highly-invasive

autumn olive around the edge of the “restored” wetland. The plants were in the ground in 2001, and by 2013, they had grown into bushes so big that it was almost impossible to see or access the wetland from Ellington Road. Furthermore, in the intervening years, dozens of new autumn olive bushes have seeded in on their own around the wetland margin. Last fall, a Northampton High School student organized a community service day to remove the autumn olive, and on a single Saturday morning, more than forty volunteers spent five hours cutting, chopping, and hauling load after load to a brush pile behind an abutter’s home. That same morning, the crew also removed many other non-native plants growing on the old fill



Pretty yet pervasive, purple loosestrife has taken over a lot of the restored wetland and during the last 20 years, spread throughout much of the cattail marsh and expanded below the powerlines.



piles and upland edges around the marsh near the end of Ellington Road, including enormous multiflora rose bushes, dozens of Morrow's honeysuckle, a similar number of glossy buckthorn, plus lots of Asiatic bitter-sweet.

Another new (since 1993) and worrisome invader here is glossy buckthorn. Not only is it growing throughout the red maple forest between

Ellington and Florence Roads, it also has established along the edges of the wetland and is growing on the higher hummocks in the marsh and on the border of the bog. If it is not controlled, it might also establish in the bog itself.

The last and final piece of negative news is that most of the people in the neighborhood still don't seem to know much about the 15-acre conservation area. The shift in ownership from an absentee landowner/developer to conservation land didn't seem to make much of a difference. Several continue to dump their yard waste along the margins, and over the years, a considerable amount of trash has been dumped on the property, making for an unsightly mess.

The remainder of this document describes some of the "new" findings about the property's geology, history and vegetation patterns.



A small part of the crew of volunteers cutting and lugging Autumn olive, loaded with berries, in the fall of 2013. *Photo courtesy of Keith Davis.*



Glossy buckthorn is now widespread throughout the forested portion, along the wetland edges and occasionally on the higher hummocks.

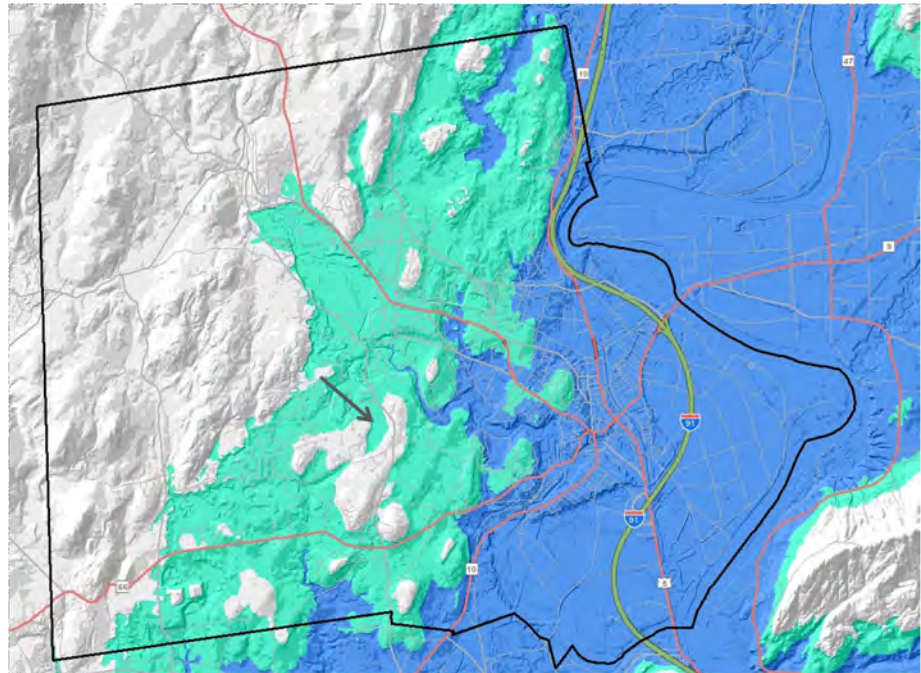
Geological and Human History

The first edition of *Rediscovering Northampton* described why this wetland complex, and the bog in particular, is here at all. That scenario remains the most likely explanation, and to briefly recap, the conditions needed to create a bog were laid down 15,600-12,400 years ago, during the era of Glacial Lake

Hitchcock. At that time this area was a well-protected cove on an island just off lake's western shore. The cove itself was probably created by a large block of buried ice. Calm water conditions in and near the cove/ice block allowed fine clay particles to settle out from the lake's milky waters.

When the level of Lake Hitchcock dropped and the block of ice melted, the underlying clay lay-

ers created an impervious lining, trapping rainwater and intercepting groundwater in the basin-shaped depression. With an impermeable bottom, restricted water flow and little nutrient input, the conditions were set for the development of a bog.



This GIS-created image shows the two levels of glacial lakes in Northampton, with the higher Glacial Lake Hitchcock in turquoise and the lower glacial Lake Hadley in blue. White areas are islands, and as this image reveals the wetland (arrow) was a cove in an island. Roads are included here to help with orientation, as is the boundary of Northampton. Courtesy Northampton DPW-GIS.

This coming year the validity of that scenario will be examined when a team of researchers from UMASS Department of Geosciences surveys the wetland's sub-surface using ground-penetrating radar. Their findings will provide a map of the underlying bedrock and will likely refine our current understanding of the wetland's geology and origin.

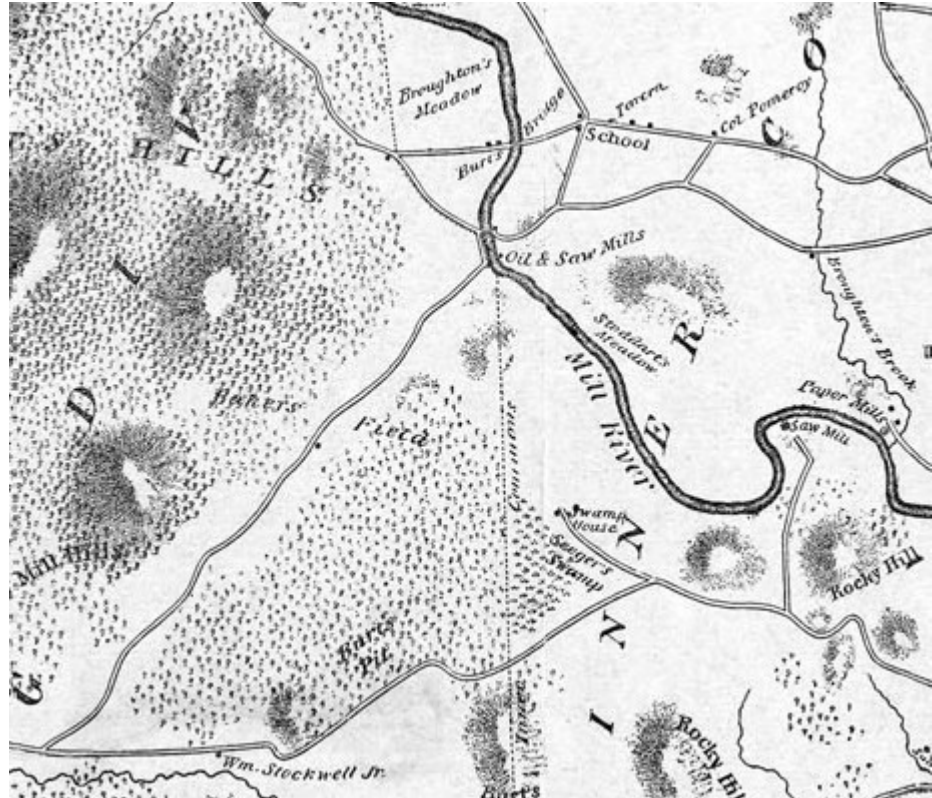
Human History

Since the first edition of *Rediscovering Northampton*, more information about the history of human activity has been uncovered and a revised version is offered here:

Based on historic maps and Sheffield's *History of Florence*, this wetland is the true "Burt's Pit," and was named after Gaius Burt, an "industrious" farmer who moved to Broughton's Meadow (now known as Florence) in 1798 and was its third full-time resident. Burt lived in Broughton's Meadow for 35 years before moving to Easthampton, and during those decades he accumulated 100 acres in Broughton's Meadow and became a part or

full owner in several other properties and ventures. Exactly how his name came to be associated with this property is unclear; he may have been the original owner, or he may have been the first (or at least the best known) farmer to mine peat here. During his active years of farming, a veritable "peat fever" took hold in the region, and the use of peat as an excellent soil conditioner and amendment was widely promoted in farming publications. As a major farmer in the area, Burt and his sons probably mined peat to use on their own farm, and possibly sold it to others. By 1831, however, the "pit" was no longer named after Burt. It was known as Seeger's Swamp.

Five years after the Burt family moved away, the next notable owners of the peat bog property arrived in the area--David Lee Child and his wife, Lydia Maria Child. By then, Lydia was well-known for her



The 1831 map shows Burt's Pit further west and the conservation area as Seeger's Swamp. According to Sheffield, Seeger's Swamp is the original Burt's Pit. That the map is wrong makes more sense, especially given the closer location of Burt's farm to the bog and the fact that this map also has another error, showing Baker's Field off what is now Ryan Road, when it was actually located in the bend of the river and what is now Maine's Field. That said, the true location of Burt's Pit might never be resolved as a much smaller wetland does exist today in the area where the 1831 map notes "Burt's Pit."



David Lee Child

<http://www.accessible-archives.com/wp-content/uploads/2013/10/David-Lee-Child.png>

writing, and she is still remembered today for her now-famous Thanksgiving poem “Over the river and through the woods.” Both she and her husband were ardent abolitionists and they moved to Florence in 1839—partly because of its progressive reputation and also because of David’s plan to grow sugar beets and produce slave-free sugar. For a few years, Child, along with two business partners, grew “large fields of beets in the meadows.” Although they were successful in extracting sugar, they couldn’t make a profit and after a few years, Child gave up on beets and according to the Daily Hampshire Gazette, he next “entered upon the manufacture of peat” and “bought the farm in the west part of town then known as the Seeger swamp farm, but since that time called the Child farm” (DHG, September 9, 1874). But like his beet operation, Child’s peat operation failed too, as “the material provided was unfit for the purpose wanted and the attempt to put it on the market was soon abandoned.” In 1849, the Childs left the area permanently.

After their departure, a small part of the bog was purchased by Dr. Edward Evans Denniston, then a prominent physician in Northampton. He had arrived just a few years earlier, in 1846, and after a brief stint at the Round Hill Water Cure, he built his own water cure establishment called Springdale on a large farm that was located where Cooley Dickinson Hospital now stands (The street called “Denniston Place” near the hospital is named after him). Until the Civil War, his “Home for Invalids” was extremely successful and on the 1873 map, Denniston’s name appears as the owner of several pieces of land in Northampton and Baystate. Presumably Denniston’s interest in the peat bog was to use the peat as a soil condition on his own farm next to his hospital. By the late 1870s, however, Denniston was in financial trouble and this may be when he sold his bog acreage to the next owner--Northampton State Hospital.

For many years, the hospital mined peat at this site and hauled it to their gardens on Burt’s Pit Road. According to author Charles Sheffield, the practice of mining peat was still common in the late 1890s and, in describing the Burt’s Pit area, Sheffield noted that “large quantities of muck are annually dug in this region.” In 1955, the State Hospital sold their small part of the bog to Leonard Day, who resold it in 1959 to the Gutowski family. The Gutowski’s held on to the land until 1994, when they donated the very same 5.25 acre parcel to the City’s Conservation Commission. Today the bog’s mining history is still etched in the lines of its old drainage ditches, which are still obvious on today’s aerial photographs. The large ponds, including the one in the conservation area, were created when the peat was excavated and hauled away.

Aside from a few other small in holdings, most of the wetland area—aka Burt’s Pit—aka Seeger’s Swamp---aka Child's Farm-- was owned in 1916 by Edward S. Bottum. A life-long resident, Bottum

owned quite a bit of property in this vicinity, including land on the other side of Florence Road (including Bottum Road). When he died in 1925, his heirs sold some of the land to Adolf and Alice Mizula and the rest (which included most the wetland and upland area along Florence Road and Burt's Pit Road) was sold in 1948. During their tenure, the Mizula's operated a dairy farm and gradually sold off a series of lots. In 1970, they sold a large piece of land along Florence Road (including part of the wetland) to Kay-Vee Realty Company. In 1974, they sold the remainder to John Skibiski, a realtor who was acting on behalf of Kay-Vee Realty.

By then, Kay-Vee Realty had been working in the area for more than a decade and had already built hundreds of homes in Easthampton. After acquiring this property, they wasted no time getting their plans in order. Within months, they had submitted a proposal for a 101-lot subdivision. It was called Brookwood Estates, and less than a year later, the planning board approved the project in full.

Ultimately about 90% of this development was built. What changed the original plan was the passage of the Wetlands Protection Act and the realization that there were some serious drainage problems with some of the new homes—like flooded basements and cracked walls. Ultimately parts of two roads and twelve houses were not developed, including four that would have been right in the wetlands.



The conservation area parcels in 1952. Note how forested the area is and how open water is difficult to detect (in contrast to the photo below.)



The old drainage lines are clearly evident in this photo taken during the 1971. It also appears that the fill and piping of the brook has caused the water level in the wetland to rise. *Courtesy of UMASS Archives.*

Once the City shut down Kay-Vee from building in the wetlands, the company stopped paying taxes on the property. In 1990, the City took the remaining land-- the unusable scraps of the former subdivision-- in lieu of back taxes and named it the Brookwood Marsh Conservation Area.

Vegetation Patterns

In the twenty years since the first natural history survey, the broad vegetation patterns within the conservation area have remained generally the same. Aside from the arrival of non-native plants, the powerline is still a mix of lawn and tangled shrubs, the former pasture/hayfield is still dominated by red maple, the disturbed wetlands between Crestview and Ellington remain a jumble of old fill piles and younger trees.

The biggest change in vegetation has been in the 21-acre wetland complex. Because of beaver activity and the installation of the Clemson leveler, the water level in the wetland is now slightly higher than it was in 1993, and that change has transformed the vegetation patterns. Twenty years ago, the main wetland was covered with a vast expanse of young red maple and the cattails were restricted (more or less) to the area under the powerlines. Out in the peat bog, there was a slightly higher “island” that even supported a few white pine. Today, the red maple and pine are gone and the cattails have spread dramatically.

Where the red maple once grew, the sphagnum mat is now open and sunny. The wettest portions are toward the center and are covered with the arching stems

of false loosestrife, scattered meadowsweet, marsh fern, sundew, and sedges.

West of the main drainage ditch, where the peat is a little drier, the vegetation shifts and includes more woody shrubs (winterberry, meadowsweet, steplebush, chokeberry). Back in the bog portion of the wetland,

the sphagnum mat is now the shrubbier vegetation from



Twenty years ago, this area was covered with 3-5 foot red maple. Today it is an open sunny mix of water willow, purple loosestrife, cattails, sundews, orchids, sedges and grasses. Pickerelweed (lavender flowers) grow along the open water margin.

Uplands

1: Powerline ROW: Periodically cut back, with portions cleared for lawns

2: Brushy tangle, now dominated by Morrow's honeysuckle

3: Old fill, oak, autumn olive, various non-natives

Wetland

W-1a: Red maple dominated with understory mostly of Morrow's honeysuckle and glossy buckthorn. Some trash and dumping of yard waste

W-1b: Red maple dominated, lots of fill piles, some cottonwood, alder and abundant non-natives, especially Asiatic bittersweet, Morrow's honeysuckle

W-2: Alder, glossy buckthorn, winterberry thickets

W-3: Cattail dominated, with abundant purple loosestrife

W-4: Water willow, meadowsweet, etc. on sphagnum mat

W-5: Slightly higher wetland—more shrubs

W-6: *Calamagrostis* grass, mixed with cattail, steeplebush



Detailed Vegetation Descriptions

15-Acre Parcel (See Vegetation Map)

Powerline Swath

The powerline right-of-way runs along the back border of the homes on east side of Ellington Drive and cuts along the eastern edge of the wetland. Roughly fifty feet wide, it was laid out and constructed in 1939. In the late 1960s, new transmission lines were installed and every few years, the understory vegetation is cut back.

Within the powerline ROW, the plants vary depending on the hydrology and activities of the abutters. For instance, at the northern end, several neighbors have converted the powerline ROW/conservation area into lawn and a few use it as a place to dump their yard waste.

Further south the right-of-way transitions to an overgrown tangle and a messy mix of Morrow's honeysuckle, multiflora rose, glossy buckthorn and goldenrod, along with autumn olive, Asiatic bittersweet, and grape. Black locust is on one of the old fill piles.

Along the wetland edge, the shrubby mix transitions to include speckled alder, silky dogwood and steeple-bush, but multiflora rose and glossy buckthorn continue to dominate.

Further to the south in the wetland, the vegetation below the powerline is mostly cattail, with an abundance of purple loosestrife. Grasses (*Calamagrostis canadensis*) and bulrushes are common too.



The powerline, looking north from off the property and near the area with reed grass, *Calamagrostis*.

Marsh & Open Water (formerly Red Maple Swamp/Beaver Pond)

This part of the conservation area includes the 2.5 acres of marsh and open water that lie along the northern fringe of the 21-acre wetland. A loop trail (on old fill piles) leads between two smaller pockets of open water and along the edge of a longer stretch of open water and provides a view



across the expansive marsh. As noted earlier, this wetland complex is dramatically different in composition and appearance from twenty years ago. The red maples have died and have been replaced by a mix of sedges, bulrushes, marsh fern, false loosestrife, sundew, and meadowsweet. Purple loosestrife grows throughout this area and has invaded the cattail marsh, the restored wetland, and occurs along the edges of the old fill piles.

Disturbed Swamp Forest

Fifty years ago, this area was dramatically altered by bulldozers. Rock piles, mounds of fill and a scruffy

The leaves of water willow glow red in the early autumn, transforming the slightly drier section of the wetland to a carpet of color.



Clockwise from the top: Pickerelweed along the edges of the open water; water willow in bloom; a mix of Joe Pye weed and purple loosestrife; a type of orchid known as nodding ladies' tresses (*Spiranthes cernua*).



mix of plants is the uninviting legacy of that past activity. The understory is covered with Morrow's honeysuckle and Asiatic bittersweet is widespread. The trees include gray birch, quaking aspen, cottonwood and red maple.



Jumbles of rocks and fill piles left behind by the developer are common within the red maple forest. During the last twenty years Morrow's honeysuckle (with yellow leaves) and glossy buckthorn have become the most common shrubs in the understory.

Bog Habitat (5.25 Acres)

The true bog begins in the southern half of the wetland complex and includes a mix of open water and thick, floating mats of sphagnum moss. Although this parcel has no public access, by skirting along the edge of the woods, you can access the bog. A good visual cue to figure out when you've reached the property boundary is a cluster of paper birch. At the margin of the wetland, there is a large mound of rock and fill that was dumped here in the 1970s. As unnatural as it is, it now provides an excellent lookout across the bog, and at the moment, its jumbled boulders also include a cavity that beavers are currently using for shelter. There is also a fallen tree trunk near the base of the mound that is big enough to walk out on and check out the plants on either side.

But beyond the lookout and the tree trunk, if you want to actively explore this portion of the conservation area, you will need to visit during the winter



A photographer uses the fallen trunk to go a little further out on the bog mat and take pictures of rose pogonia orchids (*inset*).



Overview

when the ice is solid, or carry in some kind of small boat...or be ready to get very, very wet. The 5.25 acres includes a mix of open water, sphagnum mats, and brushier margins.

Open Water

Based on the lot lines, the open water areas in the bog appear to be artifacts from the 19th century peat mining operations. The open water areas have some spatterdock water lilies, but are otherwise free of vegetation.

As a fish-free setting, the open water ponds now function like a large vernal pool and in April and May, spring peepers, wood frogs, spotted salamanders and gray treefrogs breed in these waters. The bog's open water also provides habitat for some unusual dragonflies, including the impressive spatterdock darner (*Aeshna mutata*). Painted turtles, spotted turtles and snapping turtles also use this part of the wetland.



Without a boat, the open water is best seen from the top of the old fill pile.

Peatlands (Sphagnum Mats)

Dominated by broad expanses of open sphagnum moss, the peatlands support about two dozen



Although no longer on the state's list of protected species, spotted turtles are rarely found in Northampton.

species of plants that have evolved to cope with these water-logged, low oxygen, nutrient poor, and highly acidic conditions. These include sheep laurel, cranberries, sundews, two kinds of orchid, cotton grass, and a mix of grasses and sedges. In areas where the peat is slightly higher and drier, there are young red maple, and a few pathetic white pine, as well as winterberry, chokeberry, meadowsweet and high bush blueberry.

Invasive plants are currently not widespread, but they are a worry here. A good-sized patch of *Phragmites* appears to be spreading into the marsh and bog margin, and purple loosestrife is scattered along the margins as well. Glossy buckthorn is also increasingly found along the margin, including several large specimens growing on the mound of fill that serves as a look out.

Recommendations

From my perspective, this little-known, seldom-used conservation area is one of the most interesting within the City's entire conservation portfolio. It has some problems, and some of them (invasive spe-



Once the ice is solid, winter is a good time to explore the bog mat. Not only is it less damaging to the mat, but the views and colors of the sphagnum are spectacular.



Cranberries (top) are common on the sphagnum mat and can be found all year round. Round-leaved sundews are another common plant, but are only visible in the growing season. These leaves are dotted with trapped insects.

cies, dumping troubles) are more serious than others (poor signage, limited trails).

One project that would help to raise the profile of this conservation area and also help build neighborhood awareness/ community support is the construction of a wildlife blind. It could be located at the southwest corner at the end of the existing mowed trail and much like the blind at Fitzgerald Lake, it would give people a new vantage point to observe the wetland and the wildlife it supports.



With more awareness, a friends' group might form and they could help address other tasks, such as:

Short Term

1. Install a sign at the edge of the conservation area (versus further back where it is now located.)
2. Create and install a kiosk that describes the property's natural history (geology, ecology and human history).
3. Improve the existing wetland trail with better bridges and boards to create a loop.
4. Inform abutters about the conservation area to try to reduce/eliminate the practice of dumping lawn clippings and extending backyards.



This is the only place in Northampton where cotton grass grows. A member of the sedge family, its bright white seed heads stand out in the fall.

Long Term

1. Control invasive species (autumn olive, glossy buckthorn, Asiatic bittersweet and Morrow's honeysuckle) around the Ellington Road access.
2. Work with National Grid to fund the release of another round of purple loosestrife leaf beetles to try to manage the purple loosestrife more effectively.
3. Work with the neighboring landowner to limit the spread of *Phragmites* near the bog.
4. Secure permission from the abutting owner to create a trail that connects with existing trails and includes a spur to the mound of fill that overlooks the bog
5. Acquire the abutting western woodlands.



Autumn olive in fruit.



The *Phragmites* stand is on both private and city-owned land.

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Lichens are pollution-sensitive and this is one of a few places in Northampton where this branched *Usnea* lichen is found.

A Natural History of the Sandy Hill Lots



Sandy Hill Lots



Sandy Hill Lots

Two lots, totaling less than an acre, were acquired as part of the land once held by the Kay-Vee Realty Company that was taken in lieu of back taxes in 1990.

Brookwood Drive Lot

Only a $\frac{1}{4}$ acre in size, this tiny lot is mostly a marshy wetland, fed by water from the large wetland complex at the end of Ellington Road. The lot includes a mix of quaking aspen and red maple, with a mowed margin and a scruffy edge with multiflora rose and bittersweet.

The water reaches this site via a pipe and is briefly daylighted on this lot, before being routed back into a pipe, which angles across Brookwood Drive and empties into Sandy Hill Brook.



The wet drainage and swampy ground on the Brookwood Drive lot.

Sandy Hill Road Lot

Located at the intersection of Sandy Hill Road and Brookwood Drive, this mostly open lot (0.41 acres) is underlain by sandy loam and crossed by a wide trail that leads to a more extensive network of old wood roads and foot paths. The trail is rutted and reveals the underlying sands which give Sandy Hill its name.



The path cuts across the Sandy Hill Road lot, exposing the sand below. At the edge of the lot are young white pine and oak. Behind this is a large patch of pine/oak woods that are laced with trails.

The open areas of the lot are dominated by grasses, goldenrod, blue curls, dewberry and *Polytrichum* moss, while around its borders there is a mix of pine, oak, black locust, staghorn sumac and sweetfern. So far, there are not many invasive plants, but Asiatic bittersweet is growing near the road edge along with several autumn olive and mul-tiflora rose bushes.

What makes this parcel interesting and valuable is its continuity with Sandy Hill, one of the largest remnants of pitch pine/white pine/oak forests in Northampton. About 140 acres in size, this patch of woods abuts the Brookwood Marsh Conservation Area and to the west, backs up to dozens of houses in the Ryan Road neighborhoods. The property has a patchwork of owners. While some portions have been left idle for decades, other areas have been logged in the not-

too-distant past. These have grown

Top Photo: *Polytrichum* moss grows in abundance on the sandy substrate along the disturbed edges of the conservation area.

Middle Photo: A mix of pitch pine and white pine dominate the forest. There is almost no vegetation in the understory.

Bottom Photo: An open clearing dominated by little bluestem. Unless there is a fire or mowing, the young pine in this photo will replace this clearing within the next 25 years.



up into a mix of oak, birch and red maple, while the older forests include mixed stands of pitch pine and white pine, with scattered oak. There is also a small clearing, dominated by little blue stem, which is apparently a popular area for parties for local teens.

The protection of this adjacent 140-acre patch should be a priority because of its special ecological values (pine barrens, habitat for box turtles, presence of vernal pools, and good nesting habitat for turtles), its recreational values (network of trails), and its contribution to groundwater recharge for the Clark Street wells.



A. The sandy trail that crosses the city-owned lots becomes a beautiful wood road once you enter the forest. Other trails branch off from it and connect to the nearby neighborhoods.



B, Scarlet oak is common in these woods.



C. An old, abandoned culvert, probably left behind by Kay-Vee Realty, the developers of Sandy Hill Road, Brookwood Avenue, Ellington Road and Crestview Avenue.

A Natural History of the Indian Hill Section





A Natural History of the Indian Hill Section

Like every other conservation area that was inventoried in 1993, the most significant change at Indian Hill has been an increase in the abundance of non-native plants, particularly within the powerline right-of-way. Fortunately, the most ecologically significant portion of the property—the stream and bordering wetlands—remains mostly free of invasive plants. Meanwhile, the other problems that existed in 1993—poorly defined access and dumping of yard waste—continue.



Indian Hill in context. The conservation area is shown in yellow. To the north are the city's Clark Street wells, and to the south are the two protected parcels that form the Brookwood Conservation Area.

History

Although the Nonotuck undoubtedly used this area, the name “Indian Hill” is a completely made-up name for the condominium development and has no historical authenticity whatsoever. During the 1800s, this area was all farm-land, and that farming tradition continued until the 1960s.



From that period on, this part of Florence began to experience more development; Florence Heights was built across the street, the homes in the Ryan Road neighborhood were built, and several new homes went in along Florence Road. During the 1970s, nearly 200 more homes were built surrounding properties on Sandy Hill Road and off Brookwood Road.

In the mid-1980s, the 13-acre property piece here was sold, with the buyer proposing a cluster subdivision. As a condition of clustering, the developer donated to the City the seven acres that now form the Indian Hill. Although that figure represents more than half the subdivision's total acreage, the donated portion consists of all of the undevelopable land—a stream, bordering wetlands, a steep slope, a powerline



The access into the conservation area—not too obvious or inviting.

right-of-way, and a sewer line easement.

This kind of donation of marginal land was typical during the early days of cluster subdivisions, and in this case, it was literally on the margin of the property, so that the conservation land now wraps around two-thirds of the subdivision.

Although the conservation land is almost entirely bordered by development, it also lies fairly close to a few other city-owned parcels, including the Clark Street drinking water wells (8 acres), Brookwood (20 acres), and closer still, two very small lots along Brookwood Drive.

Vegetation Patterns

During the twenty years since this property was first surveyed, the basic patterns have remained the same. Based on hydrology, vegetation and past land use, the conservation area can be separated into six major vegetation zones: (1) powerline uplands; (2) powerline wetlands; (3) the Florence Road slope; (4) sewer line easement; (5)





the brook and its floodplain, and (6) surrounding upland woods. More detailed descriptions of these areas follow and the accompanying vegetation map offers a more detailed assessment.

The Powerline-- Uplands and Wetlands (1)

The powerline was first built in the late 1930s and was updated in the late 1960s. It is periodically maintained, and now varies between 30-60 feet in width. It is 640 feet long on the property, extending from Brookwood Drive to the property's northern boundary, and includes both upland and wetland habitats.

During the last twenty years, the upland portion has shifted from a mix of bluestem grasses, goldenrods, young birches, and patches of sweetfern to an unruly mess of invasive species. Asiatic bittersweet is the most abundant of all, but autumn olive, multiflora rose, garlic mustard, glossy buckthorn and scattered catalpa are also present. In the midst of the non-natives you can still find native plants. There are resprouting red maple, patches of goldenrod, some sweet fern, as well as an abundance of American hazelnut, raspberry, meadowsweet, hay-scented fern, bracken, pale touch-me-not, cow-wheat, Virginia creeper, grapes, sedges and grasses.



The powerline ROW changes appearance based on its maintenance schedule; top shows ROW in 2012; below in 2014.



Pale touch-me-not grows in the ROW as does American hazelnut. Beaked hazelnut is also found on this conservation area.

Heading downslope to the wetter areas, the invasives begin to drop out and give way to species that favor a higher water table, including more halberd-leaved tearthumb than I've ever seen, spotted touch-me-not, cinnamon fern, silky dogwood, meadow sweet, winterberry, fringed loosestrife, turtlehead and Joe Pye weed. There is also some multiflora rose, but less than in the drier borders of the powerline.

The Florence Road Slope (2)

From the powerline wetland, the east arm of the conservation area is a narrow, wooded strip (100-140 feet wide), which climbs gradually and then more steeply until it reaches Florence Road. The composition of the vegetation shifts as you follow this transect, with the changes reflecting the interplay between hydrology and land use history.



Larger trees grow near the top of the slope, closer to Florence Road. The conservation area is narrow, in this stretch, but the forest is nice.

Close to the powerline wetland, the land is level and there is a dense stand of young white pine, intermixed

with red maple, black cherry and in the understory, ironwood. Virginia creeper, poison ivy, touch-me-not, Canada mayflower, New York fern and Asiatic bittersweet grow in the damp soils and shade of the pines.

Not far away, the band of pin cherry that was alive in 1993 has



From the powerline, heading up slope to Florence Road, the vegetation shifts from younger trees to older. Large bittersweet vines can be found, as well as massive boulders that were pushed during construction of the condominiums.

died, and the forest floor is carpeted with hayscented fern. The slope climbs gradually and on these better drained soils grow big-toothed aspen, oak, more white pine, and sprawling Asiatic bittersweet that is clambering over the Virginia creeper and dewberry.

The slope levels off and in a wetter spot, the bittersweet drops out and is replaced by a carpet of wood fern, Christmas fern and spicebush. Scattered winged euonymus and Morrow's honeysuckle are growing here.

As the slope climbs again, the forest becomes more open and the soils are drier. Black cherry, white pine and red maple dominate the canopy. The ferns drop out, and the understory is mostly bare, except for a few isolated partridgeberries, Can-



Views of the upland forest, as well as images of dwarf ginseng and wood anemone, two common spring wildflowers that can be found at this conservation area.

ada mayflower and starflower.

Nearing Florence Road, Asiatic bittersweet reappears and garlic mustard becomes common.

Black locust, a species that readily colonizes disturbed soils, grows here, and there is also an impressive shagbark hickory. Even closer to the road, in the vicinity of lots of giant boulders, is a small patch with sugar maple, red maple and trillium. Along the roadside, Norway maple has taken hold along the edge.

Surrounding Upland Woods (3, 4)

On the higher, drier ground between the power-line ROW and the stream is a mixed forest, dominated by white pine, red oak and red maple. The understory vegetation is thin, but there are some large patches of hay-scented fern and an abundance of Canada mayflower and star flower. Partridgeberry, northern running pine, poison ivy and an old apple tree grow here too. This is a very pretty part of the conservation area.

In the property's southwestern corner is a similar forest, but it also includes a few pitch pine.

The Sewer Easement(4, 5)

At the western end of Indian Hill Road, there is a thirty foot wide sewer easement, which was supposed to serve as the access into the conservation area.

Top to Bottom: View from the sewerline, looking north along the stream; litter left behind on the sewerline; the stream, bittersweet, honeysuckle and a basket ball stand(!) dumped in the forest; yard waste dumping along the sewerline (#5 on map).



But since no one goes here—at least not via this access—the “path” has been maintained by the abutting landowner as lawn and where it borders the powerline ROW, the entry is blocked by multiflora rose, Morrow’s honeysuckle, and a white pine entangled by Asiatic bittersweet. Growing below is another unwelcome non-native plant—goutweed.

West of the powerline, the sewer easement zigzags its way through woods. One arm heads toward Brookwood Drive, and neighbors use part of it as a lawn and the edges as a dumping ground for all sorts of yard waste. The other arm of the sewer line continues west, crosses Sandy Hill Brook and continues to Sandy Hill Road. At the stream crossing, the sewer line is a steep, twenty foot high berm. The top and slopes of the berm has been overtaken by a nasty mass of bittersweet vines and young black locust. Over the years, people have dumped different kinds of junk along the berm, from old bottles and cans to a complete, but broken basketball stand! With some effort, this could be a beautiful trail, overlooking the brook and offering easy access into the site from both Brookwood Drive (via the powerline ROW) and Indian Hill Road.

Sandy Hill Brook and its Floodplain

(w-1, w-2)

The most interesting portion of the conserva-



Top to bottom: Water from old peat bog and Sandy Hill Brook; culverts under sewerline; sandy bottomed brook.



Clockwise from top: A pileated woodpecker pounds away on a red maple; lush cinnamon ferns in the understory below the red maple; the brook with an old tire; lesser celandine, an unwelcome non-native plant, has established along some places on the brook's wet borders.

tion area is Sandy Hill Brook and its bordering wetlands. The brook is fed by a stream that drains Sandy Hill as well as the water from the Brookwood Marsh Conservation Area, which is piped for almost 1,500 feet before daylighting at the southwest corner of Indian Hill. Not unexpectedly, the 100-foot stretch between the culvert and the sewer line is dominated by invasives—especially multiflora rose, Japanese barberry and bittersweet. Downstream from the sewer easement, however, the surrounding vegetation shifts and most of the invasives disappear.

The brook is shallow, sandy-bottomed and bordered by a red maple forest, with a scattering of white pine, hemlock and elm. Highbush blueberry, winterberry, silky dogwood, fetterbush, alder, and witch hazel are common in the shrubby understory. Below the woody shrubs, there is an herbaceous layer that changes with the seasons. In the spring skunk cabbage covers the wettest areas, while Canada mayflower, wood anemone, trout lily, wild oats, violets, golden ragwort, red trillium, and

various grasses thrive in the wet, rich soils along the stream and surrounding wet woods. By late summer, these plants are overtopped by touch-me-not, asters and a mix of ferns (cinnamon, sensitive, marsh fern, New York fern, lady fern and royal fern).

In contrast to the short stretch near the sewer line, invasive plant species are not too common in this area. Yet, multiflora rose is the most abundant (but still manageable), while Asiatic bittersweet and Morrow's honeysuckle are found at even lower levels. The latter are most common in a new area of erosion. A storm drain from Indian Hill Road empties on the conservation area and the stormwater has created a gully. The disturbed soils and sands are where the bittersweet has taken hold.

After leaving the conservation area, the brook eventually enters the Mill River, half a mile downstream, opposite the Maines Field Recreation Area.

Recommendations

Although these seven acres were not originally donated because of their conservation value, they do, in fact, have conservation value. Not only do they provide groundwater recharge for the nearby public wells, but they also include habitat for a variety of plants and animals. This property could also be a place for people to explore and enjoy the natural world. They don't at this point, but that could change if:

- (1) signs were installed to indicate the property is a conservation area, of which it seems that many of the neighbors may be unaware;
- (2) the public access point on the Indian Hill cul-de-sac were improved. It has not been maintained as a "public access." Instead the first part of the 15-foot strip is mowed and looks like part of a private lawn, and at the far end, where it is supposed to lead into the conservation area, an impenetrable tangle of vegetation—a mix of young white pine, coiling bittersweet and a massive multiflora rose bush forms a barrier.
- (3) a series of trails were created leading from the Indian Hill cul-de-sac through the property and connecting to Florence Road and Brookwood Drive. As part of this, the sewer line berm could be made into trail—it might even be possible to make this handicapped accessible.

If these steps were taken, it is possible that the neighborhood would begin to take ownership of this conservation area and enjoy what it has to offer. Already the small patch of woods in the center of the In-

dian Hill cul-de-sac has a kids' fort and a mini-network of trails. With some improvements, this property could also become a bigger, wild place for young people to explore too.

Other recommendations include:

1. Work with the powerline company to control invasive plants along the ROW
2. Work with the DPW to control the erosion from the storm drain.
3. Notify owners about discarding yard waste and other junk.
4. Work with neighbors (and others) to clean up the site and control multiflora rose, barberry, and bittersweet along the brook.
5. Organize a nature walk.



Erosion in the conservation area has been aggravated by a storm drain.



5 The Connecticut River Greenway



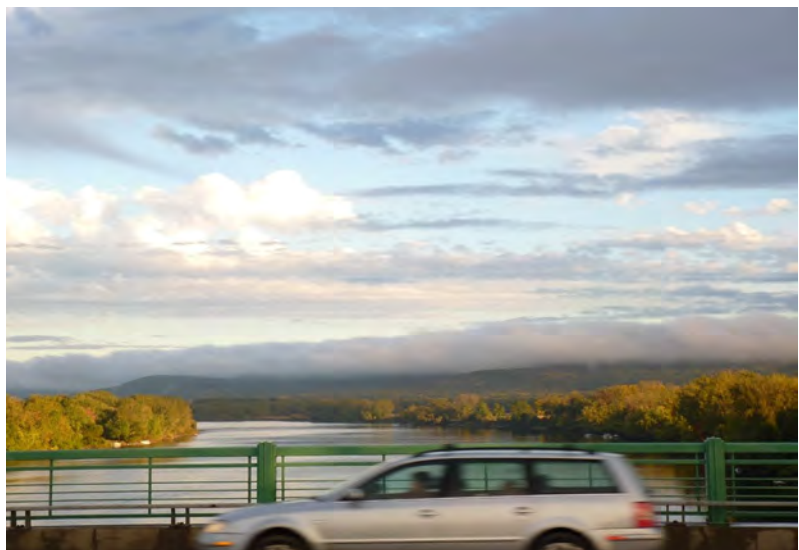
Connecticut River Greenway Overview

With nearly nine miles of shoreline along the river and roughly 3,000 acres of floodplain, the Connecticut River and its meadows comprise one of the most important landscapes in Northampton. Economically, agriculturally, culturally, aesthetically, and ecologically, they have helped to shape and define Northampton's history and earned it the moniker "Meadow City." And yet, most Northampton residents are unfamiliar with this landscape. The Connecticut River is seen only when crossing the Calvin Coolidge Bridge and the vast, open meadows are essentially unknown, blocked by flood control dikes and hidden from view by buildings and Route 91.

For the last forty years, a variety of agencies, departments and organizations have been working to gain better access and protect the special landscapes that characterize this part of Northampton. So far, their combined efforts have protected about 1,300 acres—just over a third of this 3,000 acre expanse (Table 1), with the City of Northampton protecting roughly 300 acres as conservation land. Collectively, these properties are part of an important migratory corridor along the Connecticut River, provide habitat to more than a dozen rare species, encompass some of the



This 2013 image shows the land protected in the Meadows, with different owners shown in different colors. New acquisitions in from late 2013 and during 2014 are not included.



Most people see the Connecticut River and Meadows only from the Calvin Coolidge Bridge or Route 91.

best examples in the state of floodplain forest (*Figure 1*), and also protect several habitats that are otherwise rare or unusual within Northampton's borders (e.g. beach, dry-riverside bluff, wet meadows, vernal pools, even a natural, cobble-strewn shoreline along the Connecticut River).

The future of these special natural areas, however, is jeopardized by the rapid spread of certain invasive plants. Among the most worrisome and widespread are Asiatic bittersweet, Japanese knotweed and garlic mustard, but several others—privet, winged euonymus, morrow's honeysuckle, multiflora rose, swallowwort, Canada thistle and wintercreeper—are gaining ground. Furthermore, this year's discovery of the highly invasive tree known as Amur corkwood in several places in the Connecticut River greenway is



Figure 1. This image, which shows priority habitats for rare species in yellow and exemplary natural communities in brown, underscores the ecological importance of the Meadows and Connecticut River.

Table 1: Land Protection within the Connecticut River Floodplain in Northampton.		
East Meadows (east of Route 5)	Owner of Protected Open Space	
	City of Northampton-Conservation	191
	City of Northampton-Recreation	23.5
	US Fish & Wildlife Service (Conte Refuge)	154
	MA Division of Fisheries & Wildlife	44
	MA Department of Conservation & Recreation	5.5
	Private Conservation Restrictions (no public access)	18
West Meadows (west of Route 5)	Owner of Protected Open Space	Acreage
	City of Northampton-Conservation	111
	Massachusetts Audubon	575
	US Fish & Wildlife Service (Conte Refuge)	14.4
	Private Conservation Restrictions (no public access)	27.5
TOTAL ACREAGE		1,340

alarming. Two sycamore maples were also found on the former Lyman Estate; this species is displacing native plants in the eastern part of the state.

In thinking about the management of invasive plants, the only good news along the Connecticut River Greenway is that their distribution is still patchy in many areas. Furthermore, certain areas stand out as warranting greater stewardship due to their ecological significance. The management challenges, however, loom large. None of these plants can be killed with a single application of herbicide and many of them are in difficult-to-reach places. Further complicating the effort is that much of the nearby land—and especially the Route 91 corridor—is also loaded with invasives, which means an on-going supply of new seeds.

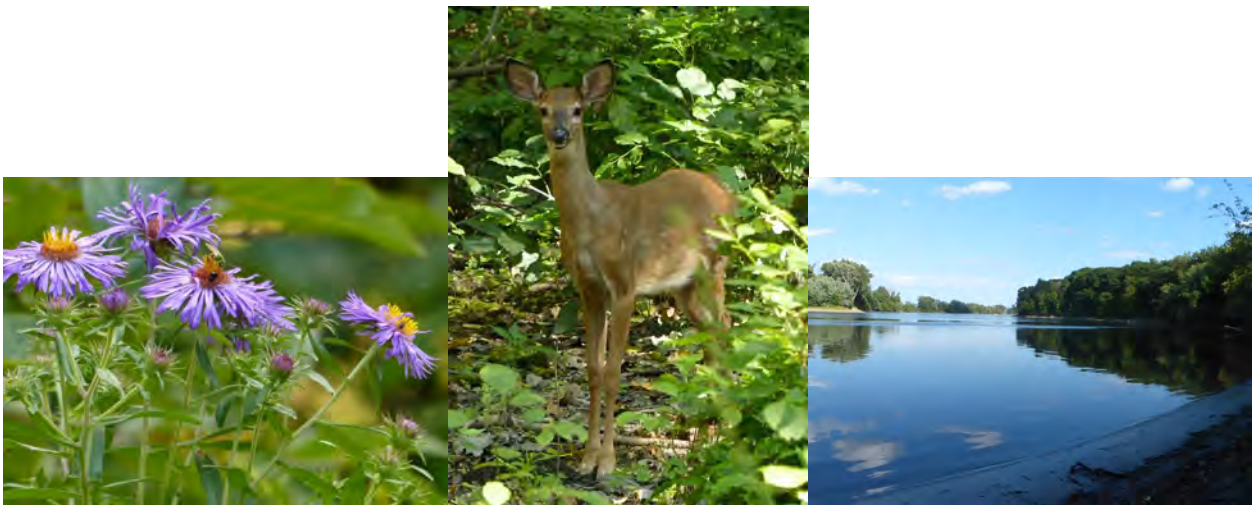
If the City intends to try to maintain the ecological integrity of some of these special habitats, it will need to take an active stewardship role and work collaboratively with other departments (recreation, DPW), agencies and organizations (i.e. Massachusetts Audubon, US Fish & Wildlife Service, MassHighway, MA Department of Agricultural Resources, MA Division of Fisheries and Wildlife, and local friends groups). For instance, MA DFW is already working on controlling invasive plants at their Rainbow Beach properties and a cooperative venture to control the invasives on the city-owned portion of the beach makes sense.



Top: Although less common along the Connecticut River than the Mill River greenway Japanese knotweed is spreading along the margins of fields and roads and also within the floodplain forest.

Middle & Bottom: Asiatic bittersweet is a prolific fruit producer and has taken off in the floodplain. Its woody vines can grow more than 8 inches in diameter. This one is “medium-sized” compared to some others.

The Natural History of the Brickyard Greenway



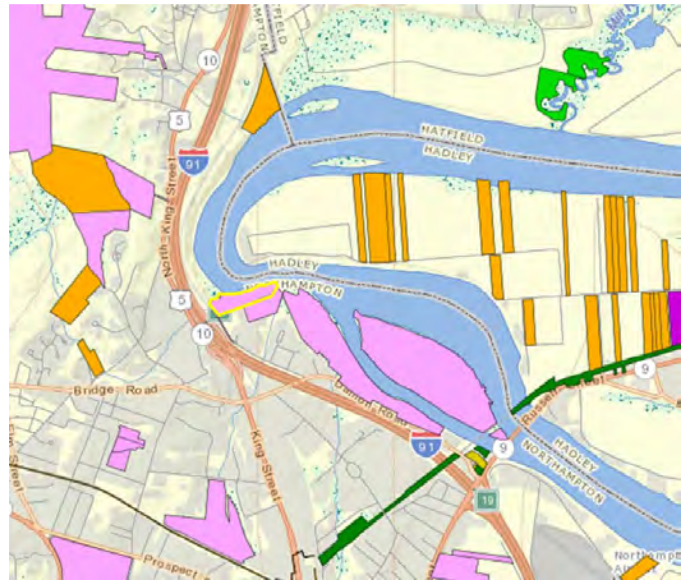
Brickyard Greenway



The Natural History of the Brickyard Greenway

Overview

Acquired in 2013, this five-acre area is highly altered and compromised, but nevertheless is interesting and beautiful. Its historical uses include decades as a brickyard, hence the recommendation for a new name. As a conservation area, it currently supports several habitats, including a pretty cove of floodplain forest, the final reach of Pine Brook, a dry, wooded bluff with great views of the Connecticut River, and about 1,000 feet of cobble-strewn shoreline. The property is part of a longer corridor of protected land, and connects to six acres managed by the City's Recreation Department, which are contiguous with 37-acres within the Elwell Area.



The 5-acre conservation area, highlighted in yellow, shown in context to the Connecticut River, Route 91, and other protected land. All properties in pink are owned by the City of Northampton, while orange parcels are held as private conservation restrictions or APRs. The bright green along the Hatfield Mill River is owned by MA DFW and the darker green is the Norwottuck Bike Trail, which is managed by DCR.

Geology

Twelve thousand years ago, this conservation area was part of a large, developing sandy delta on the margin of glacial Lake Hitchcock. The glacially-swollen waters of Hatfield's Mill River provided the source of sand, which dropped out of suspension as the river entered the glacial lake. Over time, the sands accumulated and extended out over the varved clays that had been laid down during the era of Glacial Lake Hitchcock. Those clay layers, meanwhile, had been deposited on top of the unsorted, unconsolidated till deposits, which covered the deeper bedrock.

During the 10,000 years since the glacial lake drained, the Connecticut River has migrated back and forth across the former lake bed, carving away at the sand delta and clay layers, and exposing the once-buried

till deposits along the shoreline. In the process, the river created the high, steep bluff that characterizes this reach of the river.

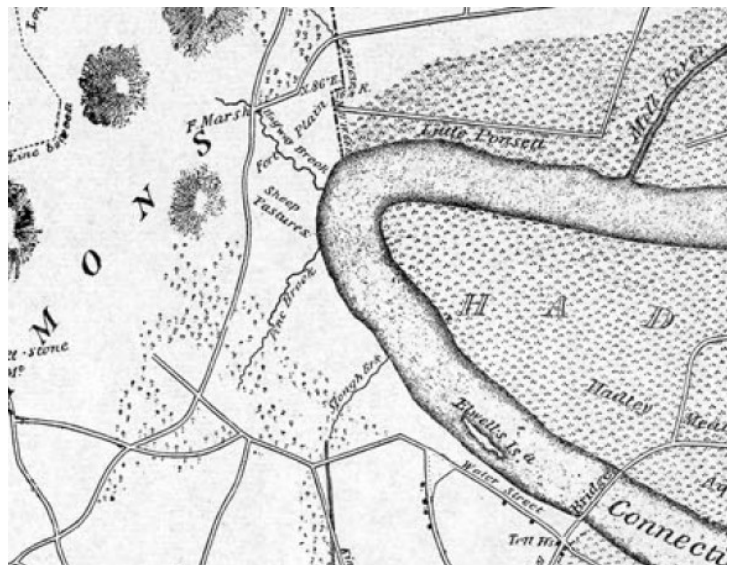
But what's curious about this stretch of the Connecticut River is that it includes one of the river's sharpest bends. After heading almost due west, the river takes an abrupt turn to the south. Why? Probably because hard, metamorphic bedrock is buried just below the layer of till. As the river bumps against the erosion resistant rock, its energy is deflected and its path shifts from due west to due south, and from that point, the river meanders east over the old lake bed.

Human Use

It is impossible to know exactly how the Nonotuck used this area, but based on information in Trumbull's *History of Northampton*, a Nonotuck fort was built in this vicinity during the 1670s around the time of King Phillip's War (Trumbull, vol. 1, p 245). How they used this area before then is conjecture, but it's easy to imagine the high sandy bluffs in this stretch being used as a campsite and lookout. Perched high above the floodplain, the site would have had fewer mosquitoes and better breezes than the meadows below. What's more, it would



An image from MA GIS showing the surficial geology, more or less, or the conservation area and vicinity. Areas in bright yellow and lavender are recent alluvium or swamp deposits, while the remaining colors represent deposits immediately after the last glaciation. Light green represents thin till deposits (this is the ridge line), the orange indicates the remains of the glacial delta created by the Mill River in Hatfield, and the light blue represents clay deposits from the Glacial Lake. The delta deposits actually extend further to the north, and many of these sands were excavated during the construction of Route 91. *From MA GIS.*

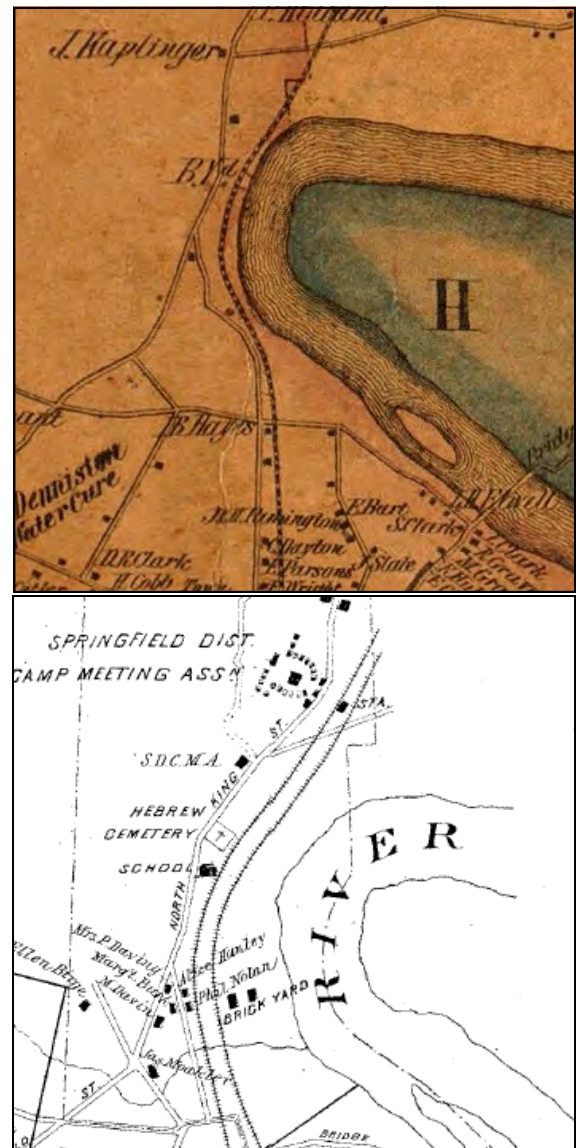


The 1831 map refers to the upland delta as Fort Plain, a nod to its history as an Indian fort, probably built in the 1670s during the time of King Phillip's War. Meanwhile, the land in the vicinity of the conservation area as Sheep Pastures, a name that also dates back to the 17th century.

have been nearly level (the top of the delta), freshwater would have been available from the nearby streams (Slough Brook, Pine Brook and Halfway Brook) and access to the Connecticut River and their crops would have been easy. And no other place in Northampton would have offered such an excellent lookout, up and downriver and across the extensive meadows of Hadley, Hatfield and Northampton.

The English settlers' use of this area probably began before King Phillip's War, but was much more intense after 1676 and Phillip's death. In 1698, Northampton's early residents set aside several parcels of common land, including this area, for "free feeding of sheep." The first parcel identified for this purpose was "north of the Slow [Slough?] bridge to Hatfield bounds" and included "all that Land between the road Wch Leads to Hatfield and the great River" (Trumbull, 1898). How long the area was used as a sheep pasture is not known, but as late as 1831, the local place name "Sheep Pasture" was still used to describe this section of town.

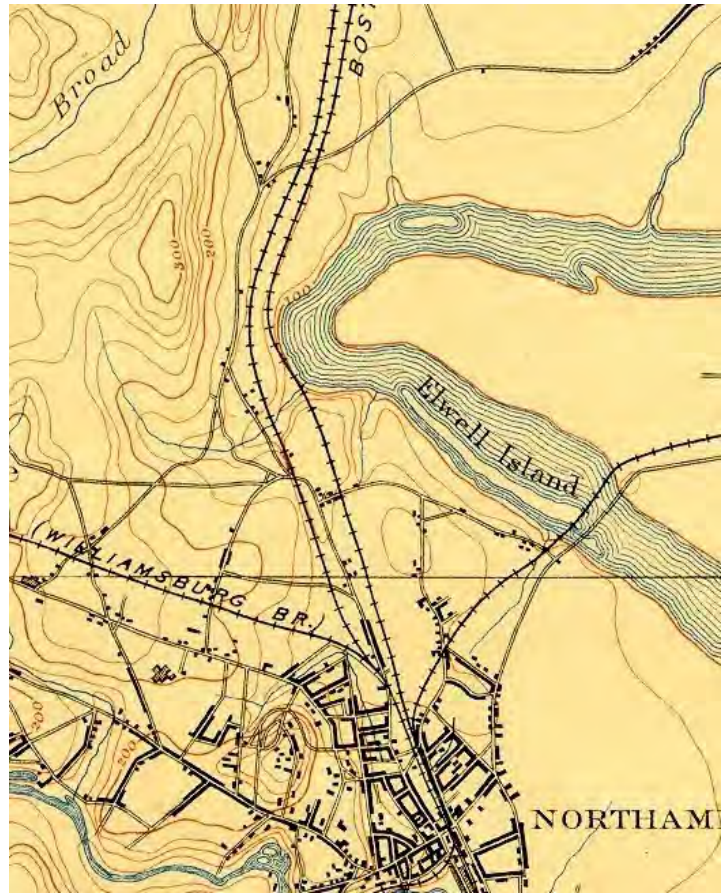
But by the time the 1831 map was published, a series of changes were underway. Back in 1822, the early success of the Erie Canal triggered canal fever throughout the eastern United States and in our area, a series of investors proposed linking Northampton to New Haven via a canal. That year a committee, including the engineer from the Erie Canal, identified Slough Brook, which borders the adjacent recreation property, as the terminus for the future Northampton-New Haven canal. The work on the canal began in Connecticut in 1825, but construction of the Massachusetts portion didn't begin until the 1830s. When the canal was finally completed, a series of four locks within Slough Brook connected the Connecticut River to the rest of the canal. A towpath ran alongside the canal and it is likely that at least part of the recreation area and the former Lane Construction Company site were used to shift cargo back and forth from ferries on the Connecticut to flat boats on the canal.



The 1854 map by Barker (*above*) shows a Brickyard (*BYd*) in the area. By 1895, the map (*below*) shows two brickyard buildings just north of the conservation land.

The canal operated for just twelve years, and by the time it was officially abandoned in 1847, the first railroad had already been punched through Northampton and tracks had been laid north along what is now the western edge of the conservation area. By 1884, a second rail line, paralleling the first, had also been built.

Around the same time as the canal's construction, a brickyard was established in the vicinity and during the next seventy years, a series of brickyards (Howe's, Smith's, Gleason's) operated here. And as a brickyard, the area was ideal—it had thick deposits of clay, abundant sand to mix in, fresh water, and access to firewood, which was needed for the fires to bake the bricks. When the railroad was built alongside in the 1840s, the brickworks had yet another advantage: not only could the bricks be hauled to distant markets, but coal dust, an additive that helped the bricks bake better, could also easily be delivered. And the final advantage was this: all the imperfect bricks could easily be disposed of—either tossed back into the shallow clay pits, over the bank, or used as fill around the pipes that carried Pine Brook under the railroads. Today, thousands of discarded bricks can be found along Pine Brook, near the railroad crossing, and weathering out from the hillside.



The 1884 topographic map shows the two railroad lines heading north and crossing Pine Brook.



Thousands and thousands of broken and deformed bricks can be found in Pine Brook, along the slopes of the conservation area and along the railroad tracks heading toward the Hatfield line.

Beginning in the late 1950s, this site experienced a new series of alterations. The first of these was just west of the property and was the construction of Route 91, which resulted in another 400-foot stretch of Pine Brook being piped and buried under the highway. During the years of the interstate's construction, the shopping plaza that now includes Big Y and Walmart was developed, burying another 800 feet of Pine Brook. Then, in 1963, the Lane Construction Company purchased four separate tracts that included all of the land formerly used by the brickyards and extended from Slough Brook to Halfway Brook. During its fifty-year tenure, Lane Construction used the site for making cement and storing sand and gravel.

In 2013, the City of Northampton negotiated with Lane Construction and for a dollar a piece, purchased two contiguous parcels: a 6-acre parcel, which is now

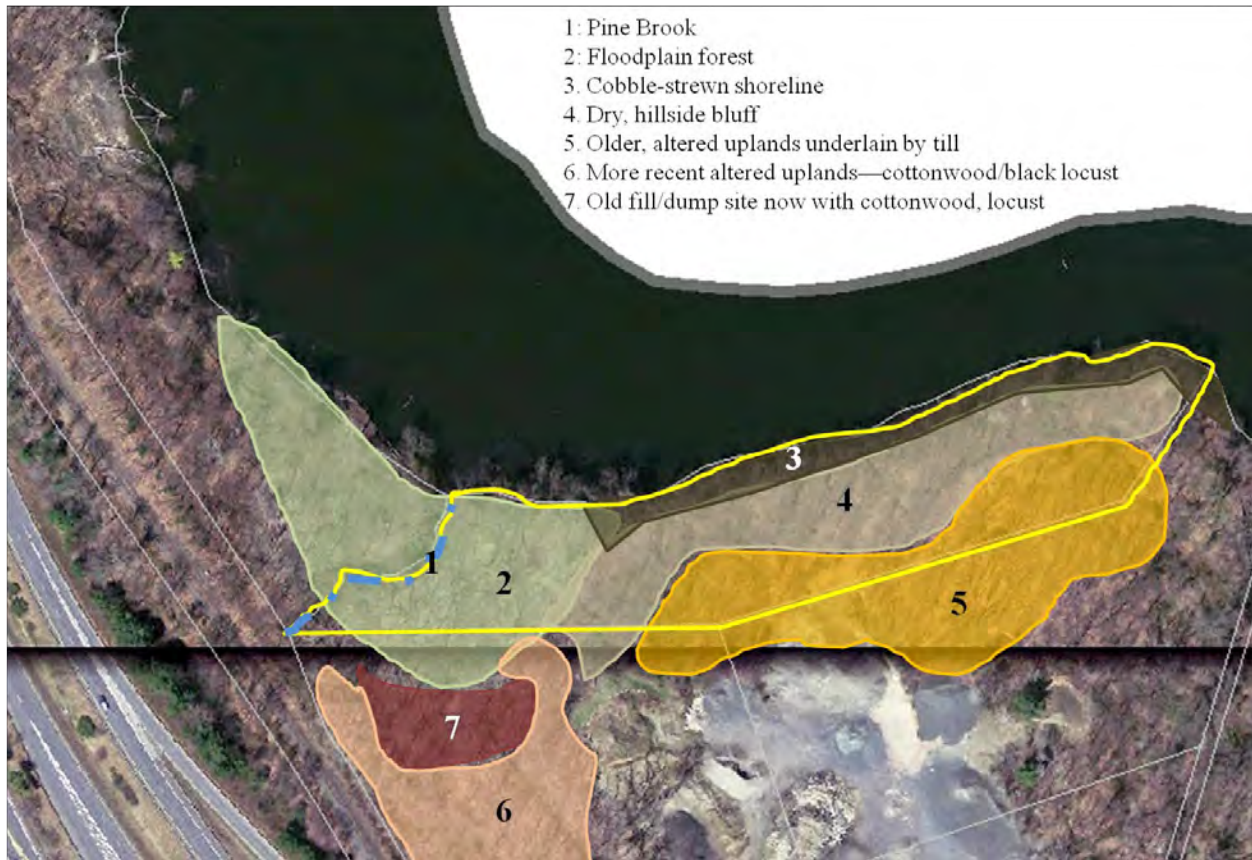


A view of a small part of the Lane Construction Company's operations adjacent to the new city-owned parcels in 2014.



This aerial image from 1952 sharply contrasts with the bustling activity in 1958, which included the construction of the interstate highway, the building of a new shopping center, and intensive use of the uplands between Slough Brook and Pine Brook. Gravel mining, cement mixing and vehicle storage had replaced the former fields.

owned by the City's recreation department and includes a new boat access ramp, and a 5-acre parcel, that was protected as conservation land. These acquisitions create a link to 37 acres of conservation land between the Connecticut River and Damon Road, and a new trail over Slough Brook will connect all three properties.



Vegetation Patterns

The property's geologic history, long record of alteration, and location along the Connecticut River have shaped the habitats and vegetation patterns we see today. Generally, the land can be split into five different habitat types: (1) Pine Brook; (2) floodplain forest near Pine Brook; (3) cobble-strewn shoreline along the Connecticut River; (4) dry, riverside bluff; (5) altered, forested uplands adjacent to former Lane stone-and-gravel operations.

1. Pine Brook forms one boundary of the property and runs for approximately 330 feet before entering the Connecticut River. It emerges from a pipe and is surrounded by brick fill. On either side the brook has carved down through the old river silts and has created a deep channel, which in some areas has exposed layers of varved clay. At its mouth, the



stream enters the Connecticut River just below the sharp bend. From the shoreline, there are excellent upstream and downstream views of the river.

2. Floodplain Forest: Dominated by massive cottonwoods and silver maple, this little pocket of floodplain forest is very pretty. In addition to the size of the trees, part of its charm is that it is within a natural, amphitheatre-shaped glade, so that, in spite of the noise of Route 91, it feels isolated and almost pristine. The forest floor is a mix of Virginia creeper, poison ivy, ostrich fern, sensitive fern, clear weed, jumpseed, false nettle, and spotted touch-me-not. Asiatic bittersweet, garlic mustard and Norway maple are present here and so too is Japanese knotweed. All of these invasive species are still at relatively low-levels, particularly compared to the highly altered woodlands above, which are loaded with invasives.

3. Cobble-Strewn Shoreline: Within this conservation area and extending about ½ a mile upriver, a rocky layer of till has been exposed. This is the only place in Northampton with this type of shoreline, and in fact it's one of the few places like this anywhere along the Massachusetts section of the Connecticut River. Very few plants grow here, but one that does is Indian hemp. The shoreline is covered



Varved clays can be found along the margin of Pine Brook, which is seen flowing out into the Connecticut River. Its channel is still strewn with broken bricks.

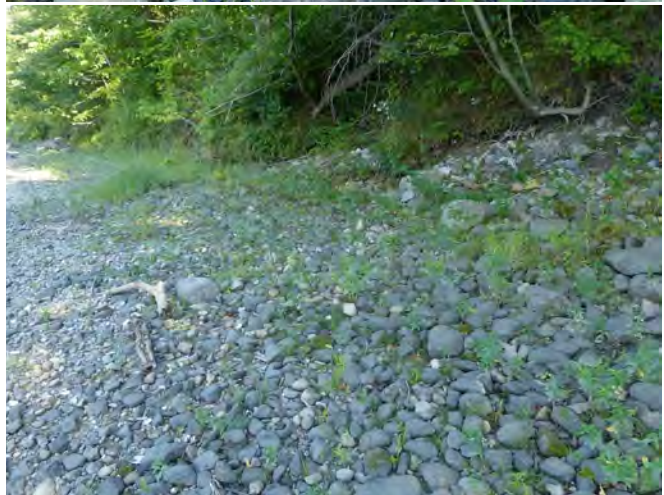


Ostrich fern dominates the understory of the floodplain forest.

with the shells of Eastern Elliptio, the most common freshwater mussel in the Connecticut River. A future summer survey for the state-listed cobblestone tiger beetles is warranted along this shoreline. At present, this endangered beetle is known from only a single site in Franklin County.

4. Dry, Riverside Bluff: This is one of the rarest of the natural community types in Northampton and it is limited to this short reach between the Hatfield border and the mouth of Slough Brook. During the last 50 years, a lot of it has been damaged by sand and gravel mining. In addition, this habitat is now threatened by the spread of invasive plants. What distinguishes this natural community are the dry, sandy, somewhat alkaline soils that often lead to open, park-like conditions. The list of species is fairly high, with trees, shrubs, wildflowers and grasses. Woody species include red oaks, sugar maple, elm, basswood, birches, red maple, ironwood, speckled alder and chokecherry. Scattered in this area are non-native autumn olive and common buckthorn, as well as Asiatic bittersweet and Morrow's honeysuckle. The herb layer contains a mix of grasses and wildflowers (hog peanut, woodland sunflowers, wild sarsaparilla, etc).

Altered Uplands (5, 6, 7): This includes places where the land was recently dis-



Top: The cobble-strewn shoreline of the conservation area is obvious in this photo that was taken a little further upriver. The cobbles are exposed glacial till. This is the only place on the Connecticut River in Northampton with this type of shoreline.

Middle: Along the shoreline are thousands of empty shells from the freshwater mussel known as the Eastern elliptio.

Bottom: The small cobble shoreline may provide habitat for the state-listed Cobblestone Tiger Beetle (Endangered).

turbed, as well as areas that were modified long ago and have since revegetated, growing back over the decades into a mix of red oak, shagbark hickory, red maple, hop hornbeam, black cherry, bitternut, and black birch. In more recently disturbed sites (e.g. just off the conservation land on the Lane property), the canopy is dominated by black locust and big-toothed aspen, while the understory includes patches of sedges (*Carex pensylvanica* mostly), wild rye, ground nut, wild sarsaparilla, wild agrimony, Virginia creeper, an interesting trefoil, and various asters and goldenrods. Poison ivy is fairly common, and the shrub layer includes maple-leaved viburnum, silky dogwood, panicled dogwood, hazelnut, and false honeysuckle (*Diervilla lonicera*)—a native species. As elsewhere on this property, Asiatic bitter-sweet is present, and so are autumn olive and privet.

Recommendations

- (1) Build a trail from the parking area, along the ridge, down into the flood-plain forest and ending at the edge of

Three different areas of disturbed forest. *Top image* shows a level area that has not been disturbed in a long time; *Middle image* shows the edge of the dump at the crest of the slope, with an abundance of Asiatic bittersweet; *Bottom image* shows the vegetation along the dry, high hillside that abuts the recreation land and was altered intermittently during the last 50 years.



Pine Brook and the Connecticut River.

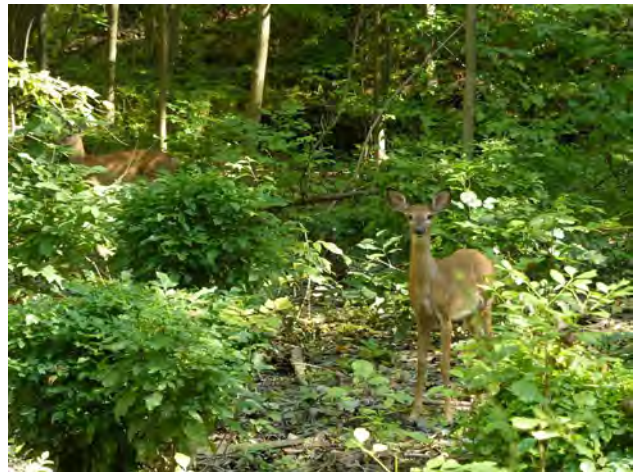
Visitors could return either by walking back along the shoreline to the boat access or on the same trail. It would be nice to create an open vista from the ridge with the help of some judicious tree trimming.

(2) Prepare a complete inventory of the plants;

(3) Control the invasive plants, which are currently at manageable levels within the conservation area, but less so beyond its borders. On the old fill and along the Lane entry road, invasive plants are wide-spread, abundant and include many of the most problematic, difficult-to-eradicate species: privet, Asiatic bittersweet, Japa-nese knotweed, Morrow's honeysuckle, autumn olive, multiflora rose, purple loose-strife, common buckthorn, and garlic mus-tard. Any control effort should be coordi-nated with the Recreation Department, and if possible, it would also be helpful to work with a group of volunteers (rowing club, kayakers, friends group, etc) on management activities over the long-term.



Common buckthorn, *Rhamnus cathartica*, is still not very common in Northampton, but occurs with some frequency in this conservation area and along Route 5. It is a non-native shrub and one of the invasive plants that should be controlled at this site.



This site is heavily browsed and regularly visited by white-tailed deer, a species whose population has increased dramatically in Northampton during the last twenty years. Two deer can be seen in this photograph.

Sources

Trumbull, James Russell. 1898. History of Northampton. Vol. 1.



Cross Path Road - Kossakowski Section (2.92 Acres)

This small field near the fairgrounds is currently maintained as part of a larger hayfield and includes a mix of grasses, clover, daisy fleabane, madder, dock, and tall buttercup. During the last fifty years, a wooded border has grown up along a drainage ditch that carries water from the area of the fairgrounds and down into the swale behind the new, unnamed six-acre conservation area off Pomeroy Terrace.



The property, highlighted in yellow, and its relationship to interstate 91, the fairgrounds, neighborhoods and other city-owned land (blue, yellow, orange) and private conservation land (light red).

Silver maple is the most common tree growing along the ditch, but other trees include slippery elm, pin oak, catalpa and less commonly basswood. Silky dogwood is the most abundant (and it is abundant!) woody plant in the shrub layer. Other frequently encountered shrubs are common



The property in 1952, before Interstate 91, was part of the 100-year floodplain and surrounded by open fields. Today, sixty plus years later, it is still mostly farmland, but a row of trees have been allowed to grow up along the drainage ditch.

buckthorn, multiflora rose, high-bush cranberry, northern arrowwood and stag-horn sumac. The autumn olive is present, but low in numbers. Vines are also abundant along this border, with Virginia creeper, Asiatic bittersweet, poison ivy, grape and wintercreeper (!) occurring in order of abundance. Within the herb

layer, common cinquefoil, sensitive fern, fringed loosestrife, and ground nut are the most often encountered.



Recommendations

This property has limited ecological value to wildlife and the wooded border, and although it provides a visual screen for the homes along Cross Path Road, it does not play any significant ecological function. Its handful of invasive species (common buckthorn, multiflora rose, autumn olive, Asiatic bittersweet and wintercreeper) are present and could be controlled, but it's hard to know who would take on the task. There are many other areas in town that are more ecologically deserving of attention than this one.

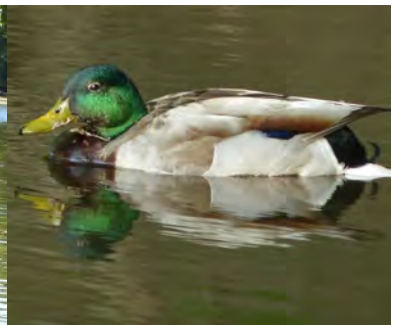
With this in mind, the City has several options:

- (1) continue to rent the land for hay and/or other crops;
- (2) partner with GrowFood Northampton, MCCC, or another group and use the property as an other location for community gardens (which would be convenient to residents of downtown);
- (3) transfer the land to the recreation department to use for a future recreation field, or
- (4) sell the land with a conservation restriction/APR to a local farmer.



Silver maple, *Acer saccharinum*.

A Natural History of the Elwell Section



Elwell

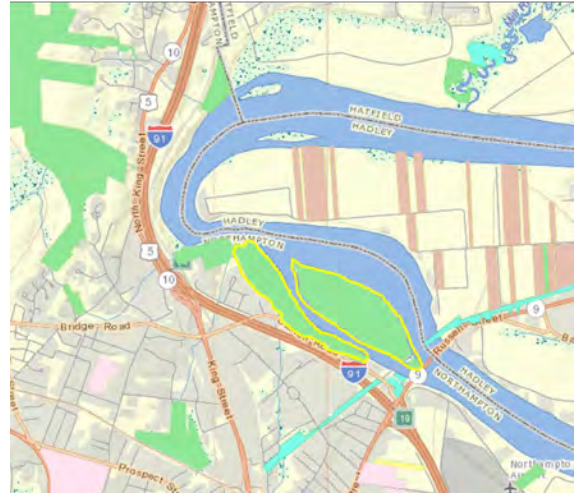


Elwell includes two separate parcels: Elwell Island (87 acres), which is accessible only by boat, and a narrow, 37-acre band between Damon Road and the river that extends from Slough Brook to near the Norwottuck Rail Trail. The two parcels lie just south of two new (2013) city properties—one offering boat access to the river and a second small conservation area. A new trail over Slough Brook will soon connect the recreation area to the mainland portion of Elwell and provide the first land-based public access since the land was acquired in 1981. Considered together, these two properties include more than 2 1/2 miles of shoreline and all of the land is within Priority Habitat for Rare Wildlife.

Changes Since 1993

Since my first assessment of the Elwell Conservation Area in 1993, several changes have taken place on

Elwell



Elwell, outlined in yellow, in context with other conservation land (green), recreation lands (teal blue), APR properties (orange) and other publicly-owned land (pink).



Although no farming activities have occurred on Elwell Island for decades, about 25% of the conservation land along Damon Road is devoted to agriculture. As of 2014, about 8 acres (*Photo A*) were under cultivation for annual crops and another two acres were being hayed. In 2015, another acre or more will be available as community gardens. This area is at the northern end of the property (*Photo B*) and was cleared of brush and young trees toward the end of the 2014 growing season.

the two parcels, some minor, some major. The agricultural field, for instance, is now being farmed organically and an overgrown area at the north end of the mainland has just been cleared to create more farmland and/or community garden space. Several blight-resistant American elms have been planted on the island (some more successfully than others) and the conservation area is being studied by The Nature Conservancy as part of two separate research projects—one studying the impacts of Asiatic bittersweet on tree health and a second project that is part of a larger watershed-based study correlating river flooding with vegetation pattern.



(A) Of the elms that were planted on Elwell Island, a few, like this one, have died and/or are being overwhelmed by non-native plants. (B) Preliminary results from The Nature Conservancy study have revealed that a tree that has both native grape and non-native Asiatic bittersweet clambering up its trunk is more likely to die younger than a tree with just grape vines or just Asiatic bittersweet vines. Why? Because the vines cause more branches to break, opening the pathway for fungus, diseases and other pathogens to enter the tree and cause its premature demise.

Another “change” since 1993 is that the island has stopped growing (*See photos*). Prior to then, the island’s expansion had been documented with every new map and aerial image since 1831. In contrast, during the last twenty years, its shape and size has remained almost identical.



These images from Google Earth show Elwell Island in 1995 and 2014, revealing that the overall dimensions of the island are similar and that the vegetation patterns are remarkably similar as well.



The Appearance and Expansion of Elwell Island

Named after its first owner, Elwell Island first began forming in the early 1800s. The local lore is that its creation was aided by its first owner, Levi Elwell, who purportedly planted young willows to stabilize a newly developed sandbar. Whether true or not, the fact is that the island did not exist when the first map of Northampton was prepared in 1794. By 1831, however, the city's first real map documented an island of about five (or so) acres. During the next 150 years, the island continued growing. Its growth, at least early on, was probably fostered less by Levi and more by the extensive amount of amount of sediments eroding off the slopes from excessive timber cutting and land clearing. Undoubtedly, changes in the river's flow because of the building of the bridge across the Connecticut River in 1808 and dams also affected the island's growth.

These changes, however, can all be put in the “minor” category when compared to the dramatic change in the quantity of invasive plants growing on both the island and mainland.

Back in 1993, I found only four non-native plant species growing here: purple

loosestrife, garlic mustard, Japanese knotweed, and Asiatic bittersweet, and none of them were widespread or abundant. Purple loosestrife, for instance, was confined to just one area of the island, garlic mustard was in a single section on the mainland, and Japanese knotweed was found in just two spots—at the north end of the island and behind the houses along Damon Road. Asiatic bittersweet, the worst invasive plant at that time, received only four mentions, including a comment that there was “some problem with Asiatic bittersweet.” Today, paddle up the channel between the mainland and the island and you will see cascading curtains of bittersweet, stretching from the tops of the trees down to the ground. In the floodplain forest, big and small bittersweet vines twist up the trunks and many of the light gaps are covered with tangles of young vines. Earlier this year, when forester Mike Mauri surveyed the property for the City, he estimated that the number of bittersweet seeds in the mainland portion was two million per acre.

If these four species were the only ones that had taken off, there would be a problem, but the situation is actually



(A) A tree along the Connecticut River, engulfed in Asiatic bittersweet, and (B) an impressive Asiatic bittersweet vine on the mainland portion.



A female Amur corktree in fruit on Elwell Island.

much worse because more than a dozen other problematic invasives have become established and many of them have also taken off. These include Morrow's honeysuckle, privet, autumn olive, multiflora rose, yellow iris, tree-of-heaven, swallowwort, Dame's rocket, moneywort, *Phragmites*, Canada thistle, catalpa, Japanese barberry, Norway maple and Amur corktree. Although their distribution is still patchy, their rampant growth threatens the long-term health of the property's floodplain forest habitat, one of the rarest habitat types in the Commonwealth. Additionally, the continued spread of invasive plants could negatively affect the property's butternut stands, which according to forester Mike Mauri, are two of the most impressive he has seen. If only for these reasons, the control of invasive plants should be a top priority within Elwell.



Butternut, *Juglans cinerea*, in fruit. This species is in serious decline because of the arrival of two non-native pathogens.

What follows are more detailed vegetation descriptions of the conservation area and a list of management recommendations.



The park-like floodplain forest along Damon Road, with touch-me-not and tangled bittersweet vines under a canopy of silver maple and a partially flooded swale in the background.



April 29, 2002



August 18, 2003

Elwell Island and the land along Damon Road are annually affected by flooding, with large areas of the island and fields completely inundated. In contrast, during dry spells, the Connecticut River is low and large beaches are exposed along the island's northern, upriver end.

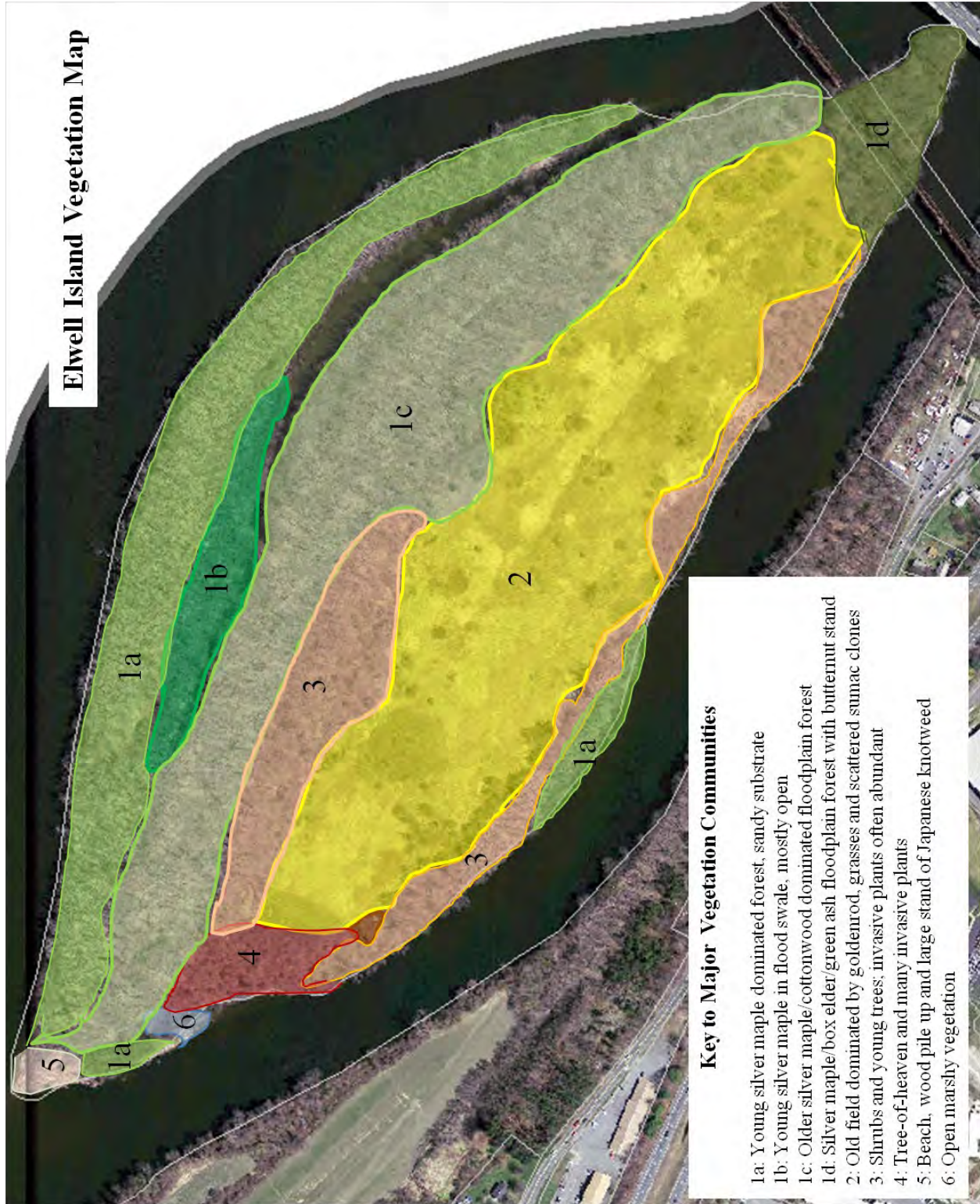
Elwell Island

During the last twenty years the ratio between the forest, meadow, mudflat and beach habitats on the island has not changed much. The meadow is continuing to grow in, both along the edges and as the sumac clusters expand in size. The size of the beach and mudflats vary depending on the river's height, shrinking or expanding as the level rises and falls.

Forested Land

The amount of forest covering the island is now about 50 acres, with about 40 acres of high quality floodplain forest and the remainder being scruffier, second growth forest on higher ground. The second growth forest is on the margins of the meadow and along the Northampton side of the island and it is where *all* of the problematic woody species are located, including tree-of-heaven, Morrow's honeysuckle, privet, catalpa, autumn olive, mulberry, multiflora rose, Japanese bar-





berry (rare), euonymus, Norway maple and amur corktree. It is, however, where the butternut is coming in too. None of the non-native woody species are terribly common (yet), but they have all arrived and based on their habits elsewhere, they will increase in abundance unless they are controlled.

In contrast to the messy feel of the secondary forest, the floodplain forest is open and park-like, with a tall canopy, virtually no shrub layer and an understory carpet of ferns and herbs. The highest quality floodplain forest is located on the side of the island closest to Hadley. This is the oldest section and includes monster cottonwoods over three feet in diameter, huge, multi-stemmed silver maples, and the occasional black willow. Below is a lush, ever-changing carpet of herbs, with ostrich fern in the siltier soils and wood nettle in the sandier deposits. In the wetter low spots, there are smaller patches of false nettle, sensitive fern, touch-me-not (*Impatiens capensis*; *I. pallida*), clearweed, jumpseed, Virginia creeper, poison ivy and white cutgrass (*Leersia virginica*). Woody debris piles are common and grape vines stretch into the canopy. There are also lots of young Asiatic bittersweet vines; gill-over-the-ground and moneywort are found in this area too.



A carpet of stinging nettle grows below the canopy of silver maple. The presence of stinging nettle reveals that the soils are sandier (versus silty and loamy).



A variety of views of the floodplain forest and its changing character and qualities.



More views of Elwell Island and its different habitats:

(A) A mix of invasives grow at the base of a large tree-of-heaven; (B) Box elder, a type of maple is common at the downstream end of the island; (C) The shrubby margin as seen from the channel between Damon Road and the island; (D) The view through the flood-plain forest in late afternoon. (E) Another swale that is periodically flooded, now thick with rice-cut grass and other annuals; (F) The massive pile of branches and trunks at the island's upstream end.

In the northern portion of the island, the floodplain forest is younger, but is similar in composition, with cottonwoods, silver maple, black willow and because of the sandier soils, swaths of wood nettle and white cutgrass. Widely scattered in this area are young Asiatic bittersweet vines.

Near the Rail Trail bridge is a third “type” of floodplain forest. Here, the canopy is dominated by a mix of box elder and silver maple and the ground below is an almost solid stand of ostrich fern. When Mike



This image from the 1950s, before the interstate, shows the island with much less vegetation. It is also narrower than it is today.

Mauri explored the area in April 2014, he estimated about 80,000 ostrich fern clumps/acre in this area.

The Meadow

The open meadow covers 30 acres of the island and is a half mile long and about 600 feet wide. For more than a century, from the 1830's through the early 1950's, this section was managed by the Elwell family as a cow pasture and hay fields. Since then, farming



A view to the north across the meadow, with the yellow-glow of flowering goldenrod in the distance.

has been abandoned and the only changes have come from annual flooding and occasional fires, with the last burn consuming about 8 acres in the fall of 1992.

Although dominated by goldenrod (*Solidago canadensis*), the meadow also includes swaths of ostrich fern (near the rail trail), patches of open grass, and mixed in with the goldenrod, a variety of wildflowers, including touch-me-not, false nettle, poke-weed, stinging nettle, common milkweed, dame's rocket, garlic mustard, poison ivy, and several others. By mid-summer, the meadow vegetation is taller than an adult and so thick that it is almost impossible to get through.

Within the meadow are expanding patches of staghorn sumac and not far from the rail trail, the planted

disease-resistant elms and a grove of butternut. These trees look healthy (so far), but aside from the threat of butternut canker, what's growing in and around them is a worry. Not only is there Asiatic bittersweet, but there is also swallowwort (argh!) growing underneath and galloping across the open meadow. Swallowwort, true to its common name, forms dense monocultures, has no natural pests or pathogens, and will "swallow up" and displace the native plants—and even outcompete some of the other non-natives! It is found in about a dozen places in Northampton (so far), and is an important plant to control.

The Mudflats

Elwell



Two views of the meadow in March; above, with flattened goldenrod, and

below, one of the large, expanding clones of staghorn sumac.

much smaller, along the southwest shore. These inlets provide the sheltered, calm-water conditions necessary for fine silts and clays to settle out and the mudflats to develop.

During the growing season, these exposed muds are ringed with mud plantains, false pimpernel, monkey flower, rice cut grass and clammy hedge hyssop (*Gratiola neglecta*; *G. aurea*), beggarticks (*Bidens cernua*; *B. tripartita*; *B. vulgata*), *Eleocharis*, and *Scirpus*. Purple loosestrife and about a dozen bunches of yellow iris also grow here.

Point Bars

At both ends of the island are sandy beaches (technically point bars), with the largest and most heavily used being at the island's north end. Fortunately, people have not been leaving much debris behind or damaging the area. In fact, what is a lot more worrisome is the expanding patch of Japanese knotweed growing at this northern end. The most common plants found here are willow, stands of young cottonwood and silver maple, plus hundreds of cocklebur and grasses.



The beach at the upstream end of the island is scoured each year by ice and floodwaters. It is a popular destination in the summer for kayakers and boaters. Meanwhile, a thick stand of Japanese knotweed has begun growing along one edge.

Wildlife

Although the entire island usually floods each year, sometimes for weeks at a time, wildlife is able to either recolonize—or move back and forth between the mainland, either swimming or crossing the ice. Among the mammals found here are woodchucks, red fox, deer, coyote, mink, raccoon, muskrat, and beaver.

Red-winged blackbirds, gray catbirds, song sparrows, yellowthroats and red-tailed hawks are a few of the birds that nest on the island, and dozens of other bird species can be seen feeding and roosting on the island as they migrate along the Connecticut River corridor in the spring and fall.

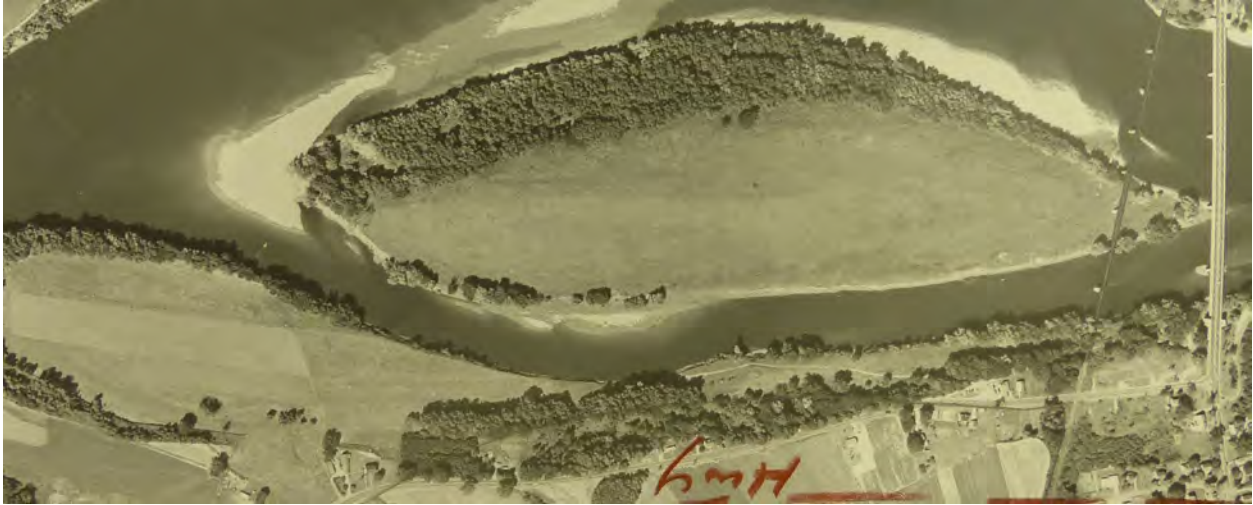
Pickerel frogs, green frogs, and American toads can also be found here.



It's easy to find evidence of beavers on Elwell Island, and raccoon prints are also common.



(A) The channel between Elwell Island and the conservation land along Damon Road is a beautiful place to paddle. It's also a great place to look for freshwater mussels. The shallow sands here appear to act as a nursery ground for young eastern *Elliptio* mussels, which is the most common species in our area. (B) If you're lucky, you may also find other species, including yellow-lampmussels, *Lampsilis cariosa*, which is one of the most imperiled species of freshwater mussel in Massachusetts.



The Mainland

In the 1950s, the mainland portion of this conservation area was almost entirely open and treeless, with big farm fields and a cart path running through a smaller clearing. Back then, the only trees were growing around a deep, regularly flooded swale, along the river's edge, or had been intentionally planted as part of a small red pine and spruce plantation. Today, only about a third of the property (12 acres) is open farmland and with the exception of a small, open marsh, the rest is wooded. But the wooded areas are hardly uniform and can be divided into seven zones based on composition:

Red Pine and Spruce Plantations

Between the MA DCR office and behind the few houses on Damon Road, there are planted stands of spruce (*Picea* sp.) and red pine (*Pinus resinosa*). Now part of the conservation land, these evergreen stands



A small red pine stand and a small plantation of now-dying spruce grow on the slopes along Damon Road. A thick understory of ferns carpet this area, which is now increasingly a mix of hardwoods, including black cherry and butternut. There are also some impressive Asiatic bittersweet vines growing here.



have gone unmanaged for many years and their understories are now a mass of poison ivy, touch-me-not, sensitive fern, lady fern, evergreen woodfern, ostrich fern, Virginia creeper, garlic mustard and big clumps of Asiatic bittersweet (including some whopper 3" diameter vines). Between the two stands and growing below, there are several large butternuts, plus elm, black cherry and some ash. A city storm drain empties out in this area and is a major source of water in the swale.

Floodplain Forest Along Damon Road

Dominated by silver maple, the floodplain forest is open and park-like. The understory shifts between open mud flats and broad expanses of sensitive fern. Jack-in-the-pulpit is common here and there are a few small patches of Japanese knotweed near the riverbank. Asiatic bittersweet can also be found along the bank and is spotty in the forest.



A large butternut grows in a clearing between the two plantations of spruce and red pine.



This culvert (A) drains both groundwater and storm runoff from the land on the west side of Damon Road and empties into this long swale (B).

Open Marsh

A mix of grasses, cattails, touch-me-not, tearthumb and other common wetland plants occurs behind the MA DCR building. This area also has purple loosestrife.





Disturbed Area/Clearing

Behind one of the houses on Damon Road, there is a small clearing that leads to the river, where there is part of an old dock that's tied into the bank. Old junk and other debris have been left and/or dumped here. There are also some very big bit-tersweet vines.

Nearby is a seepy swale with skunk cabbage and a large patch of Japanese knotweed and a small patch of Phragmites.

Butternut/Sugar Maple Forest

Moving downriver, the forest changes and becomes dominated by butternut, with increasing



Images from in and around the clearing behind the private homes on Damon Road, including a picture of my dog near a massive bittersweet vine and the nearby wet swale that has grown in with Phragmites and Japanese knotweed. A small patch of knotweed was growing in this same area in 1993.

amounts of sugar maple along the drier slopes. According to Mike Mauri, this is one of the highest concentrations of butternut that he has seen, with the largest individual having a 35" diameter. These are mostly healthy, although some are suffering from butternut canker and/or a secondary root rot pathogen. This area also has several non-native shrubs (privet, Morrow's honeysuckle, euonymus, Japanese bar-



(A) A heavily-diseased butternut grows in a clearing, with winged euonymus nearby and silver maple in the background. (B) The sugar maple glade near the south end of the parcel.

berry, multiflora rose) as well as garlic mustard. Near the river's edge, grape and Asiatic bittersweet are both abundant.

Forest Along Connecticut River & Hedgerow

Between the agricultural fields and the river is a narrow wooded strip that includes a shifting mix of silver maple, cottonwood, box elder, staghorn elm, cottonwood, butternut, smooth sumac and staghorn su-



mac. There are curtains of grape and Asiatic bittersweet, as well as goldenrod, raspberry, yellow touch-me-not, evening primrose and at least three kinds of smartweeds growing along the border. In the forest, the understory vegetation is patchy. Some areas are open and easy to walk through, with a mix of grasses, ostrich fern, poison ivy, white snakeroot, and Virginia creeper, but other areas have become thick with



(A) A view upriver, with a narrow mudflat with overarched silver maples. (B) Another female Amur Corktree, with fruit, growing along the river's edge that borders the hayfield. (C) A muddier stretch of shoreline, looking downriver toward Elwell Island; (D) The hayfield, looking north. (E) An open patch dominated by Virginia creeper and growing below the narrow border of silver maple between the Connecticut River and the hayfield. (F) Box elder bugs on box elder seeds.

Asiatic bittersweet, privet, Morrow's honeysuckle, multiflora rose, burdock and other unwelcome invaders. A single, female Amur Corktree with fruit was found growing along this strip as well.

Between the two fields, a narrow hedge-row includes a mix of native and non-native species. Of the non-natives in this stretch, the most worrisome are the autumn olive, Canada thistle and Asiatic bittersweet.



The end of Slough Brook, once the terminus of the New Haven-Northampton Canal and now the drainage for the water from the Barrett Street Marsh.

Recommendations

1. Control invasives.
2. Organize trash clean-ups for the island and improve policing to prevent damage to the conservation area.
3. Consider removing red pine and spruce plantations.
4. Follow Mike Mauri's suggestion about limiting the trails to avoid sensitive areas.
5. Install a kiosk near the future Community Gardens showing changes to the area and describing its human and natural histories.
6. Lead field walks here to showcase this interesting property.



A spectacular view of the Summit House from the clearing that will soon become a community garden.



According to MA NHESP, seven state-listed plants and nine state-listed animals have been found in or near Elwell.

Sources

Mauri, Mike. Stewardship & Management Plans for Elwell Conservation Area. 2014.

A Natural History of the Montview Section



Spotted Touch-Me-Not (*Impatiens capensis*)

Butternut (*Juglans cinerea*)



Montview (3.2 acres)

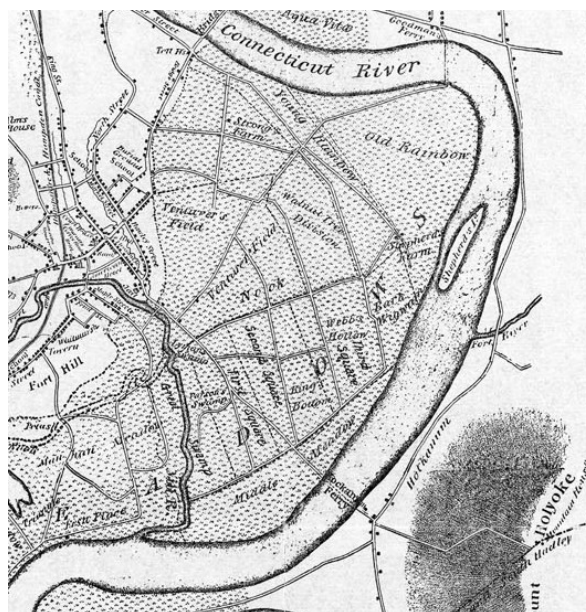
Located near dozens of houses in Ward 3, this three acre property functions as a pocket preserve and park for the local neighborhood. The eastern half includes an informal, $\frac{3}{4}$ acre recreation field and a small meadow, while the western half includes a shallow wetland surrounded by a semi-open landscape with a network of mowed trails. Here, local residents can take in views of the Holyoke Range (“Montview”), watch birds, and enjoy this small piece of semi-wildness.



Montview, outlined in yellow, in context with the dike, Inter-state 91, the Meadows, downtown Northampton and other land protected. Light or-ange properties are conservation land, light red are protected through private conservation restrictions.

History

When the first English settlers arrived in Northampton in 1654, this property was probably an open meadow and was being used, either intermittently or permanently, by the Nonotuck for farming. Within a few years, the land between Hawley, Pomeroy Terrace and Williams Street was divided into eight home lots, and this parcel—along with the rest of the Meadows—was divided into lots for agriculture. For the next 300 plus years, the land was used continuously for farming. And for most of those years, it



The 1831 map identifies all of the different parts of the Great Meadows. This conservation area abuts the section called Venturer's Field.

flooded. But after the devastating floods that occurred in 1936 and after the 1938 hurricane, the Army Corps of Engineers built a 5,000 foot long flood control dike that effectively isolated this piece of property from its historic floodplain. After 1941, for the first time in thousands of years, this land was no longer subject to annual flooding by the Connecticut and Mill Rivers. The owners, how-

ever, continued to farm

the land. When the elderly owner died in the late 1990s, the property was being used to grow corn and hay.



These two photos, 1958 and 2013 show the property in yellow, and the changes in the land—from cleared farmland to a mix of vegetation types—and, of course, the construction of interstate 91. The dike and Venturer's Field Road can be seen in both photos.

In 1998, the heirs had a different plan for the land: a cluster subdivision with forty townhouse condominiums. This was subsequently scaled back to a six-lot, single family house development, which after long conversations with the neighbors and City, was taken off the table completely. In the end, the heirs carved out a one acre lot with the original family home, which they sold to a private buyer, and then donated the remaining 3.2 acres to the City as conservation land.

Since 2000

Soon after assuming ownership, the City worked with the Ward 3 neighborhood and secured a NRCS Wildlife Habitat Incentive Grant, which was used to reseed the cornfield portion of the property with grass. During this same period, the neighborhood converted the southeast corner into a small, informal playing field for the neighborhood kids. A few years later, in 2005, the City leased most of the property to the Montview Neighborhood Farm, a private, organic farming group. For a few years, the farm planted berries and fruit trees and established a vegetable garden in the northeastern corner of the prop-

erty. The western section, however, was not maintained, and over time, woody plants began to creep in around the margins of the wetland and into the former hayfield.

In 2008, the Montview Neighborhood Farm's lease was up, but modest gardening operations continued, although no farm shares were being sold. By 2012, the relationship between the Montview Neighborhood Farm, the neighbors and the City had deteriorated and the City required the operators to vacate the property.

That same year, the Meadows City Conservancy Coalition began working with the City on a management plan for the property. By then a large section in the western part of the property had been overtaken by sumac, and with permission from the Conservation Commission, the neighbors had the area brush-hogged. Some of the sumac stems were already too large to be brush-hogged, which is why today this portion of the property has a network of mowed paths looping through and around clusters of sumac and piles of decomposing brush, circling the wetland and passing through more open areas of goldenrod, touch-me-not and asters.

One arm of the trail system connects to the eastern half of the property where the abandoned gardens of the farm have begun growing in. Some of the farm's former plantings (e.g. bee balm, bergamot, comfrey, blackberries, pawpaw, hazelnut) are still holding on, but most of the garden beds have been overwhelmed by a mix of goldenrod, asters, Canada thistle, Indian hemp, and many other wildflower species. This is the best part of the property to explore if you're interested in butterflies, pollinators and other kinds of insects. Plus from here, you can easily access the dike, and walk over to the conservation land off Pomeroy Terrace or take the dirt roads into the Meadows.



After the property was protected as conservation land, the northern portion began to grow in with brush. Today staghorn sumac towers over the paths and creates some shade.



Local residents, in cooperation with the MCCC, have continued to mow a network of trails through the northern portion of the conservation area. Without their efforts and brush hogging, the land would have grown up into a solid stand of staghorn sumac.

Ecology & Vegetation Patterns

Within the context of Northampton's conservation land, this is a very small parcel, and even considered within the context of the Meadows, it's quite small. But from an ecological perspective, it has four things going for it:

- 1) It has a wetland that functions as a breeding pool for spring peepers and American toads (among other things);
- 2) It includes wet meadow habitat, which has become less common in the last 50 years as fallow land has either been cultivated or allowed to grow into forest;
- 3) It provides wildlife habitat—albeit limited—for migratory and nesting birds, as well as for other some other animals that live in fragmented habitats.
- 4) It has relatively few invasive species. Asiatic bittersweet, multiflora rose, and a large swath of Canada thistle are the most worrisome at the present time. Because of the MCCC and the active role of the neighbors, the likelihood that the invasive species will be controlled here is higher than most other conservation areas in the City. A very small patch of Japanese knotweed has also established in the southeast corner, and swallowwort was observed just outside the boundaries of the conservation area.



The wetland is dominated by reed canary grass, but also includes many other classic wetland species.



Canada thistle in flower, and later in the season, gone to seed. It will continue to spread and take over the "hayfield" portion of the conservation area (former garden) unless it is controlled.



Detailed Vegetation Descriptions

1: A former cornfield, this area was not maintained for several years after the land was acquired by the city and has grown up into a mix of staghorn sumac, with a sea of touch-me-not, goldenrod, and aster bellow. There is some Asiatic bittersweet and multiflora rose in this area.

2: The former permaculture farm is now a mix of leftover plantings (bergamot, comfrey, etc) along with wild-seeded species, including common elderberry, asters, goldenrod and Indian hemp. A native tall thistle grows here, but so does Canada thistle, an assertive non-native that could easily take over this open area unless controlled and mowed.

3. Playing field

4. Scruffy hedgerows with a mix of black locust, staghorn sumac, elm, black cherry, silky dogwood, blackberry, former plantings (hazelnut, mulberry, Chinese chestnut, etc), as well as some non-natives, including Asiatic bittersweet and catalpa. In the understory, touch-me-not, pokeweed, clearweed, gill-over-the-ground, and daylily are common here.

W-1: This is the open wetland. Along the margins are silver maple, elm and a few green ash and pin oak. There are also clusters of staghorn sumac, silky dogwood and some winterberry. The open wet meadow is dominated by reed canary grass, but also includes touch-me-not, tickseed, arrow-leaved tear-thumb, common rush (*Juncus effuses*), meadowsweet, Virginia creeper, sensitive fern, poison ivy and some bulrush and sedges. Grape is also found along the margins.

Rare Species

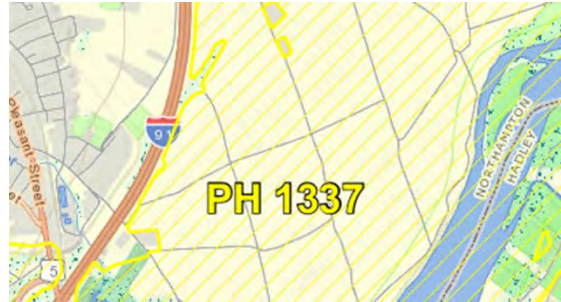
Because of its small size and land use history, this property does not appear to have habitat conditions that support any rare species. A rare clam shrimp, however, has been found in a temporary pond nearby and should be searched for here. Butternut, which is in decline due to a non-native fungus, grows here.

Recreation

In addition to its own trails, the property's proximity to the popular walking trail along the dike and the farm roads in the Meadows enhances the property's recreational value. For a small subset of folks, it might even be a welcome respite from downtown Northampton on a lunch hour.

Recommendations

1. Work with the MCCC and neighbors to control the invasive plant species (Canada thistle, Asiatic bittersweet);
2. Repair the small foot bridge and/or keep the brush down in one or two spots along the path to provide visual access to the wetland, which is a nice place to explore and observe;
3. Define the layout and width of the paths and develop a mowing schedule and brush-hogging scheme for the wet meadow. (The paths are currently about six feet wide, which makes it less likely that people will encounter ticks and



Priority habitat lies just to the east, on the other side of Interstate 91 and along the Connecticut River and its meadows.



Underappreciated wildlife like this Common Meadow Katydid can be found at this conservation area.

therefore may use the property more than if the trails were narrower. That said, there are also a lot of paths and some could be eliminated.)

4. Consider community gardens or other agricultural use in the north-eastern corner (former garden beds of Montview Neighborhood Farm) where there are prime agricultural soils.



The former garden is now a great place to look for wildflowers and birds.

5. If new native plantings are considered, make the decisions carefully—not only because of maintenance responsibilities, but also taking the long-term view (i.e. if trees or shrubs are proposed, what will they look like in 20 years? 80 years? Will they enhance the property? Block a view? Take an Olmsted perspective and carefully consider benefits and disadvantages.)

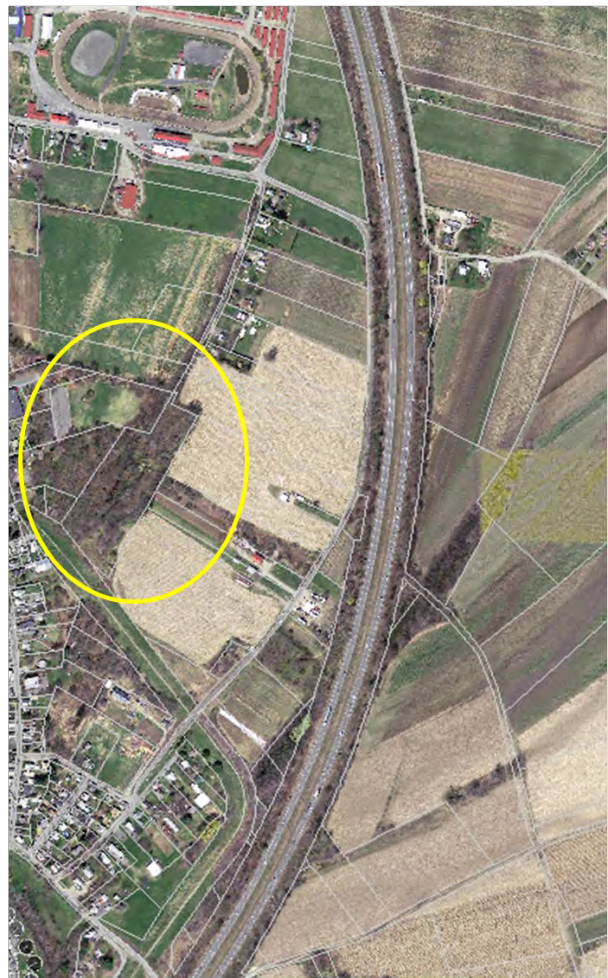
Sources

Management Plan for the Montview Conservation Area. 2014. MCCC. 10 pp.



A Natural History of the Pomeroy Terrace Section

It is hard to believe that just sixty years ago the land behind the former Northampton School for Girls, now Cutchins School, was an open clearing. Today this area is entirely wooded and includes a network of well-maintained trails. The dramatic change was due in large part to the land's acquisition by the State of Massachusetts, which recently donated the surplus land to the City as conservation land.



Vegetation Patterns

Created over time by the Connecticut River, this nearly-level property lies within the 100-year floodplain and includes a long swale that was once part of a river channel or flood trough. Today, the swale receives water during extremely high flood events and more regularly, from drainage off the

grounds, which flow into the swale via a long ditch adjacent to Cross Path Road. Historically this water would have drained to the Montview Conservation Area, but the dike (located at the conservation area's southern border and constructed after the 1938 hurricane) acts as a barricade and the water eventually evaporates.



During the last fifty years, this property has been left idle and over time, what was once a former playing field has developed into a seemingly mature forest. The canopy is dominated by silver maple, but includes impressive catalpas and an abundance of elm and Norway maple. The understory is fairly diverse, but unfortunately many of the most abundant plants are non-native. These include



Pomeroy Terrace

Asiatic bittersweet, Japanese knotweed, moneywort, privet, goutweed and more wintercreeper than anywhere else in Northampton. The common native species are, in order of abundance, touch-me-not, sensitive fern, jumpseed, avens, poison ivy, wood nettle, mad-dog skullcap, elderberry, and silky dogwood. A small clearing near the dike has a swath of sensitive fern, touch-me-not, avens and goldenrod, as well as clusters of staghorn sumac and silky dogwood. North of the property, along the wet swale, are some massive pin oaks; they show up in the 1952 photograph.



Clockwise from the top are three different views of the park-like forest. The last image is of the open clearing near the dike, which includes a thick swath of goldenrod and other forbs. A sewerline runs near here, which may be why this area is periodically cleared.

Recommendations

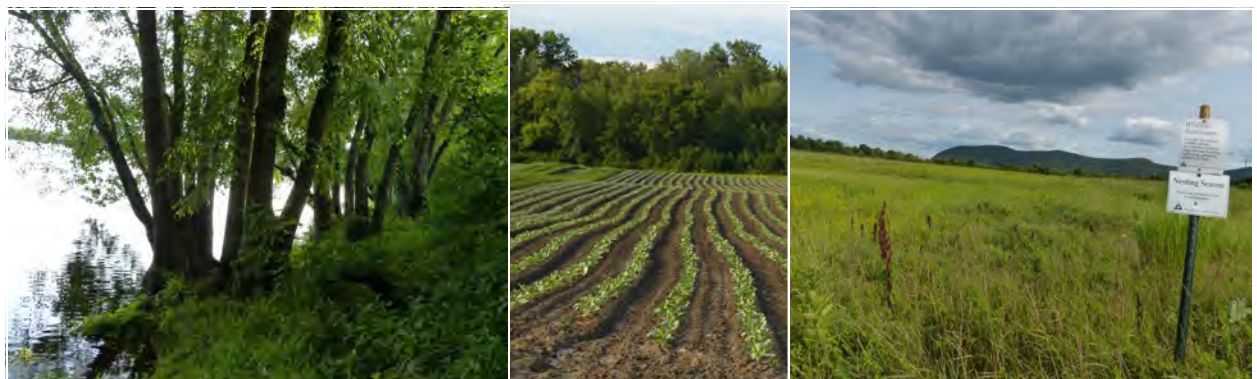
1. At this site, the invasive species appear too abundant to try to control. The wintercreeper is especially problematic, but the management of any of these species seems beyond any reasonable investment of time and money. Control invasives where they are encroaching on views and paths, but otherwise, the best course of action may be to do nothing.



A waist-high “carpet” of touch-me-not in the foreground. The structure in the back is owned by the DPW. Meanwhile, a beautiful, interconnecting network of trails has been established on the property and is well-maintained, with wood chips and wooden bridges over the drainage ditches and swale.

2. Develop an agreement with College Church and/or Cutchins to maintain the trails and/or sell the property to one of these entities with restrictions for its future use.
3. Create a connecting trail from the flood control dike to this parcel and encourage greater public use of the property.

The Natural History of the Pynchon & Manhan Meadows



Pynchon & Manhan Meadows



Pynchon & Manhan Meadows

Using Route 5 as a dividing line, the Manhan and Pynchon Meadows, now sometimes called Arcadia Meadows, encompass about 800 acres. These names—Pynchon and Manhan—were given soon after Northampton was settled in 1654. The first settlers gave John Pynchon, who paid the Nonotuck for the land, 120 acres of meadowland. Pynchon held on to this for a few years and then sold it and according to Trumbull, it has been known as Pynchon Meadow ever since. The Manhan Meadows were divided a little later, in 1657, and were named for the river.

At that time, the Mill River flowed near the toe of Fort Hill, not far from what is now Conz Avenue, and then looped along Fort Hill and emptied into the wetland now known as Ned's Ditch. Due to repeated flooding of their fields, the early settlers dug a new channel in 1721 (*shown on the 1831 map below*).



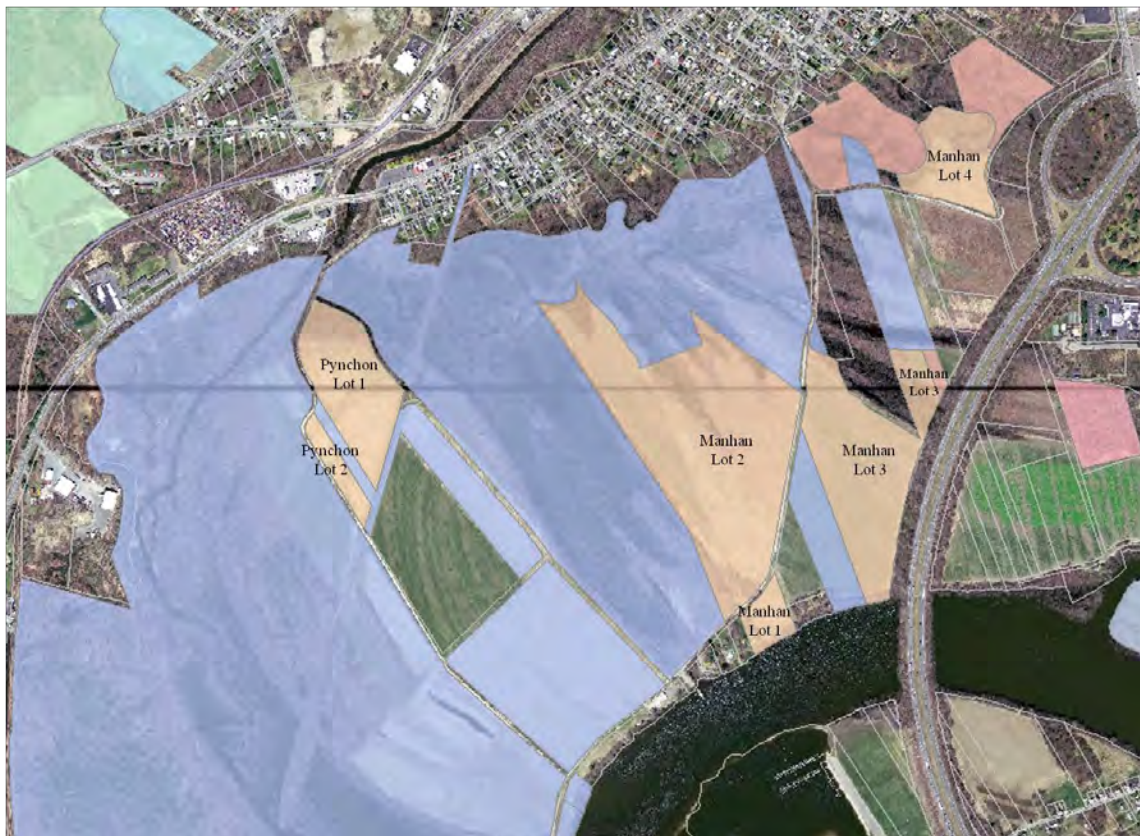
Pynchon & Manhan Meadows

The History of Land Protection in the Pynchon Meadows & Manhan Meadows

Although nearly 90% of the Pynchon Meadows and Manhan Meadows are now protected, conservation efforts here didn't begin until 1944 when the land that now forms the core of Arcadia Wildlife Sanctuary was acquired by MassAudubon. In the 1970s, the organization made several more purchases, with the largest being Ned's Ditch, which is part of an ancient oxbow that was cut off from the Connecticut River approximately 700 years ago. Since the 1990s, MassAudubon, the City of Northampton, and the US Fish & Wildlife Service have all purchased more land in the Meadows, and today all but 100 (+/-) acres remain for conservation.

As of 2014, the City-owned conservation areas include six parcels that are mostly open meadows, with a small portion covered with swamp forest and some of the land in active agriculture. Four of the six properties are managed by Arcadia. Two lots are in Pynchon Meadows; the remainder are in the Manhan Meadows.

Conservation Land in the Pynchon and Manhan Meadows As of 2014	
Name	Acreage
MassAudubon	520
City-Owned Conservation Areas	106
USFWS Conte Refuge	14
Private Conservation Restrictions	30



Pynchon & Manhan Meadows

Pynchon Meadow Lots 1 & 2

Separated by a narrow strip owned by MassAudubon, these two properties are predominantly hayfield and are managed by MassAudubon as part of its grassland restoration initiative. Lot 1 (15 acres) includes a hayfield and three acres of wetland, while Lot 2 (3 acres) is only a hayfield. The trolley line, which ran between Northampton and Easthampton from 1895-1929, forms the southern border of both lots.

Hayfield

The hayfield includes some native grasses like big blue-stem and switchgrass, which were planted and have taken hold, but most of it is covered with clover, timothy, orchard grass and other grasses. This area also has good-sized patches of common milkweed, which, at least until recently, was a good place to search for monarch butterfly caterpillars.



Wetland

The 3-acre wetland on Lot 1 is part of an ancient, 700-year old oxbow referred to earlier. Pin oak and silver maple occur on the wetland's higher hummocks and borders, while the rest is open water interspersed with buttonbush shrub swamp habitat. During the last twenty years, water levels in this area have risen due to beaver activity in the vicinity.



A farm road (Curtis Nook Road) skirts the edge of the fields and beyond it is a scruffy edge with a familiar cast of invasive plants: multiflora rose, Asiatic bittersweet, Morrow's honeysuckle, scattered glossy buckthorn, mulberry and catalpa. These are a concern, but even more worrisome are the extensive patches of Japanese knotweed along the Mill River diversion and Pynchon Meadow Road (via South Park Terrace). They have displaced the native vegetation and have effectively blocked access to the river along most of the road.

Manhan Meadows



Manhan Meadow Lot 1: This 3.5 acre property is an open hayfield, with a narrow margin of trees around three of its edges. A power line and driveway cut along the western boundary and the southern edge borders the oxbow. The driveway serves three cottages, but it is also used by people who fish along the shoreline. Invasive plants along the wooded border include Asiatic bittersweet, autumn olive and bristly locust.



Hayfield

More than half of the hayfield is reed canary grass, while the slightly higher and drier portion is a mix of grasses (smooth brome, Kentucky bluegrass, timothy, reed canary grass), Indian hemp and cow vetch.

Roadside & Powerline

Margin

A scruffy border of trees has grown up along the roadside edge and includes a mix of more than twenty species. The woody vegetation includes green ash, sil-



ver maple, silky dogwood, with lesser amounts of American elm, common elderberry and staghorn sumac. Asiatic bittersweet is common in the edge habitat, which also supports a variety of native wildflowers, including fringed loosestrife, groundnut, hedge bindweed, Joe Pye weed, false nettle, water horehound, and white vervain.

River Edge

The river's edge includes a slightly different mix of species. The most common trees are pin oak, bass wood, bitternut hickory and green ash, while the shrub layer is loaded with false indigo, poison ivy, autumn olive and silky dogwood. Asiatic bittersweet is common, as are groundnut, goldenrod, and fringed loosestrife.



Views of Lot 1, from the hayfield and access road to the camps and oxbow edge. The bottom image shows the tangle of false indigo growing in front of a narrow treeline next to the water of the oxbow. Many people park here to fish.

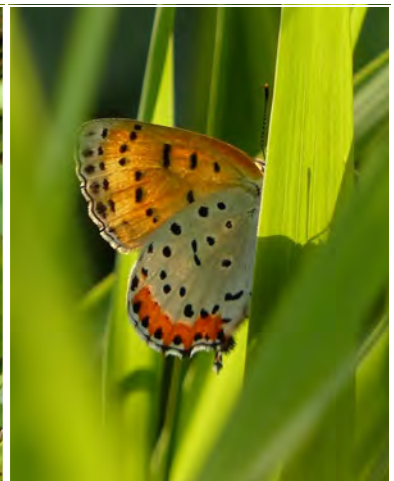
Manhan Meadows Lot 2

When I try to imagine what the Meadows looked like when the first English settlers arrived, this field is



what I picture—open and expansive, with a waving sea of grasses, a backdrop of trees along the Mill River and views of the Mount Tom and Holyoke Range.

Beyond the beauty of this field, this lot includes the largest wet meadow in Northampton and is the only known site in the City for the bronze





copper butterfly (a species in decline in Massachusetts). It is also habitat for leopard frogs, which are also in decline; their only known breeding site in Northampton is in the nearby waters of Ned's Ditch. As a whole, the property can be divided into nine main zones that vary in condition due to hydrology and past land use: (1) the forested powerline right of way, (2) the open powerline right of way; (3) a field currently in wheat, (4) wet meadow, (5) upland meadow, (6) sedge meadow; (7) floodplain forest, (8) buttonbush/shrub swamp and (9) open water.

1. Forested Edge of Powerline ROW: A mix of scruffy forest, mostly silver maple.
2. Open Powerline: This linear corridor includes a diverse mix of species, with silver maple, Joe Pye weed, reed canary grass, asters, goldenrods, Indian hemp and a variety of sedges among the most common.





(A) The seed heads of Canada thistle, an aggressive non-native that spreads both by seeds and underground roots. It currently covers about 1/4-1/2 an acre. (B) The dark seed heads of dock, the host plant for bronze copper, can be seen in abundance in the foreground. Behind is a mix of wheat and planted grains. This is where the bronze copper was found.

3. (Semi-)Cultivated Field: A cover crop of wheat was planted here, but several other species have established as well. The presence of a good-sized patch of Canada thistle (*photo above*) was worrisome, as this is a species that can readily take over open field habitats. In addition, it was growing in the vicinity of a large patch of dock (*Rumex* spp.), which is the host plant for the Bronze Copper Butterfly. This is the area where the single specimen of Bronze Copper was found, and not far away, a leopard frog was seen.



4. Wet Meadow: Much of this part of the property is dominated by a mix of reed canary grass, Kentucky bluegrass, sensitive fern and quack grass.



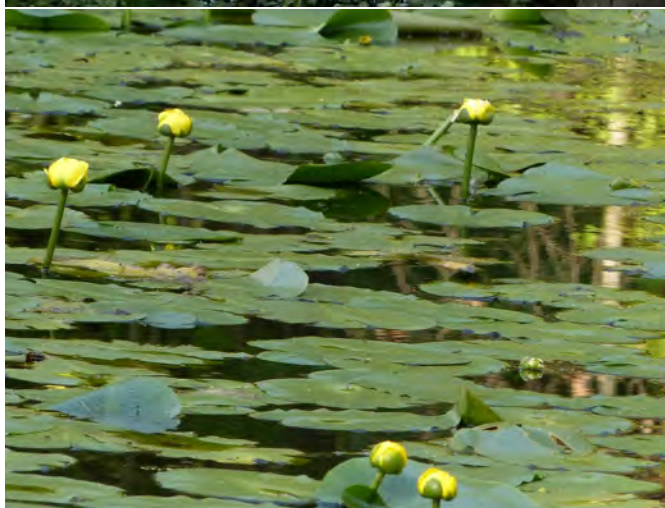
Wet-loving grasses carpet the floodplain of the Manhan Meadows, and in areas with shallow depressions that collect water, sedges (12+ species), cattails and sensitive fern take over.

5. Sedge Meadow: In wetter sections, true wet meadow conditions dominate. This is a sedgy mix, with nearly a dozen types of sedges, as well as bulrush, swamp candles, smartweeds and marsh fern. Box seed, boneset and sensitive fern are also common.

6. Upland Meadow: Only slightly higher in elevation, this area is flooded less frequently and includes a mix of species that are typical of cultivated hayfields. White clover, red clover, daisy fleabane, Queen Anne's lace, sensitive fern, wild madder, ragweed, common milkweed and a mix of grasses (common brome, timothy, quack grass, Kentucky bluegrass) are among the most commonly encountered species.

7. Swamp Forest: On the drier hummocks and margins of the shrub swamp, pin oak, silver maple, green ash, and red maple are common. Black willow is occasional, and sensitive fern, groundnut and reed canary grass are common in the understory. Purple loosestrife and multi-flora rose are occasionally found along the sunny margin and there is occasional, fruit-laden glossy buckthorn here as well.

8. Shrub Swamp: Dominated by buttonbush, this habitat also includes silver maple and pin oak along the margins. Speckled alder, winterberry, red maple



Top: An open water area surrounded by swamp forest; *Middle*: one of several buttonbush shrub swamps; *Bottom*: yellow cow-lilies growing in the deeper open water of the ancient oxbow.

and grapes also share the habitat. The understory is sparse, but beggar's ticks, water hemlock, and poison ivy are found here. Bur-reed and common bladder nut grow in the shallows.

9. Open water: Aside from cow lilies, this area is exclusively open water. No water chestnut was observed here, although Arcadia staff and volunteers hold water chestnut pulls each year in the main marsh. This area should be monitored to ensure that unwelcome species do not invade these quiet backwaters.

Manhan Meadow Lot 3

Currently maintained in agricultural crops, this area is surrounded by a border of trees, shrubs and herbaceous plants. On one side is swamp forest, on the other is Route 91, and one small stretch borders the edge of the oxbow. (Refer to map for vegetation patterns).



1. Cropland

2a. Swamp Forest Border:

Pin oak is the most common tree in the overstory, while alder and silky dogwood dominate the shrub layer. Golden rod, grape, false nettle, and Joe Pye weed are the most common herbaceous plants. Canada thistle and autumn olive were the two non-native species found growing along this border.

2b. Route 91 Border: Black locust, silver maple, and box elder dominate the slopes of the highway.



All the farming on city-owned conservation land is done organically.

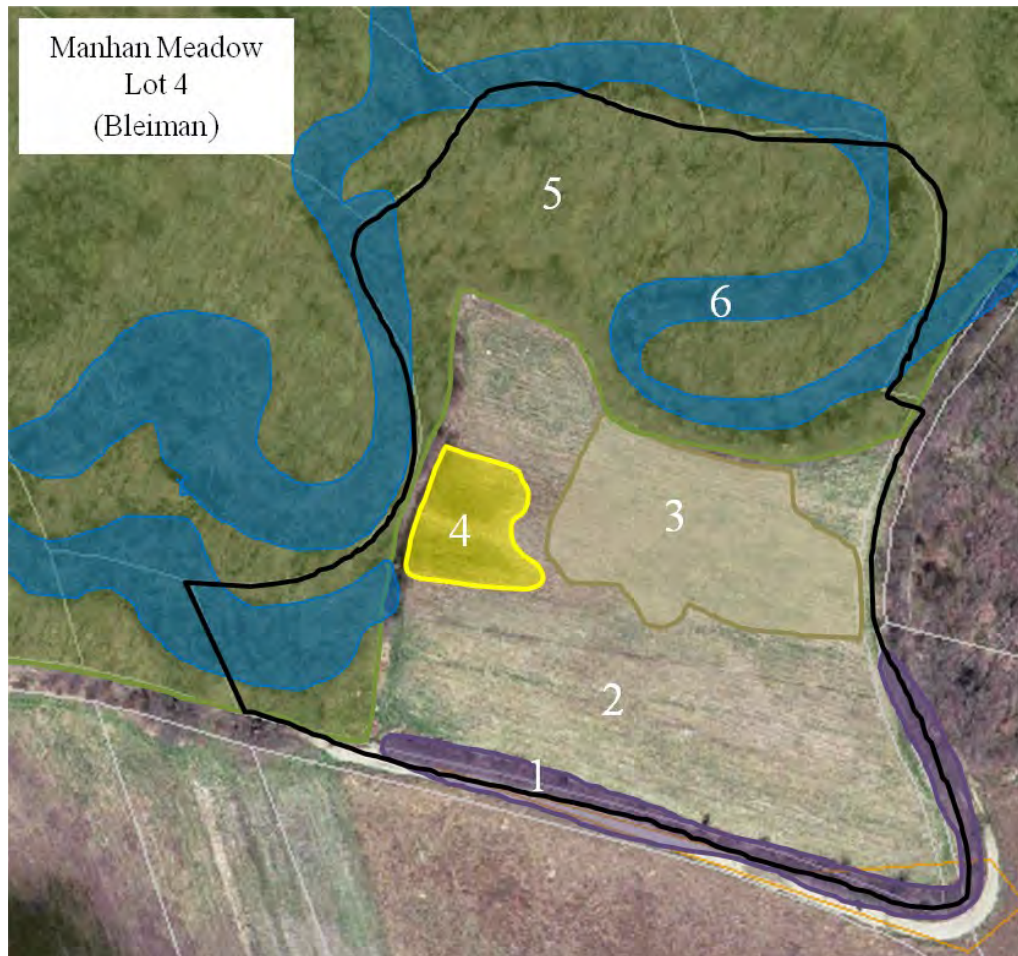
There is an abundance of Asiatic bittersweet, with occasional autumn olive and catalpa. Grape is common here, too.

2c. Oxbow Border: This area has nice access to the shoreline, but it is very noisy because of Route 91. Giant silver maple and ash dominate, with occasional basswood, box elder and bitternut along the edges. The understory is open with grasses, poison ivy, water horehound, false nettle and some Asiatic bittersweet. On the abutting property owned by Arcadia, a single Amur corktree (!) was found growing along the wooded edge.

3. A wet pocket with young cottonwood and some purple loosestrife.
4. A sunny, muddy patch with purple loosestrife, Canada thistle, bristly locust, cocklebur and common plantain.
5. Pin oak/silver maple swamp forest
6. Fallow field
7. Reed Canary Grass dominated wet meadow
8. Hayfield
9. Open water/button bush

(A) A view across the oxbow from the conservation land; (B) Swamp forest, with an understory of sensitive fern; (C) Swamp forest where water gathers for longer periods and prevents vegetation from growing; (D) Amur corktree growing along the margin.





Manhan Meadow Lot 4

Donated by Bruce and Rita Bleiman in 2009, this 9.8 acre parcel is almost equally divided between swamp forest and open field, which is bordered by a narrow hedge row that runs along the dirt road and frames two sides of the property.

Roadside Margin

During the last decade (or so) a shrubby border of vegetation has grown up along the roadside edge and now creates an almost impenetrable border.

The woody plants include both native species (staghorn sumac, smooth sumac, mulberry, elderberry, box elder, and slippery elm) as well as an abundant and worrisome amount of non-native woody plants (black locust, Autumn olive, multiflora rose, Asiatic bittersweet, and scattered ca-



The scruffy border along Potash Road is rife with invasive plants .

talpa.) The sunny margin also supports a number of weedy wildflowers, including evening primrose, giant ragweed, rabbits foot clover, Queen Anne's lace, and goldenrod.

Open Field

As part of the terms of the donation, the City is required to cut this field periodically to prevent woody vegetation from becoming established. Based on the hedge row growing along the roadside, this will be an important condition to maintain.

The vegetation in the 5-acre field shifts depending on hydrology. One large area is dominated by goldenrod and milkweed, while another big section is covered mostly in grasses and sedges. A third portion (the wettest) is dominated by sensitive fern, reed canary grass, seedbox and false nettle (*Boehmeria cylindrica*). A few purple loosestrife are growing in the wettest area, but the leaves had been extensively damaged by leaf beetles (*Galerucella californiensis*, *G. pusilla*) and there were not many flowers.

Field Edge

The edge of the field includes an abundance of silky dogwood and grape, but ash, speckled alder, and silver maple were also common. A few sapling glossy buckthorn (boo!) were also found here.



From the abandoned field, the views of the Mount Tom range are impressive.



Without routine mowing, this field would grow into brush.



Glossy buckthorn isn't yet common, but it is beginning to establish along the edges of the forest. At Arcadia Wildlife Sanctuary, it is a serious problem. As evident here, it is a prolific fruit producer.

Swamp forest & Abandoned Mill River Bed

The wooded section of the property includes a portion of the snaking channel of the old Mill River and notwithstanding the mosquitoes, poison ivy, and din of Route 91, this part of the conservation area is enchanting. The canopy is a mix of impressive silver maple and pin oak, while the understory is often an uninterrupted carpet of sensitive fern, lady fern, jumpseed and grape. Royal fern, jack-in-the-pulpit, stinging nettle, blackberry, winterberry, elder-berry, wild raisin, and bitternut are also com-mon, but most impressive of all is the amount of poison ivy in some places.

As alluring as this part of the forest is, its future appearance and composition is threatened by the spread of two worrisome invasive plants—privet and Morrow’s honeysuckle, both of which are extremely common in the shrub layer. These non-native shrubs, along with winged euonymus, are also common in the bordering properties that are protected under conservation restriction. Another threat to this area is Japanese knotweed, which is located in one location along the roadside edge (so far) near the property’s boundary.

Recommendations

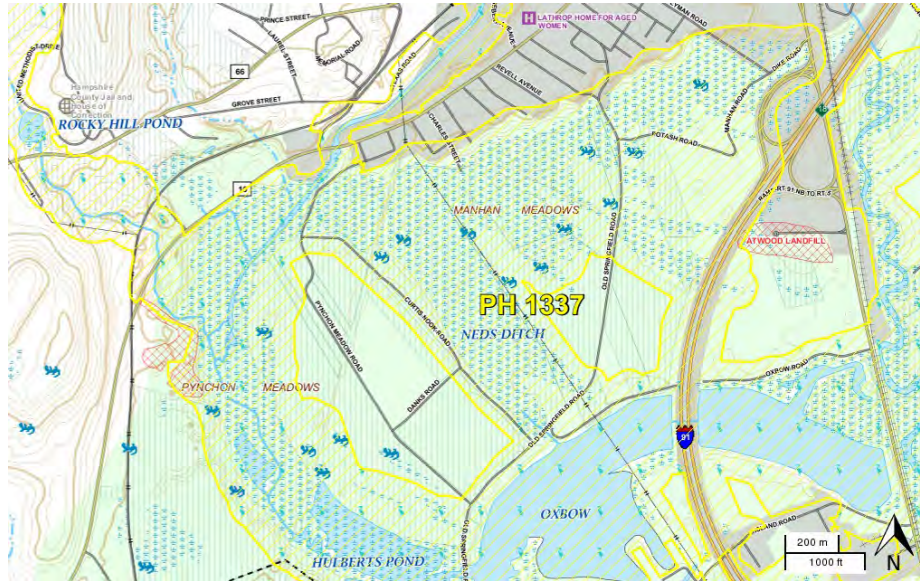
From both a local and regional perspective, Pynchon and Manhan Meadows and their associated swamp forests are significant—historically, agriculturally, recreationally, economically, aesthetically and ecologically. This entire area falls within a MA NHESP “Priority Habitat for Rare Species” and this area has



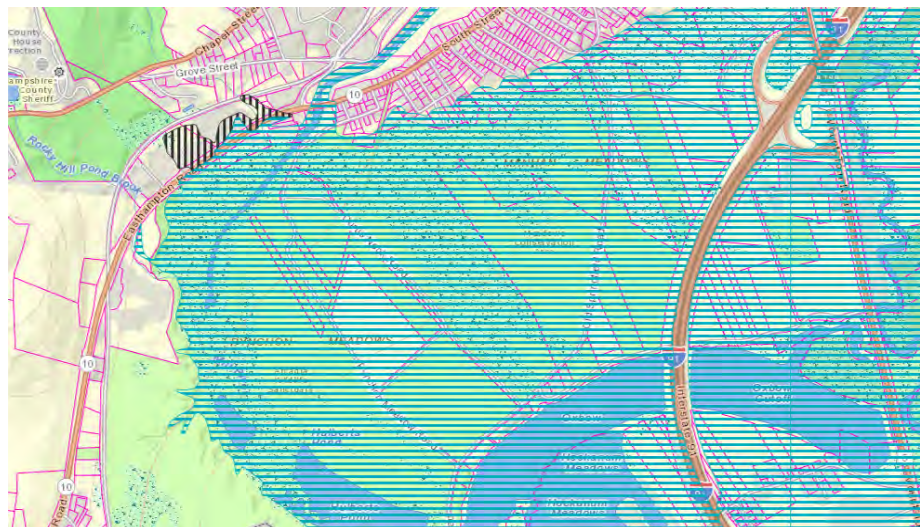
the highest concentration of certified vernal pools in the city. It is also entirely within the 100-year floodplain zone.

In terms of stewardship and maintenance, the broad open meadows are, for the most part, well-cared for. Four of the city's six conservation parcels are managed by MassAudubon, which has similar conservation goals as the City, and nowadays all of the land that the City leases to farmers must be maintained organically. Illegal hunting is no longer much of a problem, and even ATV and off-road vehicle use is less of an issue than it once was.

Today, the issues within these meadows are related to illegal dumping (household trash and yard waste) and the spread of invasive plants. Dumping has been a long-standing problem, and although the situation is better than it was years ago, annual clean-ups are needed. One of the worst stretches for yard waste dumping is in the forest along Lyman Road. Signage and more frequent patrolling might help abate this.



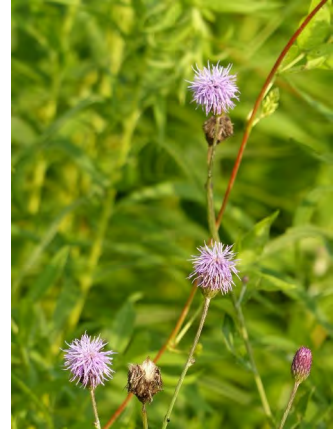
This map shows the locations of certified vernal pools (salamander symbol) and the Priority Habitat for a Rare Species, as designated by the MA NHESP. Data from MassGIS.



This entire area is within the 100-year floodplain and is important from a public health standpoint in terms of abating storm damage and storing floodwaters.



Invasive plants require even more attention than trash clean ups. Every field edge has troubles with Asiatic bittersweet, glossy buckthorn, multiflora rose, and autumn olive. Canada thistle is present in some of the fields, and the swamp forest along the former Mill River channel near the Lyman estate are loaded with privet and Morrow's honeysuckle. Meanwhile, Japanese honeysuckle has formed a wall along the diversion channel on Pynchon Meadow Road and other patches have appeared on Potash Road. Just as alarming, the presence of at least one Amur Corktree, a species that is highly invasive in eastern Massachusetts and New York state, does not bode well for the future.

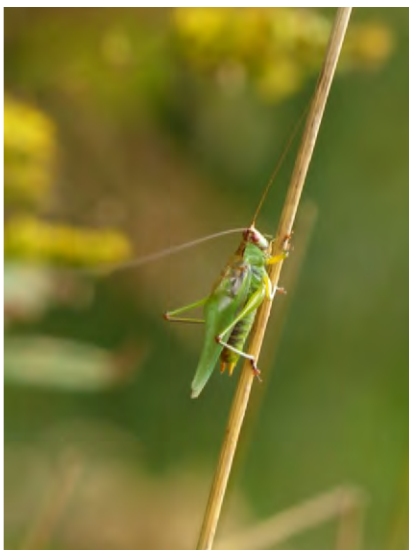


Rather than approaching these haphazardly, a logical next step is to convene a meeting to address invasive plant species problems throughout the Meadows (including the Connecticut River Meadows east of Route 5) and develop a comprehensive approach. Obvious stakeholders include MassAudubon, MassHighway, USFWS Conte Refuge, MA DFW, MA NHESP, The Nature Conservancy, Meadows City Conservation Coalition, the farm advisory committee, and local neighbors. Regardless, managing invasive plant species in the Meadows will be challenging, but the first step will be identifying the most important areas to focus on, the species to control, how to control them, and when.



Ned's Ditch, part of the 700-year old abandoned oxbow, includes some of the most extensive shrub swamps in the state and the largest great blue heron rookery in Northampton. In 2012, a pair of bald eagles began nesting here,

The Natural History of Rainbow Ranch



Rainbow Ranch

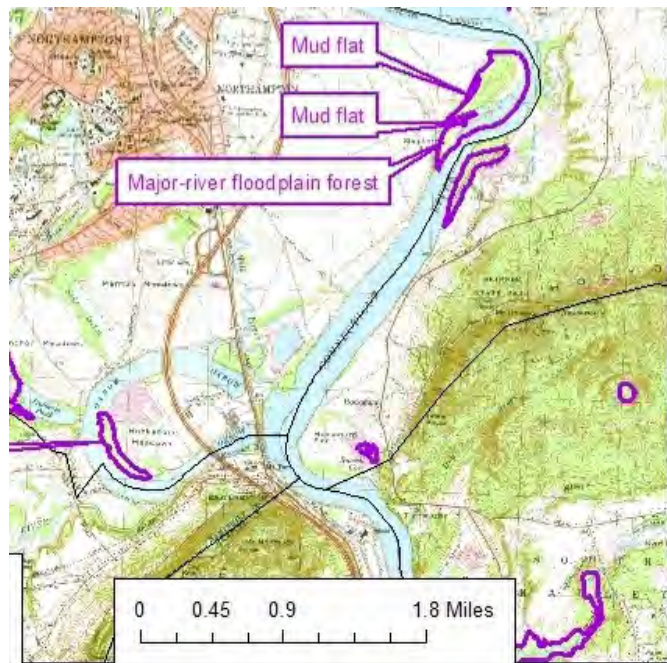


Rainbow Ranch

Overview

Together with land owned by the Massachusetts Division of Fisheries & Wildlife, Rainbow Beach encompasses more than 100 acres and several special riverine habitats, including the second largest remaining tract of unfragmented floodplain forest on the Connecticut River in Massachusetts (Pat Swain, MA NHESP, pers. comm.) and some of the state's best examples of mud flats (admittedly not a habitat that gets most people's hearts racing, but important nonetheless). The broad, sandy beach is also particularly important as it is the only known site in Massachusetts for a dwindling population of Puritan Tiger Beetle, a species that is listed endangered in Massachusetts and threatened at the federal level. The beach also continues to be one of the most popular destinations on the Connecticut River, and in contrast to the problems in 1993, the temporary structures, illegal overnight camping and tree cutting are no longer enforcement issues.

Unfortunately, the long-term health of this conservation area (and the nearby MA DFW properties) is now threatened by the spread of invasive non-native plants. The most worrisome of these are Japanese knotweed, Asiatic bittersweet and garlic mustard, but several others (pachysandra, moneywort, purple loose-



This map highlights the locations of some of the best examples of specific natural community types in the Commonwealth.

strife, Morrow's honeysuckle, privet, glossy buckthorn) are also present in or near the margins conservation area and are likely to spread.

Rainbow Beach: In Focus

Considered on its own, the city-owned portion of this protected area includes nearly 60 acres of floodplain forest, more than half a mile of sandy shoreline, and impressive views of the Holyoke Range and Connecticut River.

Depending on where you are, the shoreline varies from broad,

open beach to a narrow, muddy margin crowded with willows. The forested area is also variable, but its overall feel is park-like. Still, it's not the kind of "park" that would appeal to most people. Below an impressive canopy of silver maple and scattered cottonwood, the understory shifts from broad, mud-bottomed swales filled with sensitive fern to slightly higher, drier plateaus and old river terraces that are covered with shoulder-high, stinging wood nettle. In fact, there are acres and acres of stinging nettle. And compounding the wood nettle experience are the mosquitoes, which can be intensely annoying and persistent during the summer. Still, if



Rainbow Beach, highlighted in yellow, is located near several other protected properties. Not only is it sandwiched between two parcels owned by MA DFW, it is also in close proximity to hundreds of acres that are protected as part of Skinner State and Mount Holyoke Range State parks. Elwell is less than a mile upriver and Mitch's Island, now owned by the Kestrel Trust, is even closer downstream. In addition, many more acres have been permanently set aside through APRs, private CRs and as part of the USFWS Conte Refuge—including the farmland immediately adjacent to this conservation area (but not shown on this map).



A puritan tiger beetle, a federally threatened and state-endangered species, is held by USFWS researcher Chris Davis at Rainbow Beach in 2011. Davis has just painted it with a unique color code—red + green—which will let him and his team identify this individual if they see it again. This technique, which is based on mark-recapture, allowed Davis to track this beetle's population numbers each year and monitor its increases and decreases year-to-year. The research began in 1997 and the highest number of beetles was 198 in 2005. The numbers began declining in 2008 and in 2013, only 8 adults were found. At the end of that season, the USFWS decided to stop monitoring the Rainbow Beach population and concentrate on areas where this insect's long-term survival is more likely.





Stinging nettle, *Laportea canadensis*, in fruit at the end of the season, and a female mosquito, taking advantage of a passing meal.

you're prepared for these conditions, this is a forest worth exploring. It is, in short, a conservation area unlike any other in Northampton.

Geology & Vegetation Patterns

Unlike almost any other conservation area in Northampton, nearly all of the Rainbow Beach consists of

“new” land that was deposited by the river within the last 150 years. The rate of deposition, however, hasn't been steady. In addition, the land is further modified each year by blocks of ice, which scour the beach, and floods, which sometimes tearing open new troughs and swales.



Today Rainbow Beach is a mix of gentle ups and downs, with broad plateaus interrupted by old river terraces and swales of varying depths, widths and lengths. This variability is particularly evident within the forested portion of the conservation area, where the soils vary from well-drained, nutrient poor sands to water-saturated, nutrient rich mudflats. These variations—in elevation, soil, and moisture—influence the property's vegetation patterns, which can be divided into five main communities: river shoreline, floodplain forest, mudflats, flood troughs, and the former channel (now an inlet) that lies between Shepherd's Island and the mainland. In spite of the differences, all of these communities

A Brief History of Shepherd's Island

Islands are common, ephemeral features on meandering rivers like the Connecticut and Shepherd's Island is no exception. Like Elwell Island a mile upriver, Shepherd's is a relatively recent addition to the Connecticut River.

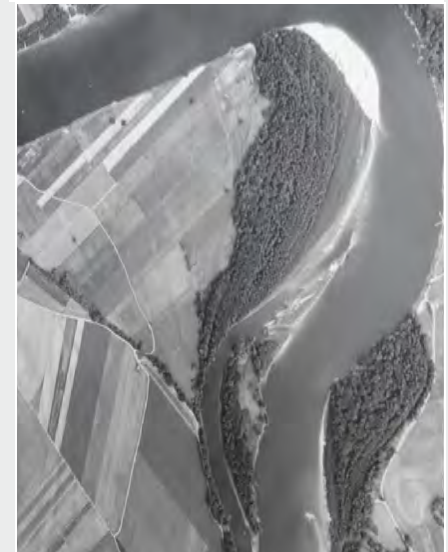
Now owned by the Massachusetts Division of Fisheries and Wildlife, "Shepherd's Island" began forming in the 1720s, and by 1754 had grown to six or seven acres and the grass was being cut for hay. In 1770, it was sold to Solomon Stoddard, a descendant of one of Northampton's earliest ministers, and for the next thirty years it was known as Stoddard's Island. In 1803, the island was purchased for \$1200 by Levi Shepherd, and has been known ever since as Shepherd's Island.

The island's initial rapid growth didn't last and by 1904, it had only doubled in size to 15 acres. By then, the land was owned by the Mount Tom Lumber Company, which had purchased the island in order to construct a series of basalt pilings that, along with a huge chain, would hold back logs floating down from the north. With this set-up, the logs could be released gradually and allowed to drift down to the mill, which was located on Route 5 where the Packaging Corporation of America now stands. Extra logs were stored in the Oxbow, which used to be called the "Old Bed of the Connecticut River".

By the 1950's, Shepherd's Island had long since been abandoned by the Mount Tom Lumber Company and in the intervening decades, the channel separating the island from the mainland filled in. By the 1980s, Shepherd's Island was no longer an island, but part of the mainland.



A log jam on the Connecticut River in 1915. *Courtesy Forbes Library.*



Top to Bottom: 1952 aerial, 1965, and 1986. Lots of changes—in Shepherd Island, the beach and vegetation. There has also been considerable cutting upstream of the beach on the northern side.



Key to Vegetation Patterns: (1) Floodplain forest; (2) Flood channels & mudflats; (3) Sandy beach; (4) Muddier shoreline.

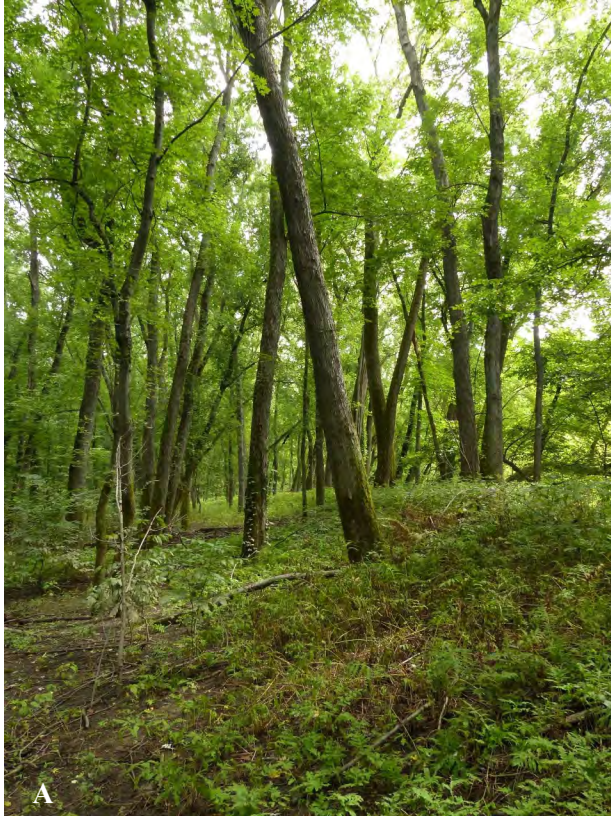
have one thing in common: they all contain perennial plants that can withstand periods of flooding that lasts for weeks at a time.

The Floodplain Forest

Just behind the arc of black willow, the true floodplain forest habitat begins. It is the dominant community type and covers more than 90% of the conservation area, from the river's edge to the vast farm fields.



The park-like quality of the floodplain forest, with ostrich fern in the foreground and an immense carpet of stinging nettle below an arching canopy dominated by silver maple, and with a single sycamore. It is one of my favorite habitats.



(A) The floodplain forest is not a level plain, but a mix of low ridges and broader, bottomland swales. These slight changes in elevation strongly affect the hydrology and plant communities. (B) Butternut is a species in serious decline due to the arrival of a non-native fungus, but several good-sized butternuts can be found within the conservation area.

As is typical of floodplain forests, there is no shrub layer, only a canopy layer above a carpet of herbaceous plants. In this case, the forest is dominated by silver maple, with occasional cottonwood, and widely scattered black willow, ash, sycamore and elm. The herb layer varies depending on the moisture, soil and light conditions. In the muddier swales, there are swaths of sensitive fern, false nettle, clearweed, mad dog skullcap, water horehound and grasses. In siltier settings, ostrich fern takes over, and on many of



More views of the floodplain forest and its variations in hydrology and plant communities.



(A) Yellow touch-me-not is common in the richer soils of the floodplain forest and like spotted touch-me-not, it is a type of *Impatiens*, so named because of its explosive seed pods. (B) Along the edge of the river, in low swales and flood channels you can often find huge rafts of branches and trunks that have been carried downriver and deposited during times of high water. (C) Although not the most common plant, poison ivy sometimes is found in abundance. In this view, it is carpeting the ground and climbing up the trunks.

the sandy, old river terraces and plateaus, the forest understory is composed of a single species: wood nettle (ouch!). Although painful for us to walk through, it is also the host plant for red admiral butterflies and in some years, thousands of butterfly caterpillars can be found feeding on the leaves.

Flood Channels

Within Rainbow Beach are several flood channels, the largest of which is just inside the boundary of the conservation area and parallels the farm fields for most of its length. Gouged by



floodwaters, this channel helps drain the farm fields and extensive floodplain nearby. As you head south, it gets gradually broader and deeper. So deep, in fact, that even during the driest part of the year, it still contains water. Just before reaching the inlet, the channel narrows abruptly. A large amount of flood debris has accumulated at this point and in recent years, beavers have built a dam here as well.



(A) A type of smartweed blooms in this open glade that is dominated by a muddy understory and surrounded by willows and silky dogwood. (B) The open glade, as seen from the edge of the floodplain forest.

Mudflats

By mid-summer, the floodwaters in the channels and low swales have evaporated and exposed the gentle slopes and muddy bottom. A mix of plant species can be found here, all of them able to tolerate wet, poorly-oxygenated, but nutrient-rich soils. Among the more common are touch-me-not, false nettle (*Boehmeria cylindrica*), monkeyflower, fringed loosestrife, clearweed, beggar's ticks (*Bidens cernua*; *B. vulgata*), smartweed (*Polygonum* spp.), various umbrella sedges (*Cyperus* spp.), grasses, young willows (*Salix* spp.) and silky dogwood. These plants and sprawling shrubs provide food and cover for a wide range of animals, from katydids and native bees to spotted sandpipers and raccoons.

Muddy Shoreline

Although known as *Rainbow Beach*, the shoreline along much of the conservation area is actually quite muddy. It is also quite narrow, and the mix of sand and



silt near the water's edge supports little to no vegetation. A few yards further from the river, however, is a thick band of black willows, their branches reaching out toward the light. Along this same margin, between the water's edge and higher ground, you can also now find intermittent patches of Japanese knotweed and the twisting vines of bittersweet.



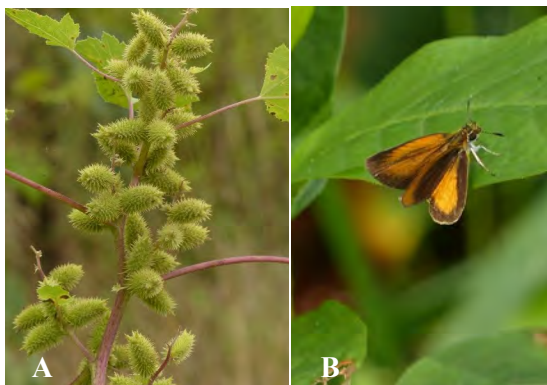
One of the fascinating aspects of the beach's ecology is the vegetation patterns, easily seen in the image above, which vary depending on the underlying substrate, flooding, and deposition history. In this view, the vegetation zones shift from open beach to a band of annuals (mostly grasses) to a zone of perennials (which includes both invasive purple loosestrife and state-listed sandbar willow) to an arc of willows to finally, taller silver maple. These consecutive, arcing bands of vegetation are, in fact, why the area was named Rainbow Beach.

Beach cocklebur (*inset photo A*) is a specialist of sandy areas like this one. Its spiny seeds, which have recurved hooks, are mammal-dispersed.

Many kinds of wildlife (*inset photo B*), both common and rare, can be seen at Rainbow Beach. This butterfly is a type of skipper.

Beach

The most used and famous part of this conservation area is the beach, which attracts hundreds of boaters during the summer season. The sandy beach is mostly open, but along its back border grow a mix of willow species (including Sandbar Willow, *Salix*



The views from the conservation area are impressive, taking in the Summit House, Holyoke Range, and in this view, a beaver swimming past. At present, the only way people can legally access Rainbow Beach is by boat.

Rainbow Ranch

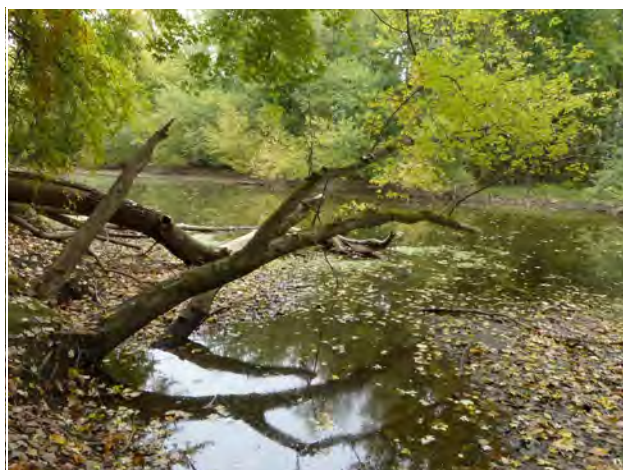


exigua, a state-listed species), beach cocklebur, Indian hemp, grasses, and sedges. There is also purple loosestrife in this upper-beach zone.

The Inlet

Although not officially owned by the City or MA DFW, this quiet backwater was once one of the main channels around Shepherd's Island. Today it supports a handful of aquatic plant species that thrive in still water, like water starwort (*Callitriche* sp.), waterweed (*Elodea canadensis*), and duckweed (*Lemna* spp.). During spring and fall migration season, this inlet is a hotspot for ducks (mallards, wood ducks, blue-winged teal, ring-necked ducks, ruddy ducks, common mergansers and American widgeon) and other waterfowl. Throughout the year, this is

also a good place to watch for kingfishers perched on the overhanging branches and find great blue herons hunting along the shoreline. Pickerel frogs, American



toads and painted turtles are the amphibians and reptiles most commonly seen here. Deer, beaver, raccoon and red fox are now common to find here as well.

Invasive Species & Other Recommendations

In terms of invasive plants, the situation at Rainbow Beach is mixed. Although many areas remain dominated by native plants, there are also several places where invasives have gained ground. Particularly worrisome are the large and expanding patches of Japanese knotweed, which occur along the edges of the conservation area (field edge and riverside) and also scattered in its interior. Garlic mustard is par-



Common non-native plants in Rainbow Beach and vicinity include:

- (A) Japanese knotweed
- (B) Garlic mustard
- (C) Moneywort
- (D) Morrow's honeysuckle
- (E) Asiatic bittersweet
- (F) Purple loosestrife
- (G) Catalpa



ticularly prolific near the farm fields, and not far from the field edge is an old river terrace with a dense tangle of multiflora rose and Asiatic bittersweet, with occasional catalpa and Japanese barberry. In fact, in 2013, this area earned the dubious distinction of having the second largest known bittersweet vine in the Commonwealth. The individual vine measured more than 8 inches across!

Other invasives on the property include purple loosestrife along the shore, moneywort in the mud-dier soils, and privet along the edges of the farm field. The adjoining land owned by MA DFW includes a similar coterie, but in addition, there are at least two patches of pachysandra growing in the forest on the Rainbow Beach property. MA DFW is now trying to control all of the invasive plants on its property (Chris Buelow, MA NHESP, email correspondence) and a collaborative campaign with the City of Northampton would prove even more effective.

- 1) Create a permission system to gain overland access to Rainbow Beach. Currently the only public access to Rainbow Beach is by boat. It would be ideal to work with the local farmers and landowners to develop a by-permission-only access policy for natural history walks and to take advantage of the existing trail along the north margin. Public access should preclude motor vehicle use and only allow foot traffic.
- 2) Monitor for trash at the conservation area and in the vicinity.



The whopper bittersweet vine, found by Northampton resident Allison Bell, was cut and herbicided in 2013 by forester Lincoln Fish. It is now completely dead and its chain-sawed vine is rotting away. The radio piece about it was carried nationally and can still be heard on the archives of *Living on Earth*.



Shattered stalks of Japanese knotweed in the foreground.



- 3) Conduct an inventory of the largest trees in the vicinity of the conservation area. There are some very large hickories, cottonwoods and silver maples.





Sheldon Field Farmland

This land abuts the Sheldon Recreation Field and is currently planted with corn. It will eventually be used for recreation. Although of limited value to wildlife, as a cornfield it does provide some value to Canada geese and other migratory birds, which feed on the stray corn and other weed seeds after the harvest.

Part of the property abuts the slopes along Interstate 91, which have grown into a tangle of cottonwood and silver maple, as well as cascades of bittersweet. These additions to Sheldon Field were acquired in two transactions. In 2004 the Kielec family donated 2.6 acres, and in 2008, Charles Jasinski donated another 1.6 acres in memory of William Jasinski. Mr. Jasinski currently has a ten-year lease agreement with the City to farm the property for \$1.00/year. The Meadows City Conservation Coalition is responsible for maintaining the conservation restriction.



Both Sheldon Recreation Field and the cornfield, shown in light blue. Although most of this is owned by the City, the Broad Brook Coalition has a shared interest in the land that is under cultivation. They are working with the Meadows City Conservation Coalition regarding stewardship.



A Brief History of Sheldon Field

In 1954, on the occasion of the Northampton's 300th anniversary, Theodore Sheldon leased his family's 10-acre tract to the City for use as a playground for 99 years. The price was a dollar a year. Sheldon's family had owned the land for seven generations, ever since it was given to Isaac Sheldon, one of Northampton's first settlers, as part of his home lot and meadowlands.

After Theodore Sheldon died in 1969, the land was transferred to his heir, who sold it to the City in 1999. It now includes a mix of playing fields and a commuter lot.



6 The Natural History of the Florence Greenway



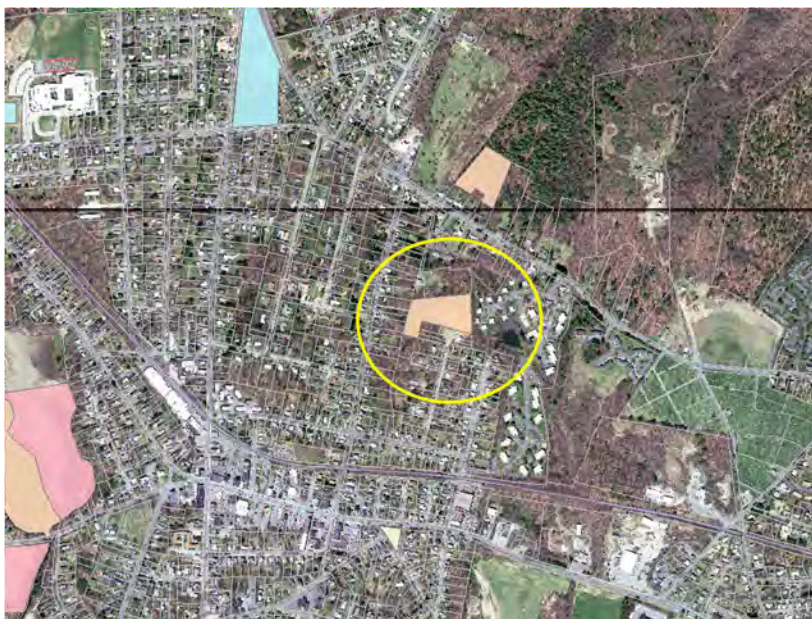


Of all the City-owned conservation areas, this 5-acre site near downtown Florence has one of the strangest histories. Accessed from Garfield Avenue, it opens into a grassy, ½ acre clearing surrounded by woods that are dominated by oak in the drier, rockier areas and sugar maple in the sections with deeper, richer soils.

On the other side of the clearing, a narrow rim of bedrock along one edge is a clue to the site's former uses. In the 1890s this property was operated as a small rock quarry. The blocks of stone were probably used locally for foundations and walls. A few, for instance, can be seen in a low stone wall at the entrance to the bike path on Chestnut Street.

By the early 1940s, the rock-quarrying operation had ceased and true to the times, what better use for a hole than to fill it in? Beginning in 1943, the quarry became a private dump. Approved by the City, trash was hauled from the local neighbor-

The Natural History of the Garfield Avenue Greenway



The conservation area, circled, is within easy walking distance of hundreds of homes and the bike trail.



In the 1700s and 1800s, numerous small quarries were present in Northampton, with most of the stone blocks used locally for building. For instance, some of the rock from this quarry can be seen in a low stone wall at the entrance to the bike path on Chestnut Street. This photograph is from *Sheffield's 1895 History of Florence*.

hoods and businesses and then burned. Fifteen years later, the hole was close to full and after covering it with fill, the property was sold to new owners. They built a house on the land (but not on the former pit). Fifteen years later, they sold the house and property to a new owner.



By 1958, the quarry had been regraded and a house built along the edge. By 1965 it was growing in with vegetation.

Whether the new buyer was aware of the property's history as a dump isn't known, but in 1989, after an investigative report demonstrated high metal concentrations in the soils, the MA Department of Environmental Protection (MA DEP) categorized it as a former dump. Four years later, MA DEP formally recognized it as a "disposal site," which triggered a series of tiered investigations to assess the public health risks. As part of this, between 1993-2003, samples from groundwater monitoring wells and the soil were collected and tested, and although the groundwater monitoring wells showed no evidence of contamination, the soil test showed higher than acceptable levels of polyaromatic hydrocarbons, heavy metals and, in one area, PCBs.

In 1995, the owner took the City to court, citing an inability to sell the property at fair-market value and listing the City as the responsible agent for authorizing the burning dump during the 1940s. To settle the case, the City purchased the property for \$240,000 and agreed that the former owner bore no future liability for any subsequent remediation costs. In 1998, the city demolished the house and in order to protect the public from any health risks associated with the soil contaminants, capped the former landfill.

Seven years later, as part of a limited development project, the City subdivided the property, selling six lots near the end of Garfield Avenue (one market-rate lot and five for affordable housing) and held on to

the remaining four acres as permanent conservation land. Today the DPW holds rights, the responsibility to maintain the landfill cap in perpetuity.

Since then, the property has not been managed other than brush-hogging the capped landfill each year. There are no signs or designated parking to let neighbors know that this is a conservation area, either along Garfield Avenue or from the Meadowbrook Apartment complex. But occasionally it has a visitor or two. Last spring, a small trail had been beaten down across the old landfill and leading into the woods. But, by July, the vegetation had grown up and overwhelmed it.

Geology

Although almost all traces of the quarry have been covered, a few bedrock outcrops appear in the wooded portion to the north. The bedrock here is part of a long, north-south running band of 450 million year old metamorphic rock that stretches from Whately to Connecticut. In the old days, many of the bedrock



knobs in this part of town were used as small, unofficial quarries—almost like borrow pits. The 1831 map, for instance, calls a nearby knob Millstone Mountain (presumably because it was a good site to quarry millstones) and the dirt road/driveway near St. Mary's Cemetery is now known to a few old timers as Quarry Road. And another small quarry lies just beyond the boundary of the conserva-

tion area. Whether it was open and operating at the same time as the Garfield Avenue Greenway's quarry isn't known, but a 1965 aerial photo suggests that rocks from the second quarry were being removed during the early 1960s.

In spite of this property's bedrock underpinnings, most of it is fairly level. This is a function, not of human alteration, but of the land's glacial history. After the last of the continental glaciers retreated from the region, this area was covered by glacial till and then by the icy waters of glacial Lake Hitchcock. The lake waters were shallow here, with a drumlin due west (High Street) and bedrock outcrops to the north-

east. Over time, the underlying till was covered with layers of lake clays, which were subsequently covered with layers of sand as the Mill River formed a large delta into Glacial Lake Hitchcock.

During the last 12,000 years, these glacial deposits have been modified by erosion and more recently, by people.



Vegetation Patterns

After the dump was covered in the late 1950s, most of the land around the old quarry/dump was left idle and is now almost entirely forested. Based on land use history and soil conditions, the property can be divided into four broad vegetation communities (see Vegetation Patterns).

Capped Landfill/Former Quarry Pit (1)

Now an open field, the capped landfill/former quarry is a jumble of goldenrod and asters, along with giant ragweed, burdock and three good-sized clumps of Japanese



knotweed. On the northwest side is a small exposure of the old quarry wall where garlic mustard, celandine, multi-flora rose, euonymus and catalpa have established. Just beyond and ringing the northern boundary of the old quarry, the forest edge is a mix of black locust, stag-horn sumac and scattered oak.

Oak-Dominated Woods (2)

Just north of the old quarry pit is a small, but almost park-like, oak-dominated forest, with impressive rock outcrops. In addition to oaks (red, white and black), the thin soils also support a mix of red maple, sugar maple, shagbark hickory, sassafras, black birch, and white pine. Witch hazel, maple-leaved viburnum, wild raisin, huckleberry and low-bush blueberries are common shrubs, while white woodland aster (*Eurybia divaricata*) and Virginia creeper are the most abundant ground cover. Other ground plants include Canada may-flower, Pennsylvania sedge, true Solomon's seal, wild sarsaparilla, teaberry, poison ivy, and bracken fern. The leathery, evergreen fronds of marginal shield fern grow in the nooks of the rock outcrops, and a few Japanese barberry bushes can be found here too.

Black Locust/Sugar Maple Woods

This pretty section of the property was obviously cleared in the past and has wetter, richer soils than the adjacent oak-dominated forest. No bedrock is visible here, and the forest is dominated by black locust and sugar maple, with a



By late summer the capped landfill is thick with vegetation, including Japanese knotweed in the foreground.



Oak leaves carpet the surface of the conservation area in the fall.

healthy component of red maple. Fallen trunks of black locust crisscross the forest floor. In the shrub layer, spicebush is common, and multiflora rose, privet and winged euonymus are occasionally encountered.

The forest floor is much richer and includes swaths of lady fern, spinulose woodfern, and hayscented fern. Virginia creeper and Canada mayflower are also common, while the dreaded garlic mustard is found here too. A single large sycamore is located on the property boundary; it is impressive...but it also has wintercreeper clambering up its trunk. Not far away is a small, shallow, isolated depression where American toads may breed in the spring.

Multiflora/Privet/Wintercreeper Area

This pocket near the isolated wetland was the most recently altered, and is an absolute mess of multiflora rose, privet and wintercreeper, with even a little *Phragmites*. Spotted touch-me-not and enchanter's nightshade are also here, but the invasives dominate this patch.

Wildlife

In spite of its small size and residential location, this property is used by a variety

Winged euonymus, one of several non-native plants, found in the Garfield Avenue Greenway. It is related to Asiatic bittersweet.



This part of the conservation area is open, with sugar maple and black locust.



An enormous sycamore grows at one end of the property. Note the wintercreeper scrambling up the trunk.



of wildlife. What enhances its value is its proximity to the protected and wooded land within the Fitzgerald Lake Greenway.

Nearly a dozen birds were heard or seen during my brief visits (crow, cedar waxwing, junco, blue jay, red-bellied woodpecker, nuthatch, Carolina wren, gold finch, yellow-bellied sapsucker, indigo bunting, wood pewee, and palm warbler) and it is probably used as a pass-through by raccoons, skunk, deer, etc. Bear have been observed on Straw Avenue many times, and so it is not unlikely that they pass through here too.



Insects, like this beautiful clymene moth (*Haploa clymene*) use this conservation area too.

Recommendations

Although this conservation area will never become a destination for a wide audience, it can function like a pocket preserve for the neighborhoods around Verona Street, Straw Avenue, Chestnut Avenue, and the Meadowbrook Apartments. This won't happen, however, unless more people become aware of what a nice little patch of woods this is. In addition to putting a sign up, I would recommend organizing a field walk for local neighbors to introduce them to this conservation area. With their help, a loop trail could be created and the invasive species could be controlled. In the future, it might make sense to build a kiosk and/or create a brochure that describes the conservation area's history.

It will also be important to work with the DPW and Board of Health to ensure that the Japanese knotweed is controlled and does not spread. It could easily overwhelm the capped landfill and spread into the black locust/sugar maple forest as well.



The roof tops of the Meadowbrook Apartments can be seen from the edge of the conservation area. A linking trail to this neighborhood would be beneficial to residents.



(A) The edge of the later quarry that lies just off the northern boundary of the conservation area. During the last 50 years its side slopes have grown in with trees and polypody fern and spinulose woodfern grow in its rocky nooks. (B) Although most of the rim of the old quarry/land fill has been covered, there are a few places where you can still find the former edge.



(A) Although this conservation area has a long history of alteration, there are a few impressive trees, including this large white pine in the central part of the conservation area. (B) Cut stumps, probably of black locust, reveal that this area has a long history of human disturbance that continued even after the landfill was covered in the early 1950s.

Sources

Sheffield, Charles. 1895. A History of Florence, Massachusetts, including a complete account of the Northampton Association of Education and Industry. Florence, MA.

Tighe & Bond. 2003. Activity and Use Limitation and Response Action Outcome. DEP Site 1-00524. 148 pp.



Above, the thin soils over the bedrock are part of the reason this forest is fairly open and easy to navigate through.

Natural Resource Summary for the Garfield Conservation Area	
Estimated Habitat for Rare Species	No
Vernal Pool Habitat	Possible
BioMap	No
Supporting Natural Landscape	No
Coldwater Fisheries	No
Conservation Priority (CAPS-UMass)	No
Climate Change Resilience	No
Medium Yield Aquifer	No

A Natural History of Mary Brown's Dingle



Mary Brown's Dingle



A Natural History of Mary Brown's Dingle

The name “Mary Brown’s Dingle” recognizes both the woman who donated the land and also reveals something about the land’s topography. A “dingle” is an old English word that refers to a small, shady dell or hollow, and this one was sold to the City’s Conservation Commission in

1983 by Mary Frances Brown. The price was a dollar, with a provision that the land be used for “passive recreation and conservation purposes, and for the protection, preservation, promotion and development of the natural resources.”

Brown’s connection with the dingle began in 1959 when she moved into the house at 141 Crescent Street. From her back



Mary Brown’s Dingle lies on the southeast side of Round Hill, a landscape that has played an important role in Northampton’s cultural and economic history. The only public access to the conservation area begins at the end of Glendale Avenue. Built in the 19th century, the street’s name probably was chosen because of the pretty little, park-like valley behind it. The word “glendale” means fertile, low-lying arable land. This photo shows the dingle in the 1950s.

windows, she could look out over this patch of woods and a decade later, she had the chance to buy it. The next year, in 1970, Brown moved away and sold her Crescent Street home. But for some reason, she held on to this one and half acre triangle. When she finally donated it to the Conservation Commission, she was living in Brickyard, New Jersey. Why she donated it, who she was, or even when she died has been impossible to find out. Today, as far as we know, Mary Brown is remembered only through her name's association with this small conservation area.

Changes Since 1993

In the twenty years since I first inventoried Mary Brown's Dingle, it has undergone remarkable and unwelcome changes. The narrow path that used to thread up the sewerline right-of-way to the woods has all but disappeared, partly from disuse and partly because it has been overtaken by invasive non-native plants. Of these, the worst is Japanese knotweed. Two decades ago, it was present at this site in a few discrete clumps. Today, not only are the patches bigger, but there are also a lot more of them. This one species has spread throughout much



Above, Japanese knotweed blocks the former path and the view of the wetland. Below, a close up of knotweed in fruit.



As this 1895 map shows, the dingle, which is located where it reads “W. 2.,” historically received enough water from the south-east edge of Childs Park (then owned by Henry Watson) and the springs on Round Hill to create an open brook. All of the water from Childs Park and the other springs in the area have since been piped and re-routed. Mary Brown’s Dingle, however, still has enough groundwater and drainage seeping out at its upper section to create the wetland that covers a third of the property.

After sheeting through the wetland, the water goes northeast under Prospect Street, then under the bike path, and into Barrett Street Marsh. From there, the water has been routed north, flowing through yet more ditches and pipes, until it eventually daylight near the mouth of Slough Brook and into the Connecticut River.

In 1792, the springs on Round Hill became the city’s first water supply when some of them were tapped and conveyed via hollowed-out logs to a limited number of businesses and residences in Northampton’s downtown. The hill was also the site of town picnics in the early 1800s, and later it became the home for the Northampton School for Boys, which became the Round Hill Water Cure and Hotel, and later became the Clarke School for the Deaf. During the 19th century, Round Hill also became one of Northampton’s most prestigious neighborhoods.

The presence of springs on Round Hill is due to its geologic history. It is a drumlin (shown in deeper green, with lighter green representing protected areas), a north-south trending glacial landform with an underlying core of compact till. Till, made up of unsorted rock, gravel, sand, and clay and located only a few feet below the surface is pretty much impermeable. Rainwater soaks through the ground until it hits the till and then, as groundwater, runs downslope until it eventually discharges as springs and seeps.

Child’s Park, to the north, is also underlain by a drumlin.



of the site and now covers large sections of the slopes and forms a barrier along the wetter portion of the property.

But knotweed is hardly the only problematic invader. During the last twenty years, garlic mustard, lesser celandine, privet and wintercreeper have arrived and proliferated. Multiflora rose has spread from the uplands into the wetland. Japanese maple and winged euonymus have established on the slopes. More catalpa and Norway maple have taken hold. Asiatic bittersweet has spread.

The changes are evident even before you enter the property. Parking at the end of Glendale Avenue, there is a patch of knotweed growing in the shade of young Norway maples. Two enormous cottonwoods nearby mark the boundary of



Above, multiflora rose in fruit and privet in flower; below, the patch of pachysandra as you enter the property.



Japanese knotweed blocks the pathway.

the conservation area, and the sign for the conservation area is just a few feet further. On the slope to the left are more Norway maple and Japanese knotweed, on the right is a grove of black locust above a carpet of pachysandra and wintercreeper.

Walking up through the conservation area, the dingle's eastern slope (behind Crescent Street and mostly private land) is dominated by a canopy of Norway maple, with scattered catalpa, elm, and red maple. Below is a tangled mess of non-natives, including wintercreeper, Japanese knotweed,



Wintercreeper, a member of the same family as Asiatic bittersweet and a type of Euonymus, now covers the hillside. Insert is a close-up. This plant is being tracked in the state because of its invasive potential.

garlic mustard, and celandine.

In fact, nowadays, native plants are few and far between.

The vegetation isn't much different along the sewer line easement. In 1993 it was open,

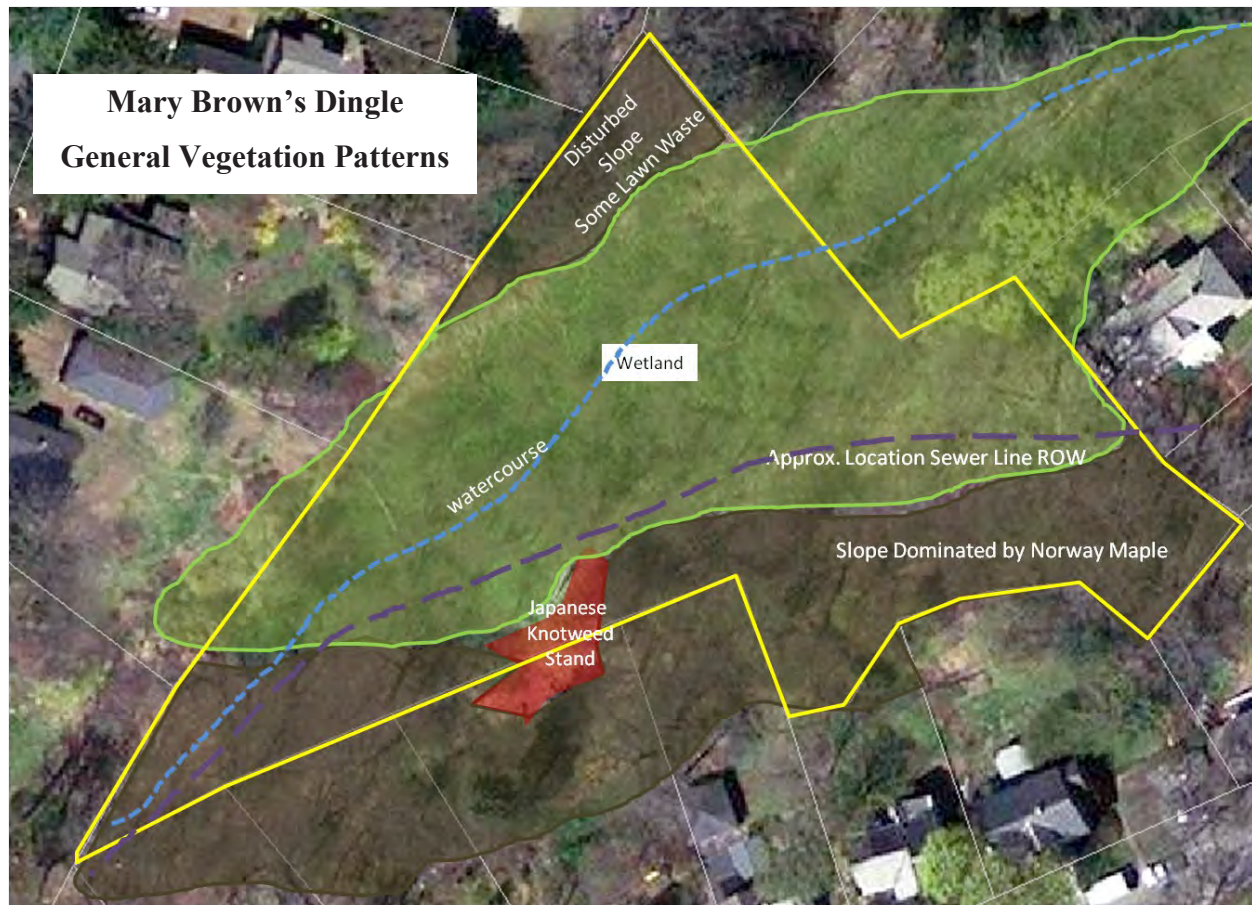


sunny and seepy, with a mix of boneset, goldenrod, touch-me-not, fringed loosestrife, rushes and sedges. Today, most of

those species are gone, replaced by lesser celandine, garlic mustard, Japanese knotweed, multiflora rose, privet and Asiatic bittersweet. Elm, red maple and black locust grow along the west-

ern edge, which is now thicker and shadier than twenty years ago.

Just beyond is the wetland, which has actually fared a little better. It still includes many of the native plants that grew here twenty years ago, including a border of black willow, silver maple and red maple and a carpet of skunk cabbage in the spring. More speckled alder and elderberry have grown up in the shrub layer, but so have privet and multiflora rose, which are now the most common woody plants in the wetland. A large patch of Japanese knotweed now runs along the prop-



erty’s western boundary, marking the edge of the backyards of the homes along Franklin Street.

Wildlife

As a green island surrounded by homes, the conservation area does provide a small but suitable habitat for a variety of animals that do well in suburbia. This list has changed during the last twenty years. Gray squirrels, raccoons, opossums, and skunks are still here, but now deer are regular visitors too. The bird life has changed as well. Carolina wrens and red-bellied woodpeckers, which were rare sightings in Northampton twenty years ago, are now year-round residents and part of the acoustic background that makes up Mary Brown's Dingle.

A Preliminary Checklist to the Vertebrate Animals at Mary Brown's Dingle		
Birds	Reptile	
Mourning dove	Garter snake	
Red-bellied woodpecker		
Eastern Phoebe	Amphibians	
Black-capped chickadee	Spring peeper	
Tufted titmouse	Red-backed salamander	
Blue jay	Pickerel frog	
Fish crow		
House wren	Mammals	
Carolina wren	Raccoon	
American robin	Skunk	
Ruby-crowned kinglet	Opossum	
European starling	White-tailed deer	
Cardinal		
Common yellowthroat		
Eastern junco		
Cowbird		
American goldfinch		
White-throated sparrow		
English sparrow		
House Finch		



Mary Brown’s Dingle

Recommendations

When the Conservation Commission first acquired this parcel, it was hardly pristine. Fill had been dumped around the edges, the sewerline had been routed through. But in those days, non-native plant species were still a non-issue. Owning the land meant protecting it,

and management and stewardship were limited to cleaning up trash and putting up a sign.

That's no longer the case.



If the conservation commission intends to maintain this area for “passive recreation and conservation purposes, and for the protection, preservation, promotion and development of the natural resources,” several steps need to be taken. A first step would be increasing public awareness and introducing more people to this conservation area. A field walk could be organized to help introduce the conservation area to the neighborhood. Such an



outreach effort might also help to minimize yard waste dumping in the future and lead to efforts by the abutters and adjacent neighborhood to control some of the invasives and transform this place into a more usable, enjoyable place, reestablishing the trail and maybe even installing a small bench. The DPW should be brought into the planning phase to discuss periodic mowing and clearing of the sewerline.

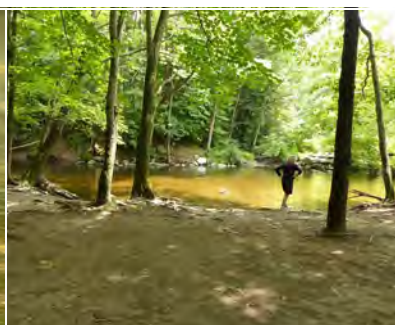
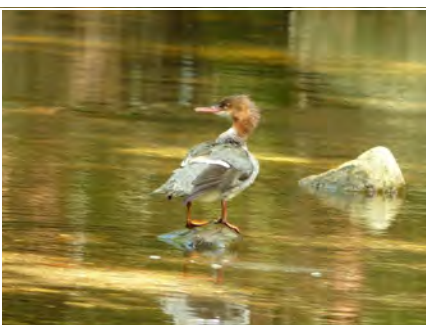
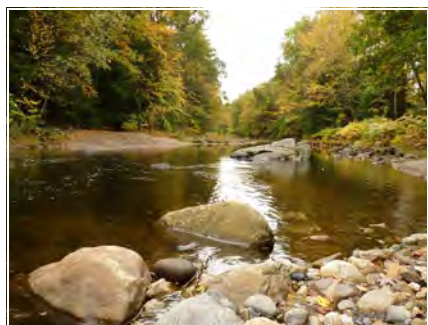
As small as it is, Mary Brown's Dingle is the largest piece of wildness left on Round Hill and the last place on Round Hill where a spring is allowed to emerge naturally. Its wetlands also help to mitigate flooding and aid in groundwater recharge, the entire parcel provides some limited wildlife habitat, and for the immediate neighbors, it is a small green backdrop for their homes.

Realistically, this conservation area will never be more than a pocket preserve/park. That's not a bad thing, but by attending to some of the invasives and adding some other modifications, Mary Brown's Dingle could be a much more interesting natural area for everyone—wildlife included.



The non-native plant known as lesser celandine forms a carpet on the ground not far from the wetland; above, from the west end of the conservation area, looking east. The green is the skunk cabbage in the wetland in the early spring.

7 An Overview of the Mill River Greenway



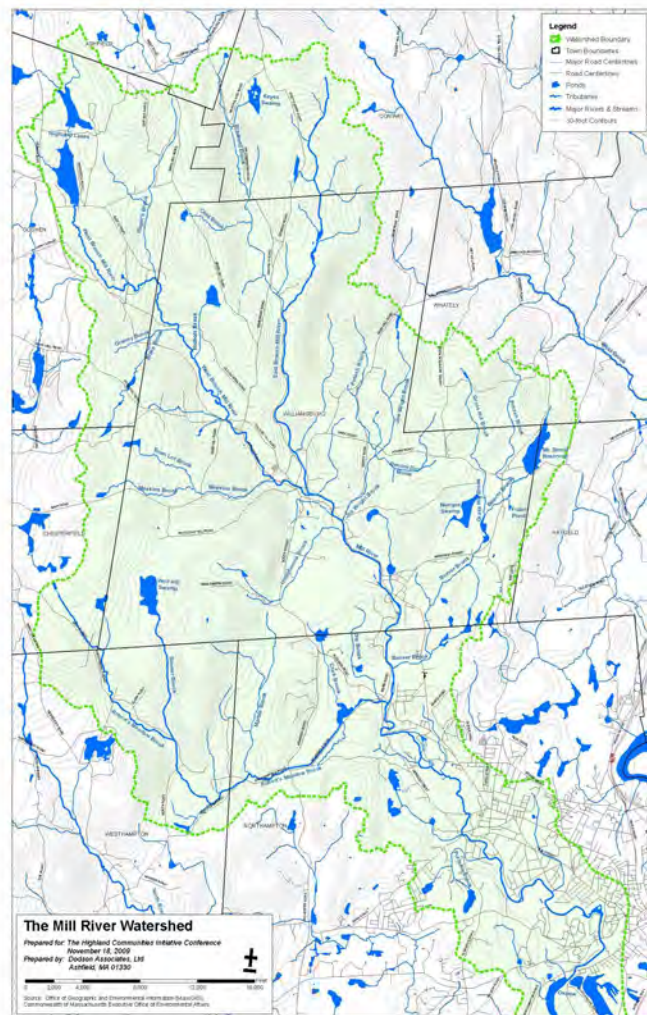
Mill River Greenway Overview

In 1974, when Northampton's Conservation Commission identified its land protection priorities, it placed the creation of a greenway along the Mill River at the top of the list. Looking back, their decision seems either incredibly idealistic or downright visionary.

At that time, the Mill River was terribly polluted. Mills and homes were still discharging wastes into the river. Road runoff was a problem. But as the Conservation Commission knew, the water quality conditions in the Mill River were improving. Just five years before, the town of Williamsburg had finally stopped discharging its untreated sewage directly into the river and the same year, the burning dump abutting the Mill River near Arcadia Wildlife Sanctuary had been closed.

The Conservation Commission expected these trends to continue, and what's more, three good sized properties within the greenway were already protected: Look Park's 157 acres included half a mile along the Mill River, Maines Field in Florence protected another ½ mile stretch and MA Audubon's Arcadia Wildlife Sanctuary owned all the land on either side of the Mill River downstream from the Route 10 (South Street) bridge. In addition, the State Hospital and Smith College lands included long stretches along the Mill River and given their ownership, they could be viewed as at least semi-protected.

Today, the original members of the conservation commission have a lot to be proud of. During the last forty years, many more properties along the Mill River greenway have been permanently set aside. The City now owns nine separate conservation areas along the river, all of the fields of the former



From its headwaters at Upper Highland Lake in Goshen (1,440 feet in elevation), the Mill River drops 1,330 feet by the time it reaches the confluence with the Old Oxbow at Arcadia Wildlife Sanctuary. Most of that elevation change takes place even before it reaches Williamsburg (530 feet) and, between Haydenville and Arcadia, the total drop in elevation is only 315 feet. Of the river's total 37-mile length, about 10 1/2 miles are within Northampton. *Image courtesy of the Mill River Greenway Initiative.*



The Mill River in Leeds, not far from the border of Haydenville, following a downpour.

State Hospital have been protected through an Agricultural Preservation Restriction, Smith College has placed a portion of its river frontage under private conservation restriction and another landowner has done the same. When all of these “protected” properties are stitched together, the total amount of riverbank protected along the Mill River is about ten miles, or about 50% of the river’s total length in Northampton.

And just as the Conservation Commission of 1974 hoped and imagined,

during much of the year, it is now clean enough for swimming and fishing, and the water quality in the lower section of the Mill River is now so good that it supports the highest diversity of freshwater mussel species in the Commonwealth, with 9 of the state’s 12 species, six of which are rare enough to be state and federally listed as either “threatened” or “endangered.” Many other portions of the Mill River greenway fall within the state’s priority habitats for rare species, and portions of the Mill River are, as the Conservation Commission hoped, among the most heavily visited natural areas in the City (*See Table 1 for details*).

But as a “tragedy of the commons,” some sections are now so popular and heavily used that the banks have become badly trampled and eroded. There is also problem with excess dog waste, which has been suggested as the underlying cause of water quality problems and *E.coli* spikes. And even more troubling and harder to solve is the aggressive spread of certain invasive, non-native plants. Some sections of the Mill



In 1940, the Army Corps of Engineers listed the Mill River as “one of the most polluted in the state.” This view was taken from the Button Mill Conservation Area in Leeds.

River are now among the most severely impacted areas in the entire city, with the most problematic plants species being Japanese knotweed, Asiatic bittersweet, Morrow's honeysuckle, Japanese barberry, garlic mustard, privet, winged euonymus, and glossy buckthorn. These plants not only harm many of the greenway's ecological values, they also reduce its recreational and aesthetic qualities.

As daunting and seemingly overwhelming as the management of invasive plant species may be, there is a new volunteer group called the Mill River Watershed Initiative (MRGI). Led by John Sinton and Gaby Immerman, MRGI focuses on raising awareness about the river's importance (ecologically, historically, recreationally, aesthetically) and working collaboratively. Already they have formed partnerships and alliances with the Town of Williamsburg, City of Northampton, Leeds Civic Association, Smith College and GrowFood Northampton, and have been working on projects ranging from assessing erosion to developing a comprehensive plan to control invasive plants along the river corridor.



Top: The Mill River near Maines Field includes a popular, quiet-water swimming hole.

Middle: The view across the fields now held by the MA Department of Agricultural Resources and managed by Smith Vocational School. Yankee Hill is located at the end of the field.

Bottom: John Sinton, one of the founders of the Mill River Greenway Initiative, next to his favorite Northampton waterway-the Mill River.

The Natural History of the Brickyard Greenway

Greenway Name	Invasive Plant Species Abundance	Most Problematic	Priority Habitat for Rare Species	Vernal Pool	BioMap Core Habitat	Conservation Assessment Prioritization	Cold Water Fisheries	Trails	Parking
Upper Leeds Rail Trail	Low	Japanese knotweed	Yes	No	Yes	No	Yes	Yes	On Street
Beaver Brook	Low	Japanese knotweed, Multiflora Rose, Asiatic Bittersweet	Yes	Yes	Yes	No	Yes	Yes	On Street
Leeds Monument	High	Multiple	No	No	No	No	Yes	No	On Street
Button Factory	High	Multiple	No	No	No	No	Yes	No	On Street
Florence Meadows	High/variable	Barberry, Japanese Knotweed, Asiatic Bittersweet	Yes	No	Yes	No	Yes	No	Designated
Vistron	High	Multiple	Yes	No	Yes	No	Yes	No	No Access
Maines' Field	High (along River)	Japanese Knotweed	Yes	No	Yes	No	Yes	Yes	Designated
Cutlery	Medium	Barberry	Yes	No	No	No	Yes	Yes	At Maines Field and walk
Yankee Hill	Medium/Low	Multiple	No	No	No	No	Yes	Yes-from Former Hospital Grounds	From Burts Pit Road
Ward Avenue (private CR)	Medium	Winged Euonymus, Japanese Knotweed	No	No	No	No	Yes	Yes	From Smith College or Ward Avenue
Veteran's Field-Historic Mill River	High	Privet, Winter creeper, Japanese Knotweed	Yes	Possible	Partly	No	No	Yes	At Veteran's Field

Table 1: Summary of natural invasive species issues, natural resource values and infrastructure for the city-owned conservation areas in the Mill River Greenway.



The Natural History of the Bay State Section



Bay State Section



The Bay State Section

Although this conservation area is only 1.7 acres, it is part of a longer, narrow corridor of protected land that extends for more than 1/2 a mile along the river—from Maines' Field south to the border of the Cutlery property. The cutlery property adds another thousand feet of forested land, and together, these properties along River Road provide one of the longest, prettiest views

of the Mill River in Northampton. Although there is no designated parking, the conservation area is easily accessible to the local neighbors via a small, informal trail that leads to the river's edge. At present, the most significant management issue is invasive plant species, which are still in low enough numbers that their control is possible.

An aerial view of the conservation area shows how long and narrow it is. At its widest it is 115 feet, at its narrowest, just forty. In length, however, it protects nearly 1,000 feet of river bank.

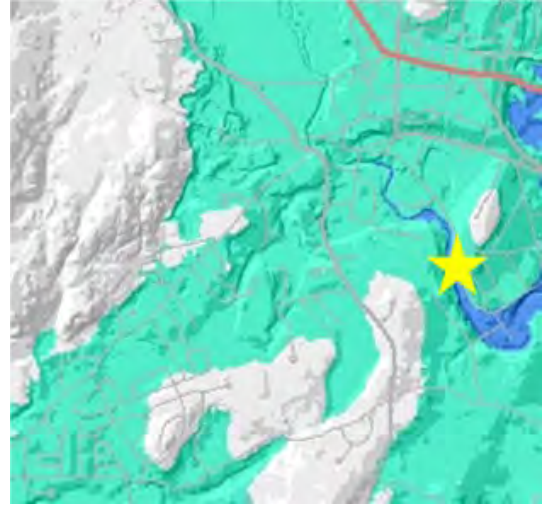


Bay State is part of a long forested corridor along the river. In this image, it is shown in bright green, with the Vistron Greenway and forested portion of Maine's Field to the north and Yankee Hill downriver and to the south-east. The duller green property immediately south of the conservation area is fenced off 21E site that can oddly be considered "protected" too.





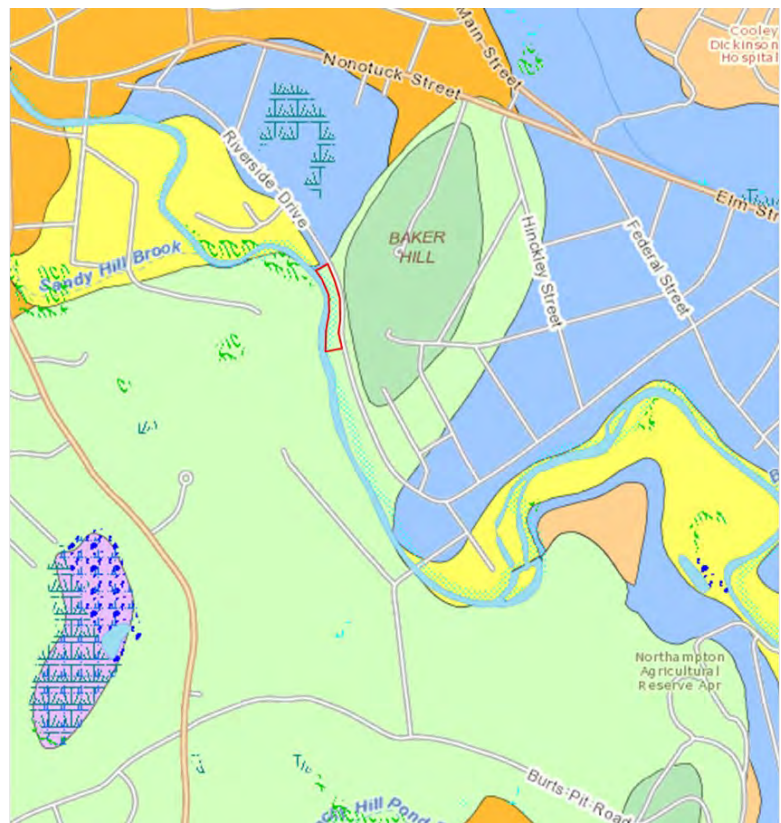
This stretch of the Mill River is rocky and fast-flowing. The land to the west is private, but mostly forested and through the passage of the Riverfront Protection Act, is essentially protected too.



This graphic shows the level of Glacial Lake Hitchcock (blue-green) at 290 feet in elevation, with the star representing the conservation area. Note the proximity of the Baker Hill island and the large island to the west, which now is crossed by Florence

Geology

One of the interesting things about this property is that this stretch of the Mill River threads between what were once two islands in Glacial Lake Hitchcock--Baker Hill, which lies just to the northeast and is a drumlin, and an unnamed hill that rises to the southwest and now forms the high ground along Florence Road. Since the glacial lake disappeared, the river has carved down through delta sands and gravels, glacial clays and ultimately, dug into the unsorted till left behind by the glacier. This is why this section of the river is particularly rocky and full of boulders.



This image shows the surficial geology of the area, with the conservation area highlighted in red and within the light green portion, which is thin till. The darker green, underlying Baker Hill, is thick till, aka a drumlin. The light blue areas are glacial Lake Hitchcock clays, bright orange are glacial outwash, and lighter orange are the remnants of the delta during the era of Glacial Lake Hadley and are deposited on top of the glacial lake clays. The bright yellow is recent alluvium, while lavender is swamps. The other hatchmarks represent different types of wetlands (deep marsh, shrub swamp, forested swamp, etc).



This image of the 1884 map of Northampton shows the Bay State section, when the cutlery buildings drew their power from the energy of the Mill River. The land that is now within the conservation area is the narrow strip above the dam, between the river and River Street.

When the Cutlery building switched from water power to electricity in the early 1900s, the owners filled in parts of the old raceway with the spoils from their metal business. During the last twenty years, the spoils were tested and found to be contaminated with chromium, nickel and other heavy metals, all of which were typical of metal manufacturing. Initially the new owners planned to excavate the contaminated soils, but the costs were prohibitive. Ultimately, MA DEP decided that the site's new owner would be allowed to leave the hazardous wastes in place, but required that the land be permanently fenced off. In 2000, the new owners donated the 1.7 acres above the raceway and dam to the City as conservation land.



Vegetation Patterns

In terms of its terrain and habitats, roughly half of the property's 1.7 acres are narrow, steep, and dry, while the rest is flat, with seeps and richer soils that were deposited when this area was the bottom of the Cutlery's mill pond.

The drier slopes are dominated by elm, red maple, black birch, red oak (~6 large ones), and 3 good-sized sycamores. There are patchy clumps of Japanese knotweed, as well as some Japanese barberry, Morrow's honeysuckle, winged euonymus, and Asiatic bittersweet. None of these invasives are very abundant, although there is quite a tangle of bittersweet in the section that has been riprapped with traprock. Garlic mustard is growing along the roadside, but most of the plants growing on the slope are native species and include Canada mayflower, field horsetail, scouring rush, poison ivy, asters, and a few different kinds of sedges. Witch hazel and panicled dogwood also grow here.



Riprap was laid along the river in the past to prevent it from cutting further east toward the road.



Vegetation Overview: 1: Flatter, richer areas underlain by recent alluvium; 2: Steep, dry slopes; 3: riprap; 4: Hazardous waste site that is now fenced off, but underlain by recent alluvial deposits (from when this was a mill pond and raceway) and glacial lake Hitchcock clays.

The flat section of the property begins where the Mill River Greenway sign was installed. An informal trail begins here too and leads to the river and the remnants of the old dam. This section includes a much more diverse mix in terms of trees and herbaceous plants. The



Much of the property has steep, dry banks. The trees here have grown up during the last century.



An informal trail near the sign leads to the flatter half of the conservation area.



In early spring, the level plain of the formal mill pond forms a rich terrace above the river. The vegetation that is greening up are barberry. Because barberry, autumn olive and non-native honeysuckles leaf out earlier than native shrubs in the spring, they are easier to spot treat with herbicide.



The same site a few months later, as seen from the river and looking up toward Riverside Drive. Now it is rife with plant life.



Flowers of Norway maple



Bloodroot



Trout lily



These images from the 1960s show Maine's field as mostly open, including the now forested land that abuts the conservation area. The bottom image shows that the conservation land has been forested for decades. The cutlery building is the largest structure in the photo.



For anyone walking or traveling along River Road, this conservation area provides beautiful views of the Mill River.

canopy, in particular, includes a varied mix of species. Black locust is the most common species, but you can also find elm, red maple, sugar maple, red oak, white pine, hemlock, white ash, black cherry, black birch, red oak, bitternut, and sycamore. The sweeter, wetter soils are covered with rich carpet of plants, including Virginia creeper, true solomon's seal, golden alexanders, avens, poison ivy, touch-me-not, and lady fern. There are also trout lily, swaths of bloodroot,



Remnants of the old retaining wall and stonework from the dam can be found in the southern section of the conservation area, just before the fenced off area that is still owned by Cutlery Building Associates. When the dam was in place, it diverted water into a raceway, which funneled the river water into the cutlery factory and powered the equipment. The dam also created a small impoundment. Today the soils below the former impoundment are level and fertile; they are old river silts that were deposited during the decades that the dam was in place.

and even ostrich fern and stinging nettle, all species that are only found in rich, moist soils. Unfortunately, there are also several non-native plants here too. The most common are winged euonymus and Japanese barberry (lots of it), as well as Norway maple, Morrow's honeysuckle, multiflora rose and Asiatic bittersweet.



Japanese knotweed is one of the biggest threats to this conservation area and the integrity of the riparian corridor.

Recommendations

Like other small conservation areas, this one is best considered a pocket preserve that serves the local neighborhood and businesses—especially since there is no parking lot.

At this point, the invasives are spreading and it would be terrific to try to work more closely with the Bay State Village Association to clear some of these out and create a better trail. If nothing is done, it is very likely that this property will soon look like it does upstream at Maine's Field, where the invasive species are so extensive that their control seems almost insurmountable. This is a really a shame. During the last three decades, barberry and Japanese knotweed have overwhelmed the native plants that once grew in the floodplain forest next to Maine's Field, reducing its value to wildlife and greatly compromising the property's recreational opportunities. In most places, it is almost impossible to reach the river's edge because of the extensive stands of knotweed.

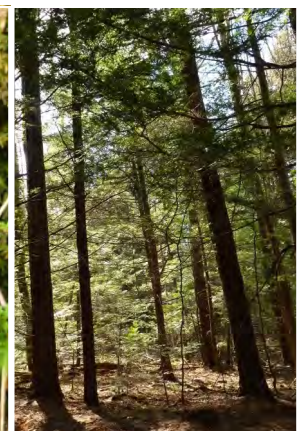


A drain from the road spills on to the conservation area. The low shrub just leafing out is a Japanese barberry.



The floodplain along Maine's Field is now inundated with invasives. Native plants are crowded out and cannot survive under the dense shade of the Japanese knotweed and bittersweet. It is a real mess.

A Natural History of the Beaver Brook Section



Beaver Brook Section



Beaver Brook Greenway

Summary

Stretching from Route 9 to the Mill River in Leeds, this 25-acre conservation area includes rocky, oak-dominated uplands, three certified vernal pools, patches of swamp forest, a very scenic ½-mile stretch of Beaver Brook, plus several hundred feet along the Mill River. All of the land falls within the



Estimated Habitat for Rare Species, abuts another 15 acres under conservation restriction, and what's really nice, this property currently has very few invasive plant problems.

History

Like most of our region, all of this land was cut and cleared for pasture during the early 1800s. In this case, the clearing was mostly likely done to raise sheep for the nearby woolen mills in Leeds. Sometime during those years, a wood road was created that extended between Route 9 and the Mill River. It probably took advantage of a much earlier Indian trail (MA Historic Commission's Reconnaissance Survey Report, 1982) and traces of the old road can still be found just upstream from the arched-stone bridge on the rail line. The rail line was punched through just after the Civil War, in 1867-68, and was built largely at the urging of Haydenville's leading manufacturer, Joel Hayden.





The remains of an old stone wall, probably dating to the 1820s or 1830s, occurs on the property, not far from the bike trail. Parts of another stonewall can be found near the remains of east-west cross road that connected Route 9 to the Mill River. Strands of barbed wire can also be found on the property, physical evidence of its history as pastureland.

By the late 1800s, this property was part of a large farm owned by the Packard family. The main farm was on the other side of Route 9 and included the land where Linda Manor is located. In 1952, a couple in their mid-forties named Fred and Mabel Whitburn purchased 40 acres of the former Packard Farm.

The woods had been logged in the 1930s, but when they bought it, the five (or so) acres along Route 9 were still cleared and opened. The Whitburns lived in the house at the end of Leonard Street (#80) and kept horses in the pasture. The rest of the land was their “backyard,” and during their tenure, they left it alone. According to the Whitburns’ former neighbor, Daniel Keith,



This photo from 1965 shows the conservation area as almost entirely forested, the one exception being the Whitburn’s pasture along Route 9. The image also clearly shows the old wood road that ran along Beaver Brook, between Route 9 and the railroad line, and it also shows evidence of the site’s logging history, with a line running down through the center of the property indicating two different land use histories.

the couple loved the land and wildlife and they opened it up to their neighbors, letting them wander the land and enjoy it too.

By the 1990s, the Whitburns were in their eighties, and thus begins the strange and complicated tale of how this conservation area came to be. In 1994, Mabel died at the age of 88 and sometime after, Fred decided to re-write his will. By then he was in his early nineties and apparently at the encouragement of his parish priest, he hired a local attorney to help him. In March, 1998, Fred died, just a month shy of his 97th birthday and when his estate was settled, his home and property had been left to his then-caregiver and his money was split between the Catholic Church and the Western New England Animal Center.

Six months later, his caregiver sold the property to John Hanley, a New York resident, who was the local attorney's

brother-in-law and also a trustee of the newly formed Beaver Brook Nominee Trust. Less than a month later, the Beaver Brook Nominee Trust filed a Request for Determination of Applicability with the conservation commission to verify the property's wetland boundaries and not long after that, a forest cutting plan was filed.

Both of these actions alarmed the neighbors, who recognized that these were often preliminary steps before a development. And they were right. In 1999, just a year later, Hanley submitted the first plan for a 49-lot subdivision on the property. During the next eight years, the neighbors' opposition to the project remained strong and along the way, they certified five vernal pools on and around the property, two of which supported rare species.

Use of land in Leeds undergoing change

[Hide Details](#)

Daily Hampshire Gazette (Northampton, MA) - July 17, 1999 [Browse Issues](#)

Readability: 11-12 grade level (Lexile: 1210)

To the Editor:

Regarding your July 8 article, "Leeds man's gift aids animals," I have only one thought.

If **Fred Whitburn's** love for animals prompted his very generous donation to a local animal shelter, how would he feel knowing what is happening to the land he owned and loved.

This land, home to many animals such as deer, raccoon, wild turkey and bear, was sold and is being divided into lots for housing units.

The construction and blasting necessary to build roads and bring water to the new units will shatter the quiet that the human and non-human residents of Leeds have long cherished. I can't help but think that threatening wetlands and disturbing acres of existing animal habitat would not have been Mr. **Whitburn's** dream of how to use the land.

Julie Daniel

Leeds

Beaver Brook plan apparently being scrapped

[Hide Details](#)

Daily Hampshire Gazette (Northampton, MA) - January 7, 2004 [Browse Issues](#)

Readability: >12 grade level (Lexile: 1310)

NORTHAMPTON - It appears that a developer's plan to build 49 homes on a parcel of land off Route 9 in Leeds that drew much neighborhood ire over a four-year period has been scrapped.

In its place now is a proposal to build three homes on the former site of the proposed **Beaver Brook Estates**, off Haydenville Road (Route 9) and Grove Avenue in Leeds.

That plan, offered by local developer Robert Jeffway Jr., will be aired Thursday at a public hearing held by the Planning Board scheduled for 7:25 p.m. in the Council Chambers of the Puchalski Municipal Building.

Jeffway's proposal is markedly different in scope from the 49-home development New York City developer John J. Hanley had once proposed for the site. Hanley is looking to sell Jeffway three of four lots on the 59-acre site, and retain one lot, which has frontage on Route 9, for himself.

Seven months ago, the Planning Board rejected a scaled-down, 19-home version of the subdivision Hanley had been planning.

Hanley's attorney, Patrick Melnik of Northampton, said today that at this point "nothing is settled," because there has been no sale yet and Jeffway has received no permits.

"It all depends on how things play out," said Melnik.

By 2004, the Beaver Brook Nominee Trust had acquired an abutting 20 acre parcel, which allowed them to reconfigure the subdivision. After multiple iterations and revisions, the project was scaled back significantly and the final plan, approved after many hours of meetings by the planning board and conservation commission, included about half as many homes as the original, larger set-backs from the vernal pools and wetlands, plus a connecting trail to the rail trail and 40 acres of conservation land, including nearly all of the former Whitburn property. Fifteen acres of conservation land would wrap around most of the new development and be held under a private conservation restriction, while the remaining twenty-five acres would be donated to the City's conservation commission and would be open to the public. In 2009 the transfer was completed, and Beaver Brook Greenway became official.

Access

Today, this conservation area has no designated parking, but informal parking is available along Grove Street and also along the cul-de-sac on Chestnut Street extension. From either of these locations, the property can be easily accessed. The boundary of the conservation area is marked inconsistently, and its trails are not marked either. One trailhead begins on the gravel path (closer to Chestnut Street Extension) and cuts through the uplands, past the largest vernal pool, and down to Beaver Brook.



The trail that begins near the bike path threads through the mountain laurel and passes a large vernal pool. In the foreground of the photo of the vernal pool is the moss-covered trunk of a swamp white oak, a relatively uncommon tree species in the City.

At that point it splits, with a thin trail heading upstream and another going downstream. The downstream trail joins the rail line next to the beautiful arched stone bridge.

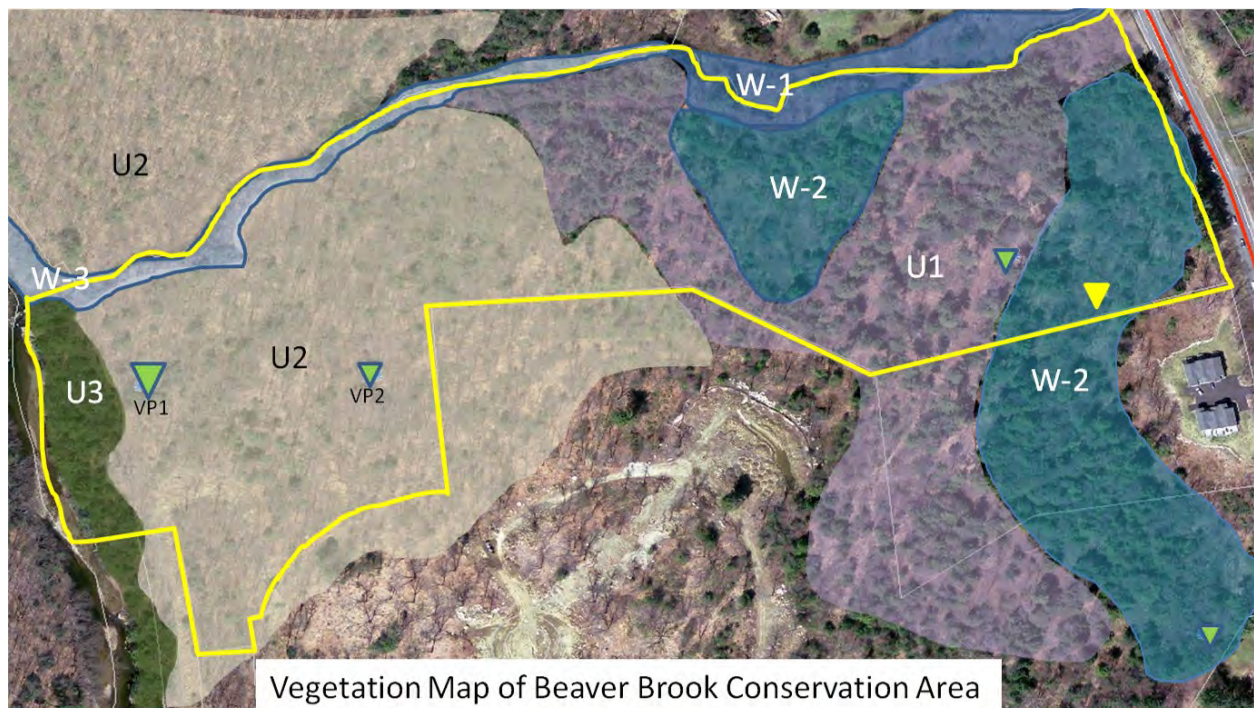
If people want more adventure, bush-whacking is also an option. The old logging roads are getting very grown in, but many are still visible, and if you head upstream from the camping/picnic area, you will find the re-



mains of the old wood road that ran between Route 9 and the Mill River. This road peters out about 800 feet before Route 9 (there is a grove of white pine and part of an old stone wall), but you can easily make your way along the edge of the brook to Route 9.

Topography & Geology

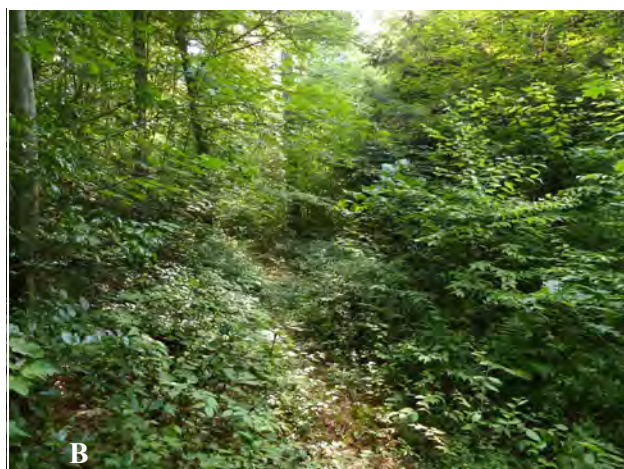
By and large, this 25-acre parcel can be characterized as gently sloping in the eastern half and rugged and rocky in the western portion. Most of the property is covered with rocky till, with just the thinnest band of



sandy, glacial outwash along the border of Beaver Brook (near Route 9 and the cemetery). In general, the eastern half of the property has wetter soils, while the western half is significantly drier.

Vegetation Patterns

Like any landscape, the vegetation patterns that we see on the property today are a function of its land use history, hydrology and underlying geology. Very broadly, the wetter, eastern half is dominated by hemlock and white pine, while the much drier, rockier western half is dominated by



(A) Hemlock, white pine, and young hardwoods are common in the eastern half of the conservation area and land under private conservation restriction. (B) A trail along an old wood road is disappearing as new growth overwhelms it. (C) The remains of cut stumps can be seen below a dense stand of young black birch.

oak, with an understory of mountain laurel. Looking more closely, these can be refined and separated into three broad upland categories, two types of forested wetlands, plus vernal pools, Beaver Brook and the Mill River. The following descriptions are matched with the Vegetation Map (next page).

Uplands

U1: Hemlock and white pine, mixed with hardwoods (red maple, shagbark, birch, oak)



The western half of the property is awash in mountain laurel and boasts a canopy dominated by oaks.

cover nearly a third of the property. Fifteen years after timber harvesting, the network of old logging roads is growing in with young black birch, while the clearings from the harvesting job are now carpeted with hay-scented fern. Other common plants in this area include bracken fern, wild sarsaparilla, clubmosses, Canada mayflower, partridgeberry...and very occasionally, Japanese barberry.

U2: The rocky, rugged part of the property is drier and more acidic, and dominated by oak (red, scarlet, white, black) in the overstory and loaded with mountain laurel and witch hazel in the understory. American chestnut resprouts are also common. The soils here are bony, and bedrock can be seen at the surface.

U3: A nearly solid stand of hemlock grows along the steep slope between the rail trail and the Mill River.

Partridgeberry (*Mitchella repens*) is one of the few members of the coffee family living in the temperate zone. Paired flowers bloom in late June and what's odd is that they fuse into a single fruit, which is the reason why another common name for this plant is two-eyed berry.



Few plants grow in the shady understory of the hemlock grove.



This topographic map nicely shows the outline of the conservation area and the land under conservation restriction, as well as the locations of the wetlands and certified vernal pools on the property.



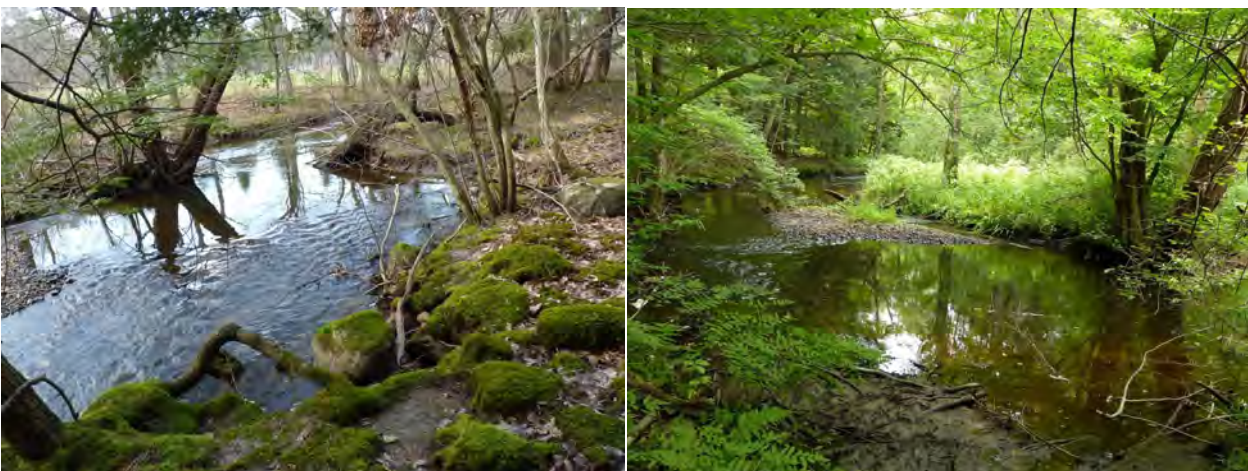
Mill River, Beaver Brook and Wetlands

Mill River: This property includes a rocky stretch of the Mill River, with bedrock exposures, riffles and pools and of course, the arched stone bridge. This is one of the popular places in the area for swimmers and it is a nice place to snorkel. Japanese knotweed, however, is present along the banks—especially on the other side.



Two views of the Mill River stretch below the railroad arch. This area is a favorite swimming spot in the summer and a nice place to snorkel to see black-nosed dace, brook trout and shiners.

Beaver Brook: This very beautiful stretch of Beaver Brook is rocky and includes bedrock outcrops. It is very different from the sandy bottomed brook on the east side of Route 9 that lies within Beaver Brook/Broad Brook Greenway. Eastern pearl mussels live in this stretch, and it



When Beaver Brook enters the property near Route 9, it is a quietly, meandering stream. This stretch of Beaver Brook has more barberry, multiflora rose and Asiatic bittersweet than downstream.



A rich swamp forest along the Beaver Brook has formed in an old meander along the river. Downstream, the character of the river changes, from a more open and sandy bottom to a faster, rockier-bottomed, shady waterway.



Part of what makes Beaver Brook so interesting and appealing is its variability, from slow-moving and sandy stretch with small rapids and large boulders. This increases the diversity of animals that can live in its waters. (The Japanese knotweed is not far from this boulder; there is also a second patch, downstream and across the river, on land owned by the Catholic Church.



Not far from the railroad arch is a small trail that parallels Beaver Brook and links to the upland trail that connects to the bike trail. This area has richer soils and more ironwood and wildflowers than elsewhere on the property. Turning around and looking downstream, the river widens and its bottom a mix of sands and small cobbles.

Beaver Brook Section

looks ideal for wood turtles. Old chewed stumps tell that beavers have been along this part of the brook. Downstream from the campsite is a small patch of Japanese knotweed!

W-1: Beginning at Route 9 and moving downstream, the brook is narrowly bordered by red maple, ironwood, scattered hemlock and white pine. Winterberry and alder are common in the shrub layer, and a broad diversity of plants grow in the understory. These include a mix of ferns (royal, cinnamon, lady, sensitive, and New York fern) as well as spotted touch-me-not, poison ivy, hog peanut, meadowsweet, and Virginia creeper.



Just opposite the private house to the north, the brook bends and there is a sunnier, old meander and an area of open water. Red maple, winterberry, sensitive fern, royal fern, silky dogwood, touch-me-not, and a mix of sedges growing in the seepy borders. Barberry is abundant here, and Asiatic bittersweet is frequent.

At the western edge of this vegetation zone is an old stonewall, the remains of the historic wood road, and a very shady grove of hemlock and pine. There is almost no understory vegetation in this area, and the brook is deeply shaded with moss-covered rocks.

Along this stretch of Beaver Brook, there are a few non-native plants (Asiatic bittersweet, multiflora rose, and Japanese barberry), but all in fairly low numbers.

W-2: A perched wetland/swamp forest with seeps and abundant hemlock and red maple. The understory is loaded with cinnamon fern, sensitive fern, poison ivy, and wetland grasses.



The vernal pools in this section are located in shallow topographic depressions that intercept groundwater. These are surrounded with High-bush blueberry, winterberry, tupelo and occasional elm.

Sphagnum moss is common on hummocks of the watery depressions. A few glossy buckthorn were found in these zones, as was scattered barberry and Asiatic bittersweet.

W-3: This stretch along Beaver Brook is higher in elevation than W-1 and the vegetation includes an abundance of ironwood, red maple, red oak (some of which are real whoppers) and a few scattered white pine (also some big ones). Witch hazel is abundant in this stretch, as is New York fern, white woodland aster, Canada mayflower, wild sarsaparilla, Christmas fern, wintergreen, partridgeberry. Low-bush blueberries (*Vaccinium angustifolium*, *V. pallida*) are also both common here. There is an old campsite in this section, and just downstream from the campsite is a small, but worrisome patch of Japanese knotweed.



Certified Vernal Pool 1 (VP1): This isolated pool is an artifact of the construction of the railroad in 1867. In building the rail line, a berm was created that blocked the water's natural drainage and created a depression in the landscape. Today, more than 150 years later, it functions as a vernal pool and is used as a breeding pond by spotted salamanders, wood frogs and many other species. After breeding here, the adults return to the surrounding uplands, where they live underground for the re-



Wood frogs (*inset above*) are one of the amphibians that breed in the pools on the conservation area, including in this wooded pool, which is located in a perched wetland in the eastern portion of the conservation area. The sphagnum here may also provide suitable breeding habitat for the less common four-toed salamander.

mainder of the year. There is little surrounding vegetation in the under-story. The slopes nearby include a mix of oak and other hardwoods.

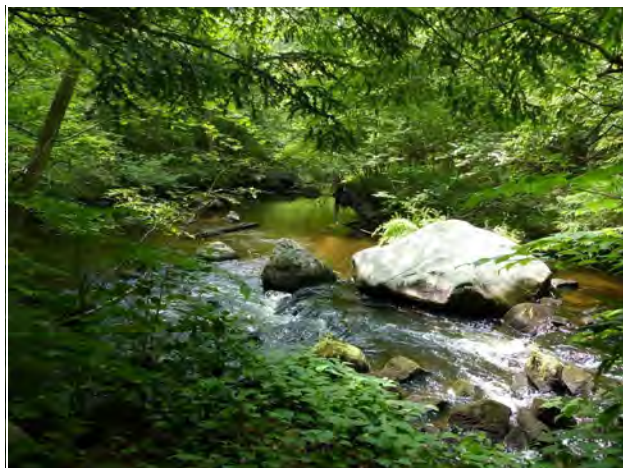
Certified Vernal Pool 2 (VP2):

This large, shallow vernal pool is within a natural depression in the bedrock, which has helped to create a perched water table. This uncommon habitat is one of the few areas in Northampton where swamp white oak occurs. Other vegetation includes sheep laurel and mountain laurel. In the original layout of the subdivision, a road was going to go right through this vernal pool. It is known breeding habitat for wood frogs, spotted salamanders, and an unspecified species of Special Concern.



Recommendations

1. Rid the area along Beaver Brook of the small patch of Japanese knotweed—or else it will grow and grow and obscure the view of this lovely stream.



The small patch of Japanese knotweed in the foreground along Beaver Brook, while the remnants of the old wood road can be seen in the second photo. It could be used as a “new” trail that links to Route 9 and other parts of the conservation area.

2. Maintain the foot trails (they are growing in) throughout the property and repair the trail erosion that has begun at the railroad berm.
3. Control the other invasives along the brook and Mill River (in conjunction with the Mill River Greenway Initiative).
4. In collaboration with the Beaver Brook Condominium HOA, the Leeds Civic Association, and/or others, keep the camping/picnic area free of litter and keep the invasives (e.g. garlic mustard) under control along the gravel and paved connecting trails.
5. Organize field walks to this property to expose more people to the varied habitats (vernal pools, upland oak woods, swamp forest, and brook).
6. Try to acquire the parcel to the north which has its own elaborate network of trails and the remains of an old quarry.
7. Install signs along Route 9 and at the entrance to the trail. Identify parking areas. Create a brochure/kiosk that describes the natural history of the land.



A Natural History of the Florence Meadows Section



Florence Meadows Section



A Natural History of the Florence Meadow's Section *a k a*

**Bean Farm (1902-2010) & Allard Farms (1978-2010)
Broughton's Meadows (1657-1846)**

Overview

During the last 350 years, the 180 +/- acres known to many as the Florence Meadows have played a significant part in Florence's history. The most poignant and heartrending role occurred in the aftermath of the 1874 Mill River Disaster when tons of flood debris poured out onto this broad, open interval. In the days that followed, more than one thousand volunteers combed through the layers of timbers and mud, searching for victims and ultimately finding more than 40 people—mostly children—whose bodies had been overwhelmed by the floodwaters and washed downriver (Sharpe, 2007).

In addition to that devastating event, this land has also been important to Florence's economic, cultural, and aesthetic identity. Its rich alluvial soils have produced crops for more than three centuries, and for a brief time during the 19th century, the land was used by "the Community" as a site for anti-slavery conventions. Finally, both historically and today, generations of Florence residents have appreciated the long, beautiful view that the Meadows afford, and for them, it is not only a favorite vista, but also an integral part of their sense of place.

Since 2010, thanks to the contributions and vision of dozens of volunteers, GrowFood Northampton, The Trust for Public Land, Massachusetts' Department of Agricultural Resources,



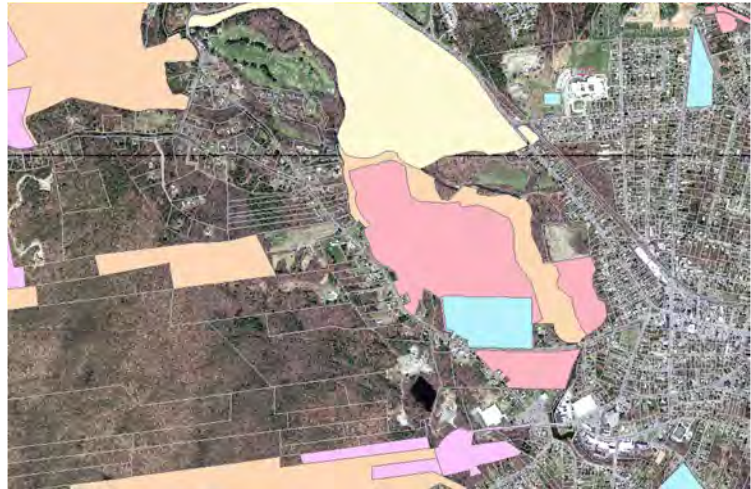
Searching for dead among debris, Florence Meadows. Photographed by A. E. and A. J. Alden, Springfield, MA. *Courtesy Digital Commonwealth.*



In 1971, a 232-unit condominium project was approved on the north side of Meadow Street. A clerical error on the permit, however, listed the project on the south side of Meadow Street. Were it not for that mistake, this landscape might have been developed and lost to posterity. This image shows what the land looked like in 2013 with a cover crop of mustard. It is now part of the recreation fields.

and the City of Northampton, that view and this important landscape has been protected in perpetuity. Today, more than 60% of the Florence Meadows (121 acres) is permanently protected through an Agricultural Preservation Restriction, dedicated to sustainable agriculture and owned by GrowFood Northampton. The remaining land is owned by the City of Northampton, with 24 acres set aside for playing fields and 35 acres along the Mill River held as conservation land. The City of Northampton has also leased twenty acres on the south side of Meadow Street from GrowFood Northampton and manages the land as Community Gardens.

Although much, much more could be written about the history of these 180 acres, given the nature of this report, the rest of this document focuses only on the thin strip that has been protected as conservation land, which, at least for now, is the largest city-owned conservation parcel along the Mill River.



The long, wiggly 35-acre conservation area shown along the Mill River is bordered by protected farmland owned by GrowFood Northampton (light red) and Look Park (light yellow). Nearby are other conservation areas (orange—Sawmill Hills and Roberts Hill) as well as some land protected around the City's wellfields (pink). The light blue areas are recreation fields owned and managed by the City's Recreational Department.

Introduction

Although just 35 acres in size, this conservation area is so long and skinny that it actually stretches for more than a mile along the meandering path of the Mill River and also includes another ¼ mile of steep hillside behind Spring Street. Along much of this length, the conservation area abuts other protected land, much of which is owned



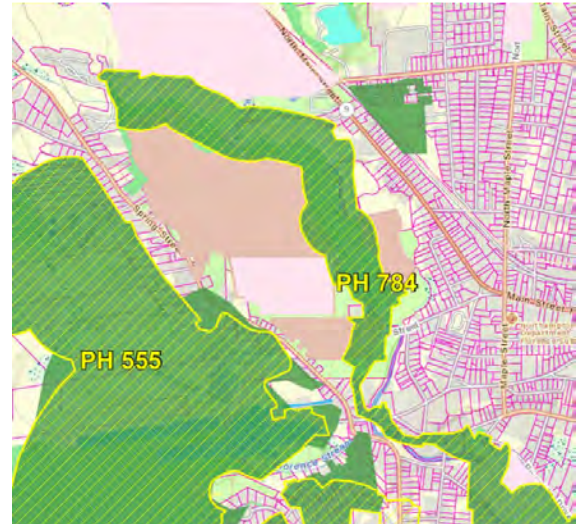
A forested riparian corridor borders the river and defines the boundary of the conservation area. With the exception of the steep, wooded slope on the west, all of the land is within the 100-year floodplain.

by GrowFood Northampton, as well as 1/3 of a mile along the Mill River that is contiguous with Look Park.

From a recreational standpoint, this conservation property has a lot of potential. Although it currently has no formal trails, there are a couple of informal trails and some sections of the woods are open and easy to explore. It also includes a couple of nice swimming holes, several good spots for fishing, and some sites of historic significance.

From an ecological perspective, this property's wooded, riparian corridor—in spite of its narrowness—supports a wide variety of plants and animals and includes a good example of a High Terrace Floodplain Forest, an imperiled natural community type in Massachusetts (Swain, 2000; Eiseman, 2012). What's more, because the river's water quality has improved significantly during the last forty years, this stretch is now classified as a Coldwater Fishery and also provides habitat for the nymphal stage of a rare dragonfly known as the Ocellated Darner (Special Concern). For these reasons, this entire conservation area is identified as a Priority Habitat for a Rare Species (MA NHESP) and has been designated as BioMap Core Habitat by The Nature Conservancy and MA NHESP.

Unfortunately, the forested corridor is also heavily impacted by invasive non-native plants. In fact, it is one of the most invaded of all the city's conservation areas—an unwelcome distinction. Of the invasive non-native plants, the most prevalent and widespread are Japanese knotweed, Asiatic bittersweet and Japanese barberry, but many others are growing here too. Collectively, their spread and growth has compromised this conservation area's biological integrity, degraded its value to wildlife, reduced its recreational potential and even impacted its aesthetic values. In addition, the spread of Japanese barberry poses an increased public health risk: based on



The conservation area lies within a Priority Habitat for Rare Wildlife (PH 784).



My daughter demonstrating the effects of Asiatic bittersweet next to a tree that has been completely distorted by this non-native vine. Many trees in the conservation area's floodplain forest are like this.

Connecticut, the risk of Lyme disease is statistically higher in areas with high populations of Japanese barberry.

Geology

From its headwaters ten miles upstream, this area is the first place along the Mill River where its course is no longer hemmed in by bedrock and over time, the river has meandered back and forth across the landscape and created a broad valley. How and why that happened is a function of both geology and time.

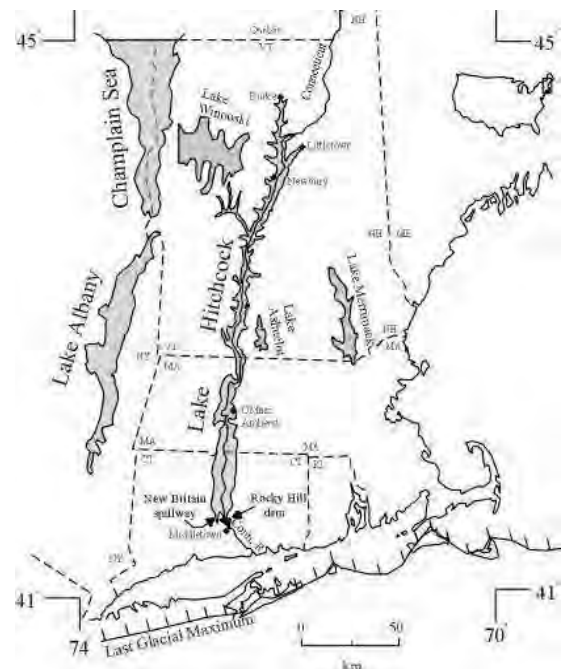
Twenty thousand years ago, this area was still covered with a mile-high, continental glacier. But change was coming. As the climate warmed and the glacier began to retreat, it left behind a layer of unsorted and unconsolidated till, a mix of rubble and glacial flour that covered the metamorphic bedrock below. By around fifteen thousand years ago, a dam of glacial debris had piled up in Rocky Hill, CT and effectively blocked the meltwaters. This “natural dam,” made of boulders, till, sand and gravel, held for many centuries because the spillway was on solid bedrock.

Meanwhile, as the glacier continued melting back, a long, skinny glacial lake now called Lake Hitchcock formed behind the dam. The lake ultimately extended 200 miles along the Connecticut River valley, from the dam in Rocky Hill, Connecticut to St. Johnsbury, Vermont.

Here in Florence, when the lake was at its highest level, its western shore roughly matched our modern day 300-foot elevation mark. Another way to visualize this is to



The conservation area supports some incredibly dense thickets of Japanese barberry. These are painful and almost impossible to walk through, plus they are more likely to support higher populations of Lyme-disease infected deer ticks.



Courtesy: <http://www.bio.umass.edu/biology/conn.river/hitchcock.html>



Bedrock appears at the surface along the farm road that leads from Crimson and Clover's barn down to the Meadows.

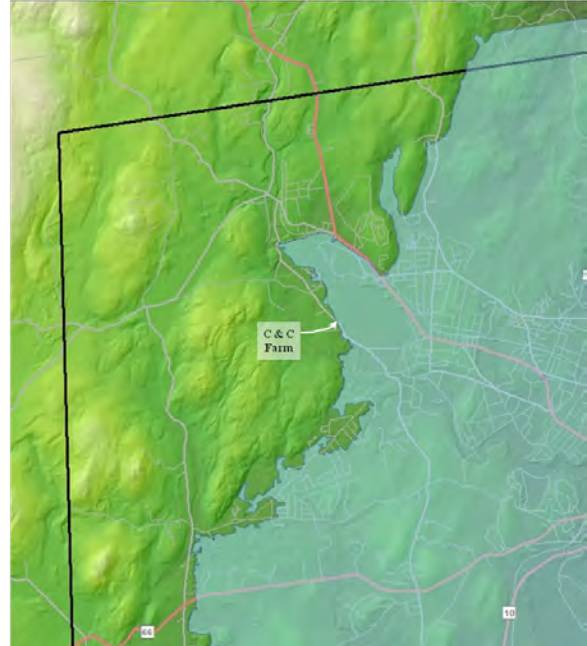
imagine that if we could go back in time, the barn at the Crimson and Clover Farm would have been beachfront property.

During the era of glacial Lake Hitchcock, the glacially-charged Mill River and countless other tributaries were carrying massive amounts of sediments into the lake. In the deeper, calmer waters, fine silts that would become clay layers eventually settled out, covering the layer of unsorted till below.

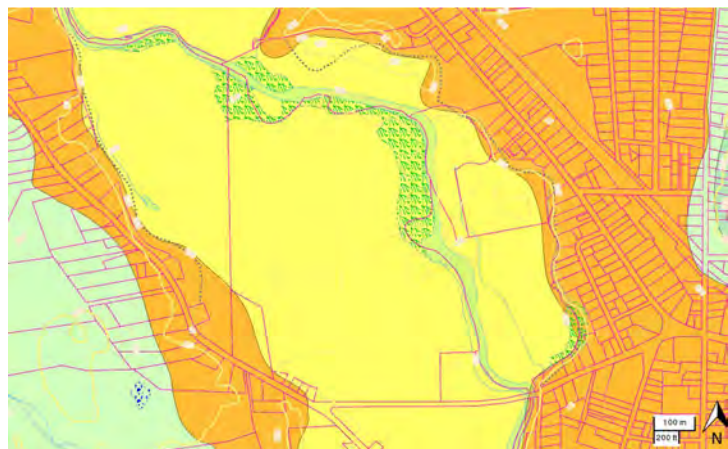
Eventually the dam at Rocky Hill gave way, leading to new, lower lake levels in the Connecticut Valley (esp. glacial Lake Hadley). On its way to these lower levels, the Mill River began to cut down through the outwash sediments and the delta that it had deposited near and in glacial Lake Hitchcock. Most of those sediments still remain, extending as a relatively flat expanse across much of Florence and as far as downtown Northampton and King Street.

The broad flat plain that we now call the Florence Meadows developed here because in this location the river could meander back and forth across the landscape, no longer hemmed in as tightly by bedrock as it is upstream in Leeds, Haydenville and Williamsburg. Eventually, its lateral movements cut away about 50 feet of the overlying, easily eroded glacial sediments and subsequently deposited rich riverine sediments. Difficult-to-erode bedrock at the location of the Vistron dam is likely to have been the factor that kept the river from cutting down any deeper than its present day ~250 foot elevation.

Over time, repeated flooding and the deposition of silt have increased the area's fertility and floods have also been



The location of the Crimson & Clover farm on the edge of Glacial Lake Hitchcock. *Image of lake courtesy of Northampton DPW, Andy Keuther.*



This map of the surficial geology shows recent alluvial deposits (yellow) along the broad floodplain created by the Mill River. To the east and west, the orange is deltaic deposits, while the light green beyond is till. Green hatchmarks are forested wetlands. *Map courtesy MA GIS.*

the principal driver in changing the river's course. The 1874 Mill River Disaster is the most famous of these, but many other floods—both earlier and later—altered the river's pathway. In Northampton, the first severe flood on record occurred in 1667 and “carried off one of Northampton's early grist mills near the old South Street Bridge.” Another bad flood took place in 1680, and then a whopper struck in 1691. Referred to as the Great Flood, it was a time when “rain fell in February almost continually for 5 days, during which ‘the sun was not seen,’ and ‘the water rose to such a height as was scarce known in the country before’” (Mill River Greenway Initiative website).



Searching for dead among debris, Florence Meadows. Photographed by A. E. and A. J. Alden, Springfield, MA. Courtesy Digital Commonwealth. Original at Meekins Library, Williamsburg, MA.

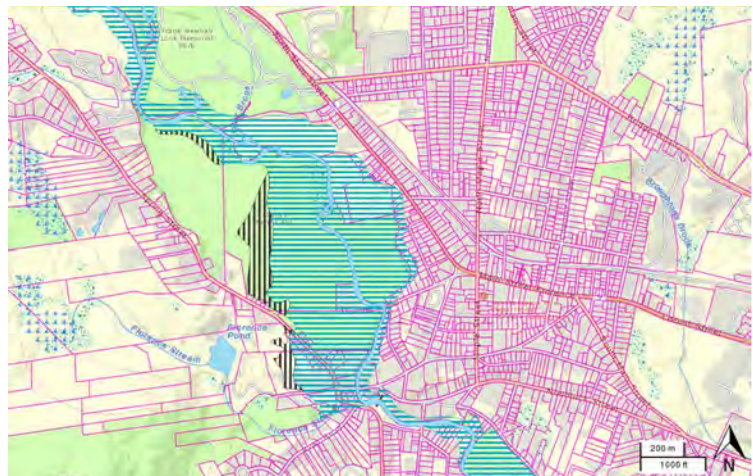
“...for almost a mile to the center of Florence, the flood spilled a layer of mud and gravel two to three feet deep, topped with a six-foot thick carpet of debris. Scarcely an acre of meadow remained untouched, either doused with sediment and debris or scoured to a hardpan. There was ‘not enough soil...left on the field to produce material for a decent breakfast,’ the Hampshire Gazette bemoaned.”

Elizabeth Sharpe, In the Shadow of the Dam

Several floods occurred during the 18th century, but the worst century for the number of floods was the 1800s, which kicked off with The Jefferson Flood in 1802 and included eight more natural floods (1828, 1840, 1843, 1854, 1862, 1869, 1878, 1896), plus the man-made Mill River Disaster (1874).

During the 20th century, the Florence meadows were affected by even more floods. One of the most severe was the disastrous flood in 1936, when the Daily Hampshire Gazette reported:

“At Lone Oak Farm on West Street, Florence, owned by H. I. Bean and Sons, the Mill River rampaged to such an extent that it again cut through



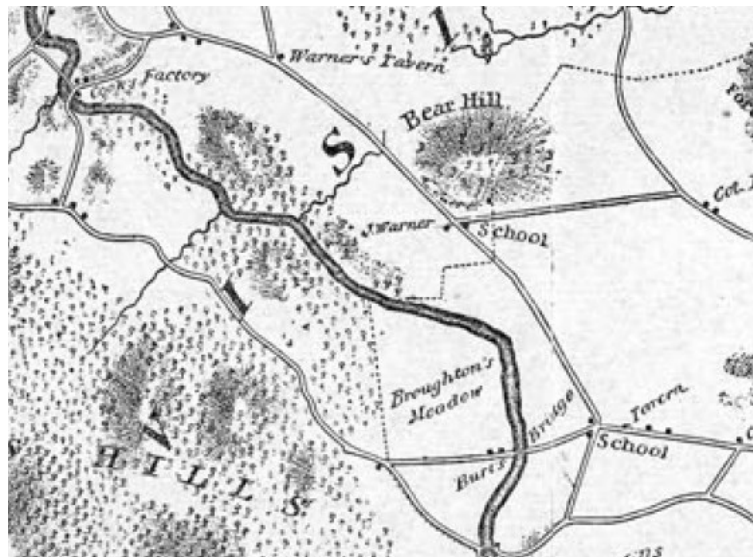
The blue horizontal hatching represents the 100-year floodplain. The black vertical hatching is the 500-year flood zone. Maps are according to FEMA.

the old channel it formed at the time of the famous Mill River flood sixty years ago. The old channel was gradually filled up as much as possible and a dam built at the river with a view to preventing the stream from coming through again. The dam, however, did not hold in this flood, and the farm land in the old channel was cut down to gravel, and the work of some thirty years of filling in has been undone. The channel cut by the river sixty years ago was never entirely filled, but made high enough so that it could be used along with the adjoining land.” (Daily Hampshire Gazette, 1936)

The 1938 hurricane caused the river’s course to shift again. And the 1955 flood shifted it again. And then again in 1982, when the floodwaters destroyed “acres of farmland and scores of trees, which fell into the river when the river bank collapsed during heavy rains in June.” The costliest damage, however, occurred “when the river cut a new channel straight across the Allard farm cornfield and brought down almost thirty trees, and that area, now an island, is no longer accessible.” (Daily Hampshire Gazette, 1982)

Vegetation Changes Over Time

Although flooding has been a prime agent in changing both the course of the river and its bordering vegetation, people have modified things as well. The earliest written accounts of this area come from the Proprietors’ book which notes that in 1657 John Broughton was granted “five acres more or less” that “lieth up the Mill River” (Sheffield, 1895). This grant was in lieu of meadowland along the Connecticut River and so strongly suggests that this area was already an open meadow, having been cleared and burned (and probably farmed) by the Nonotuck. By 1663, all of the land in this area had been given out to new settlers, and by then it was “now commonly called Broughton’s meadow” (Trumbull, 1898). Also by then, the English settlers had adopted the Indian practice of burning the woods and meadows, and in 1664, the local government ordered Joseph Parsons “to burn the woods on the easterly and northerly sides of the Mill River, two or three miles above Broughton’s

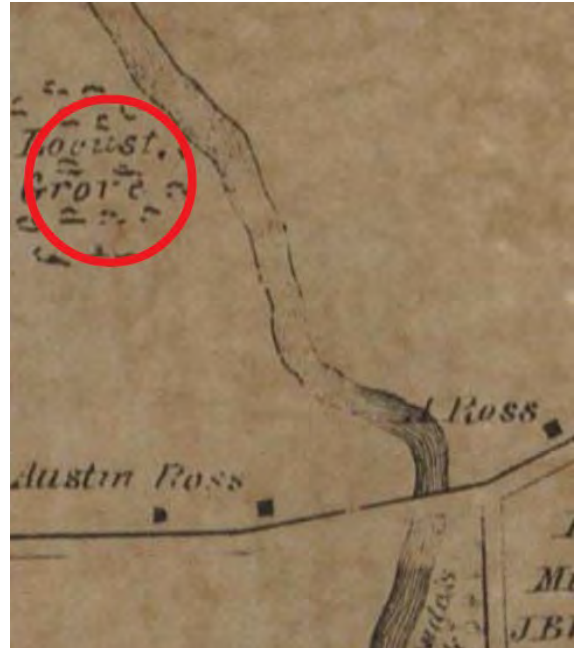


This property was known as Broughton’s Meadow from 1657-1846. The 1831 Map shows the homes owned by Gaius Burt, who was only the second permanent settler in what is now known as Florence. Burt first purchased 30 acres, but eventually accumulated 100. He sold the property in 1835 to Samuel Whitmarsh, who instigated the region’s silk craze and changed the history of Northampton.

Meadow” and gave Robert Bartlett “instructions to burn them on the westerly and southerly sides of the same river” (Trumbull, 1898). According to Trumbull, annual burning continued for “nearly one hundred years.”

Annual burning would have dramatically changed the vegetation along the river, not only clearing out the woody underbrush, but changing the composition of the herbaceous layer, which would have included mostly grasses and wildflowers. Fires would have also established perfect conditions for the germination of black locust seeds, which require open, sunny conditions to sprout. In fact, by the 19th century, “Locust Grove” along the Mill River was a local place name. In his reminiscences, Paul Munde (son of Dr. Munde, who took over David Ruggles’ water cure) describes swimming in the Mill River during the 1850s at “Locust Grove many times with my friend Arthur Hill” (Sheffield, 1895), who, in separate papers, described the Locust Grove as the location of anti-slavery meetings (Strimer, pers. comm.). By the 1860s, Locust Grove was sufficiently well known that it appeared on Walling’s 1860 map and later as a pen-and-ink illustration in Sheffield’s *History of Florence*.

By the time of the Mill River Disaster in 1874, farming has been going on in the adjacent floodplain for more than two centuries. At that time, much of the land was owned by the Ross family. They had been members of “the Community” and had purchased a large chunk when it disbanded in 1846. One result is that the meadows, which had been known as



Walling’s 1860 map shows the Locust Grove and the homes now owned by Austin Ross.



The pen-and-ink drawing of the Locust Grove along the Mill River. Note that the river is almost clear of vegetation. Whether this was artistic license or accurate is unknown. From Sheffield, 1895.



Corn on Ross Meadows. Photo by Robert Emrick. ~ 1940s. Courtesy Forbes Library, Northampton MA.

Broughton's Meadows since 1657, developed a new place name: they were now known as Ross's Meadow.

By 1874, the Ross family owned one of the largest dairies in Florence and was its most important tobacco grower. When the Mill River flood struck in May, the fields had only recently been dressed and several farmhands were out in the field getting them ready. Austin Ross was warned by his brother and rushed out to warn the hands. Hearing his cries and the roar of the floodwaters, the men "sprang into the wagon and ran the horses at top speed to the high land" (Sharpe, 2007). When the floodwater struck this stretch of the Mill River, it "captured hundreds of trees, thatching them into a fortress" (Sharpe, 2007).

During the next century, the vegetation along the river grew back and during the last 60 years, the width of the forested buffer has remained fairly consistent. These aerial photos from the 1950s and 60s also help to explain some of the vegetation patterns on the landscape today. For instance, two of the areas that were cleared in the 1950s for agriculture as well as the areas of the lower floodplain that are most prone to flooding are today dominated by cottonwood and



sycamore,. They are also the areas that are now the most impacted by non-native plants, many of which thrive in disturbed soils and sunny conditions. In contrast, the other areas that had either less human alteration and/or are less frequently scoured by floodwaters, remain in fairly good condition, with sugar maple and hickory as the most abundant species, and with significantly lower numbers of invasive plants.

Aside from flooding and human alteration, the arrival of non-native plants and pathogens is the other important source of change. At this conser-



Elm can be found on the conservation area, but it is much less common than it was prior to the arrival of Dutch Elm Disease. That said, researchers believe that a strain of American elm exists that is resistant to the disease and is making a comeback.



The swath of rusty brown stems in the background (*Photo A*) of the Mill River is one of many large patches of Japanese knotweed that have established along this corridor of the Mill River, while *Photo B* shows this species growing along the edge of the farm fields. A serious problem in North America and Europe, this Asian introduction can grow more than 7 feet in a growing season and a single plant can produce more than 200 stems. Worse yet, only about 1/2 the plant is above the surface; the rest is an underground network of roots, which extends much further out. This is part of the reason these clones are so good at spreading. Another reason is because, as (*C*) shows, the leaves are virtually free of insect damage. Like so many non-native plants, this intentional 19th century introduction arrived without its native pests and pathogens, which might help control it. A biocontrol insect, however, has been found and appears to help with control in European. It may soon be released in our area by UMASS researchers. Although this species is a prolific seed producer, the seeds are not viable. Instead it spreads entirely by pieces of rootstock. Along a river like the Mill, small sections of root are easily torn away from the parent plant and carried downstream to other suitable habitat.





(A) A swath of garlic mustard, a species that has taken off during the last two decades. (B) Morrow's honeysuckle, an understory shrub that is common throughout Northampton, particularly in areas where the acidity of the soils are more neutral.

vation area, American elms were probably much more common historically, but are now largely absent due to Dutch Elm Disease. During the last century gypsy moth caterpillars probably had an effect on the canopy trees here too, but the biggest changes in the flora have taken place in the understory—and mostly during the last two decades. During the last twenty years, half a dozen non-native invasive plants have undergone explosive growth. The worst of these are Asiatic bittersweet, Japanese knotweed, Japanese barberry, Morrow's honeysuckle, privet, winged euonymus and garlic mustard—all species that do well in disturbed soils like these that are regularly altered by flooding or were cleared in the past.

These non-native plants have dramatically altered the look and ecology of this riparian corridor, affecting light levels, nutrient cycling, forest succession, and even geomorphological processes. Without active management or the serendipitous appearance of biocontrols, the understory will probably become thoroughly overtaken by invasive non-native shrubs and herbaceous plants during the next twenty years.



A giant bittersweet vine wraps around a tree in the floodplain. At its maximum girth, this vine was nearly 7" across.



This 1950s photo shows an area along the river that was cleared and used for part of the farming operations. This area is now among the worst impacted in terms of invasive plants, especially Asiatic bittersweet.



Two views of the forest in the conservation area. A cottonwood in the historic clearing and now wrapped in Asiatic bittersweet, as well as my daughter in front of an even larger cottonwood, but this one without an bittersweet.

Florence Meadows Section



Vegetation Patterns Today

Although entirely forested, the vegetation patterns within this conservation area shift depending on historic alterations, soil conditions and flooding frequency.

(A) Dutchman's Breeches; (B) Trout lily; (C) Bloodroot; (D) False Hellebore; (E) A view of the sugar maple dominated high terrace floodplain forest. This particular photo was taken in the area that includes a handful of giant black locust trees, which may be the remnants of the Locust Grove where Sojourner Truth and other abolitionists gathered in the 1840s.



Furthest downstream and closest to the former Ross homestead and barns, the forest is dominated by black locust on the west and by a mix of cottonwood and black locust on the east. Moving upstream, cottonwood and sycamore dominate the lower, more flood prone areas, while a mix of hardwoods (sugar maple, bitternut hickory, basswood, yellow birch, black birch, red oak, red maple, black cherry) dominate the drier, more upland sites. The sugar maple-dominated woods are within the high terrace floodplain forest, and are more open and easier to walk through. They are also much less impacted by invasive plants.



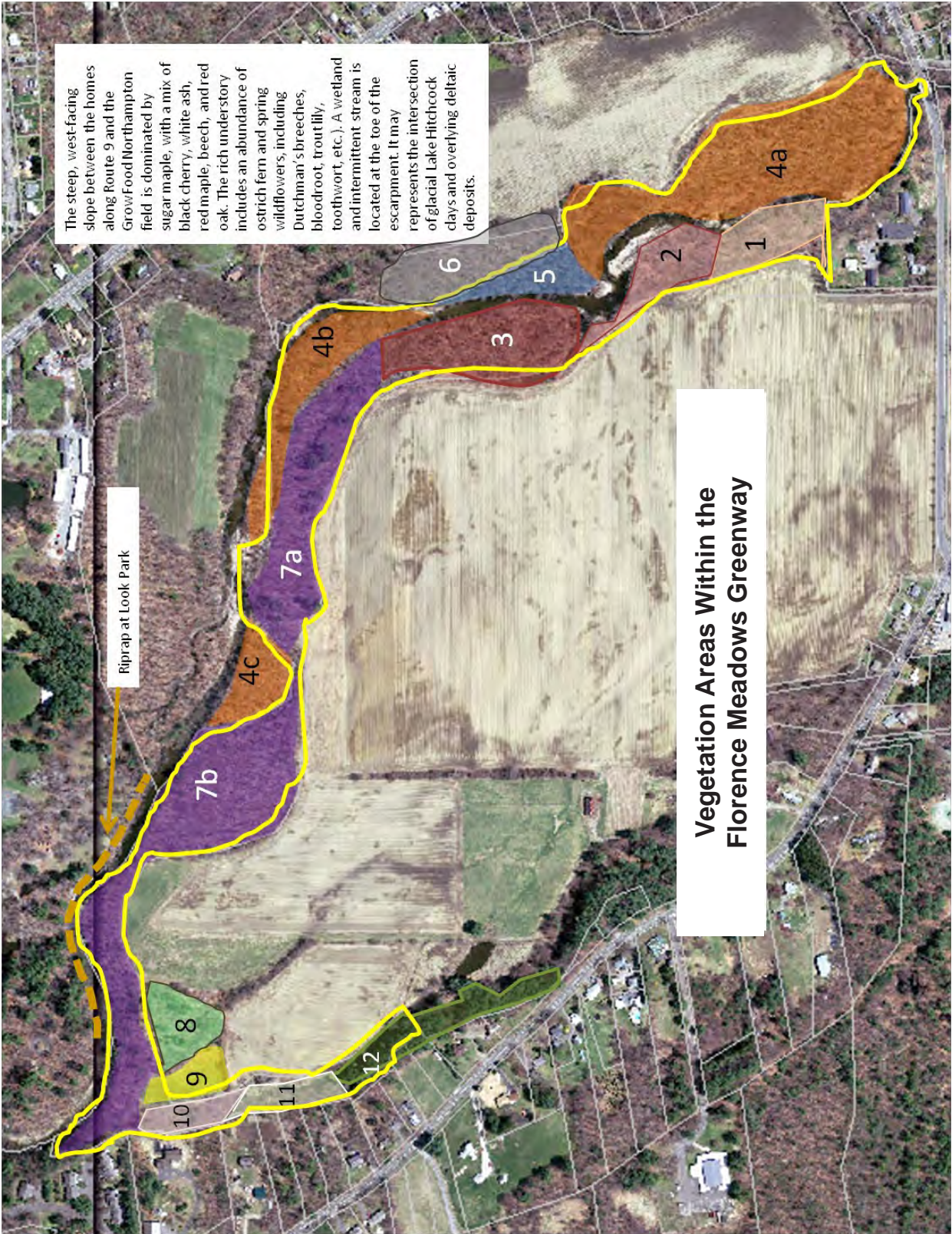
An impressive multi-trunked basswood grows on the east side of the Mill River, not far from the boundary with the private land and Look Park.

At the northern end of the property, the steep slope varies—one section was cut in the recent past and is now a tangle of sumac, goldenrod and bittersweet, while the rest is forested, either with a mix of hardwoods or dominated by white pine and hemlock, with a sparse understory.

What follows are descriptions of the dozen different vegetation areas (see *Vegetation Map*); with numbering corresponding to the Vegetation Map. The units were not GPS'd, but were mapped visually. For detailed maps of the woody invasives and Japanese knotweed, refer to the maps prepared by Polatin Ecological Services, LLC (Polatin, 2014).



(A) The edge of the high-terrace floodplain forest is dry enough to support red oak, including this one that has been girdled by beavers. (B) At the upper end of the property is the richest stretch of floodplain forest. Dominated by sugar maple and hickory, it includes a swath of ostrich fern and an abundance of spring wildflowers.



Florence Meadows Section

Key to Vegetation Map

1. A former clearing for the farm, this area is now dominated by black locust. Bittersweet is common along the edges and interior, as is Morrow's honeysuckle, which forms an almost impenetrable thicket. Japanese knotweed forms an edge between the forest and field, with large patches along the river and in the forest.
2. Black locust is present, but it now mixes with other species including black cherry, ash and hickory on the drier slopes, and cottonwood and sycamore in the wetter, low-lying areas. This area is also heavily affected by bittersweet, Morrow's honeysuckle, barberry and privet. Japanese knotweed forms an almost solid border along the edge and is widespread in the forest as well.
3. This flood-prone area is dominated by sycamore and cottonwood, with occasional black willow. Staghorn sumac and Japanese knotweed grow along the edges. Asiatic bittersweet, garlic mustard, privet, Morrow's honeysuckle are abundant. Wintercreeper also occurs in this area.
4. Lower floodplain forest
 - 4a. Located on the east side of the river, this forest is dominated by cottonwood and black locust. It was cleared historically and portions are subject to flooding. Some parts of this are loaded with Japanese knotweed (*see Polatin map for detail*) and Asiatic bittersweet. This area includes an informal trail that leads to a campsite/hang out, where quite a bit of trash has been left behind. It also has impressive patches of bloodroot and trout lily. Near the northern end it grades into sugar maple and basswood.
 - 4b. Located on the west side, this area is loaded with flood channels and includes a mix of species, including cottonwood and sycamore along the lowest elevations, but also yellow birch, shagbark hickory, white birch, red oak, black cherry, and elm. Asiatic bittersweet and Japanese knotweed are abundant, as is barberry, privet and Morrow's honeysuckle.
 - 4c. Quite similar to 4b, with abundant flood channels and dominated by sycamore and cottonwood, with scattered black willow, sugar maple, yellow birch, and hickory. Asiatic bittersweet, winged euonymus, barberry, and Japanese knotweed are all present. Christmas fern is common on the drier slopes and slightly higher ground.
5. A small triangle of forest above a popular swimming hole, this area is dominated by a mix of red maple, yellow birch, and red oak, above a sea of Japanese barberry and Morrow's honeysuckle. Remnant patches of trout lily, blood root and lady fern are present.
6. Just outside the conservation area, this patch of woods shifts to one dominated by black birch.
7. High Terrace Floodplain Forest
 - 7a. Higher and drier, this flat river terrace is mostly open and dominated by sugar maple, with old locust trees, hickory and a scattering of white pine. The soils here are sandier and the herb layer is sparse. Barberry, privet and Morrow's honeysuckle are widely scattered. Pennsylvania sedge and white wood aster are regular in the understory.

7b: Lower in elevation and richer, this area is also dominated by sugar maple, but with an extensive amount of impressive bitternut. Ostrich fern is common here and spring wildflowers are abundant. The most worrisome invasive in this area is the spread of Japanese barberry.

8. Off the conservation land, this triangle occurs on the other side of a wood road that leads to an old clearing. This area is dominated by red oak, white pine, hemlock, with witch hazel in the understory. Invasive shrubs are not common here.

9. A former hayfield and open clearing.

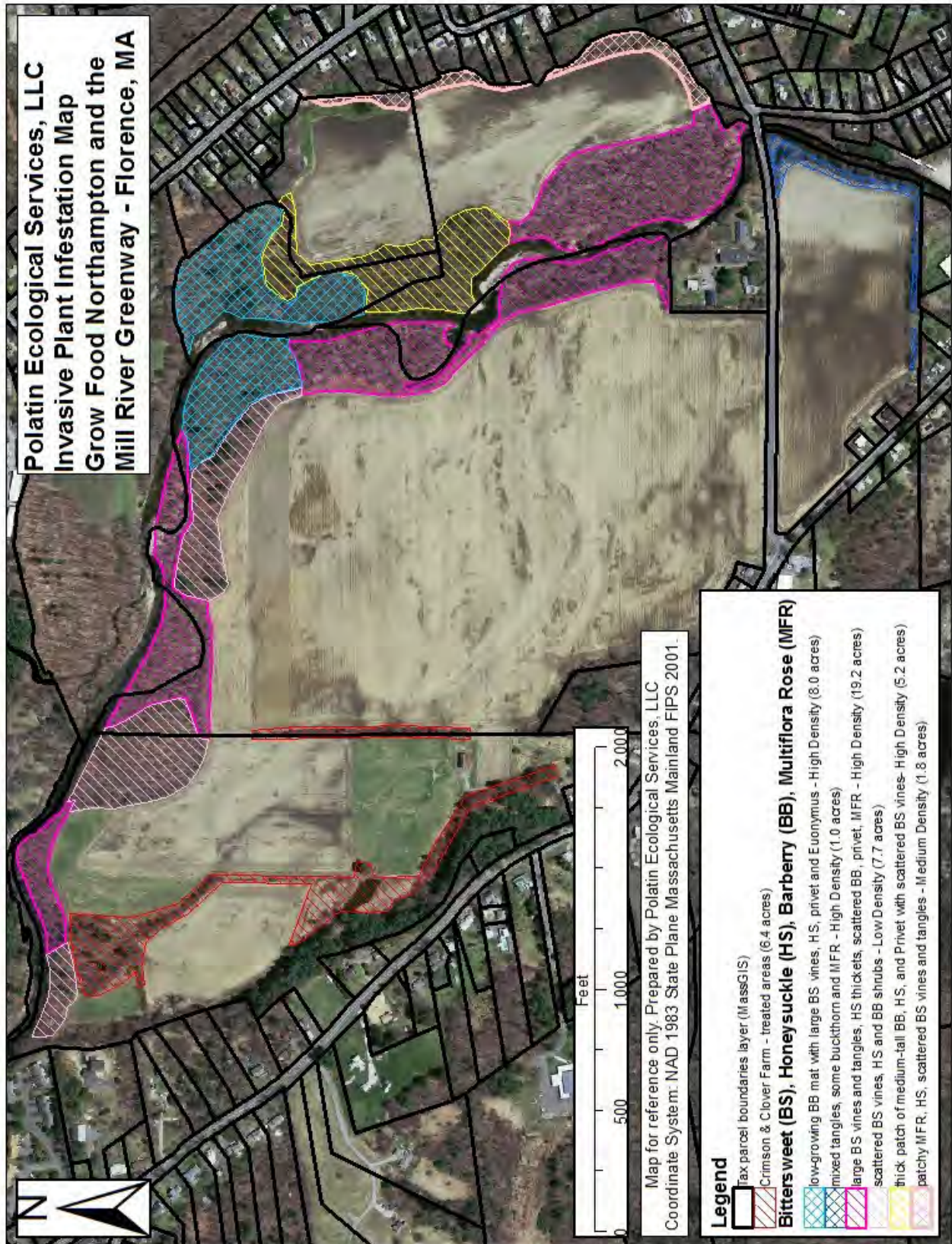
10. A steep slope that has been cut (probably by the abutter to gain a view) and is now a tangle of staghorn sumac, bittersweet, goldenrod and other weedy species. The abutter appears to be pushing yard waste and fill over the edge and on to the city-owned land.

11. A small patch of hardwood forest dominated by oak and hickory. The herb and shrub layers are sparse.

12. A narrow steep slope underlain by loamy sand covering till. This portion is dominated by hemlock and white pine, with a sparse understory. An old river channel/flood channel lies at the toe of the slope and wetland vegetation has grown up along and in it. In places it may hold enough water to function as a vernal pool.



Florence Meadows Section





In this stretch, the Mill River (A) is between 40-50 feet wide and includes a handful of deeper pools, but mostly is shallow and rock-bottomed. Around the middle of the conservation area (B), there is an important side flood channel, which borders the high-terrace floodplain forest. In this section and along the cobbly peninsulas, Japanese knotweed is gaining ground.



(C) One of the most impressive Japanese barberry thickets in all of Northampton exists on the eastern side of the conservation area. It is, as shown in this photo, an impenetrable thicket. (D) White pine and scattered hemlock dominate much of the steep slope that is underlain by till and parallels Spring Street. Rounded rocks are easy to find along the slope.

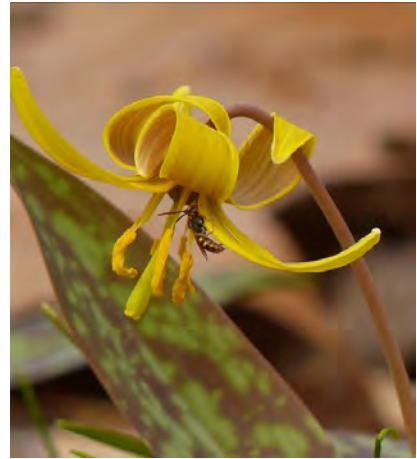


(E) A wetland exists at the base of the steep slope in the northwestern edge of the conservation area. It is fed by both groundwater and an intermittent stream that drains out of the Sawmill Hills and underneath Spring Street. (F) A house along Spring Street has cleared trees and dumped yard waste along the slope that, based on maps, appears to be part of the conservation area.

Florence Meadows Section

Wildlife

This narrow forested corridor along the river is used by a wide variety of wildlife, from native bees and butterflies to pileated woodpeckers, screech owls, white-tailed deer, raccoon, red fox and much, much more. Meanwhile, the river itself is its own corridor of aquatic life. In addition to providing habitat for rare dragonflies and cold water fish species, the Mill River supports hundreds of other aquatic invertebrates—crayfish, hellgrammites, water striders, caddisflies, mayflies, to name just a few. In addition, the river and its riparian corridor are an important migratory and travel route for migratory birds, otters, mink, and even the occasional bear.



Recommendations

1. In collaboration with GrowFood Northampton, Crimson & Clover Farms, and other abutting landowners, review and take action on the invasive species management proposal submitted by Chris Polatin of Polatin Ecological Services (2014). His 3-year plan includes the control of Japanese knotweed and other woody invasives, with an initial year of control followed by two years of spot work. The estimated cost for a three-year was \$55,000 and assumed that volunteers would take over after the three years of treatment.
2. Create formal trails on the west side of the Mill River, beginning in the new parking area.
3. Clean up trash along the east side of the Mill River.



4. Install a kiosk near the parking lot that describes the history of this part of the Mill River and a map of the area.
5. Determine if the farm road on private land (east side of Mill River) allows the public to access the conservation land on this side of the Mill River or if only farm-related activity is allowed. If public access is allowed, create a trail on this side as well.
6. Lead natural history walks in order to introduce more people to this interesting site and possibly hold vernal pool/aquatic creature/wetland workshops in the north-west portion of the property where an old river channel/wetland exists.
7. Encourage more research to take place on this conservation area.



This site is currently being used for a long-term research project by The Nature Conservancy. Aside from these tags in a handful of trees, the project has no other impact on the conservation area.

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The silty loams and sandy loams that dominate this site are all prime agricultural soils. Map data from MA GIS.

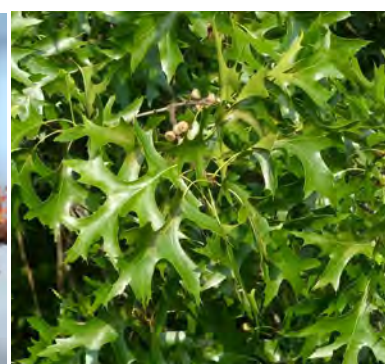


Wild oats, *Uvularia sessilifolia*, a spring ephemeral found in the conservation area.



An old farm road crosses through the conservation at the northern end of the property.

A Natural History of the Historic Mill River



Historic Mill River



Historic Mill River near Veteran's Field

This 1.3 acre property is contiguous to Veteran's Field and includes a remnant of the abandoned Mill River channel, plus a narrow band of higher ground along the margins of the old bed. Invasive species are present within the conservation area, but surprisingly, are not that common. The neighboring properties, however, are much more invaded. Privet, for instance, is especially widespread on the land to the south and Japanese knotweed forms an almost continuous ring around Veteran's Field and borders much of the bike trail.



In the mid-1940s, not long after the Mill River was diverted, much of its old bed and floodplain within Veteran's Field was filled in. The soil was from an underground heating project being done by Smith College and the city was delighted to receive the excess and fill in the old bed.

Exploring the Conservation Land

Although the bike path forms one boundary of this conservation area, the simplest way to reach it is actually to take a small foot-path on the edge of Veteran's Field (see Map). This informal trail brings you to a small rise, which is crowned with a beautiful stand of sugar maple and black locust and includes a small clearing. This area is on private land, but it obviously well-used





In 1884, this entire area was owned by the Parsons' family, descendants of Northampton's original English settlers in 1654.



This small property is contiguous with Veteran's Field and the bike trail, plus in the vicinity of several other protected properties. Its odd configuration comes from its history: part of this property was the winding road that was used to build the dike in 1939.

Historic Mill River

by locals. From this gathering spot, the conservation area is just a short walk through the woods to the northwest. Its boundary is unmarked, however, so it helps to have a map or aerial photograph to figure out exactly where you are.



Vegetation Patterns

This small, seldom visited conservation area can be divided into three major plant communities (see Vegetation Map), with the shifts from one community type to the next due principally to the hydrology and the habitats ranging from upland mixed hardwoods to deciduous swamp forest to open wetland.



Silver maple is common in the old Mill River bed.



This photo from the 1960s shows the construction road to the dike and most of this conservation area as fairly open.

Uplands to Wetlands

The canopy in the drier areas of the conservation area is dominated by a mix of red maple, Norway maple, and black locust, but also includes slippery elm, and black cherry. This area also includes a single whopper tulip tree with a 12-foot circumference!

Below the canopy, the shrub layer is fairly dense and includes an abundance of privet (non-native) and poison ivy (native). Virginia creeper, wild oats, goldenrod, celandine, lady fern and Canada mayflower are common in the drier sites, while the wetter soils have an even more diverse mix, including swaths of sensitive fern, spotted touch-me-not, jumpseed, beggar's ticks, as well as boneset, false solomon's seal, groundnut, wood nettle, and moneywort. Japanese knotweed is also occasionally found here, and Asiatic bittersweet is common. These wetter margins along the bed of the old Mill River bed also support a different mix of shrubs. Silky dogwood, winterberry, and especially northern arrowwood are common. There is also some wintercreeper and winged euonymus here too, and the canopy now includes both silver maple and cottonwood.

The final area is the remnant channel of the Mill River, which since its diversion in 1939, has developed into a semi-wooded, mostly open wetland complex. Red maple is especially common around the open wetland, but there are also scattered pin oak here and a few silver maples and cottonwoods. Ringing its margins is a narrow thicket of northern arrowwood and winterberry. A few buttonbush are growing in the most watery areas. Rice cut grass, royal fern and sensitive fern are also very common.

Heading “downstream,” the old bed is more wooded and includes more silver maple and cottonwood in the canopy, while the bed itself is carpeted with



In spite of this property's long history of alteration, a portion of it falls within the Priority Habitat for Rare Wildlife (yellow hatching). It also lies just downstream from Core Aquatic Habitat as determined by MA NHESP.

sensitive fern. This area holds enough water in the fall, winter and spring that it is used by ducks, great blue herons and other waterbirds.

Recommendations

This area could become a sweet pocket park, with a nice picnic spot and linking trails to the dike and/or South Street. It currently has some invasive species issues, but at least for now, it is the abutting properties that are more seriously invaded. That said, unless this area is monitored, this small pocket will



Clockwise: Much of Veteran's field is bordered with Japanese knotweed.

Catalpa, multiflora rose and Norway maple are three common non-native species found in the vicinity of the conservation area.

A low-spot on the former floodplain of the Mill River still holds water for longer enough periods that no vegetation is able to grow.

Two views of the Mill River from the dike, looking upstream to the bridge on West Street and downriver toward Grove Street. This part of the diversion took advantage of a portion of the long abandoned New Haven-Northampton Canal (1835-1847).

probably become much more invaded over time. The adjacent bike path, for instance, is already loaded with Japanese knotweed, Asiatic bittersweet and many other unwelcome invasive plants.

One challenge in developing this property via Veteran's Field will be safety. Right now, for whatever reason, it doesn't feel like a safe place when you're in the forest.

Perhaps a good alternative to developing this site more is to create a wildlife watching spot from the bike trail, which would provide a bird's eye view to the wetland area below, where turtles, ducks, frogs, and other kinds of wildlife can be observed.



Impressive bittersweet vines curl and twist around a cottonwood that lies just off the property.

A Natural History of the Leeds Memorial





Leeds Monument

When this tiny conservation area was donated in 1999, its primary purpose was to host a stone memorial to the victims from Leeds who died in the 1874 Mill River Disaster, but by default, it also created a piece of dedicated open space in the heart of downtown Leeds and right along the river.



Today, with the exception of the small garden around the monument, this conservation area is a wild tangle. The trees and brush along Main Street are so thick that it is almost impossible to see the river for most of the year, there is no path to the river's edge, and most of the land along the river has been overwhelmed by a mass of invasive non-native plants.

That's the bad news.

The good news is that that's not the way it has to be. With the proper permits, the non-native plants could be controlled (which would help the native species recover) and a portion of the conservation area could be opened to allow easy access to the river's edge. These initiatives would not only improve the ecology of this tiny conservation area, but they would also make this property a more interesting place for neighbors, as well as people who will stop here as part of the soon-to-be-published self-guided historical walking tour of Leeds.

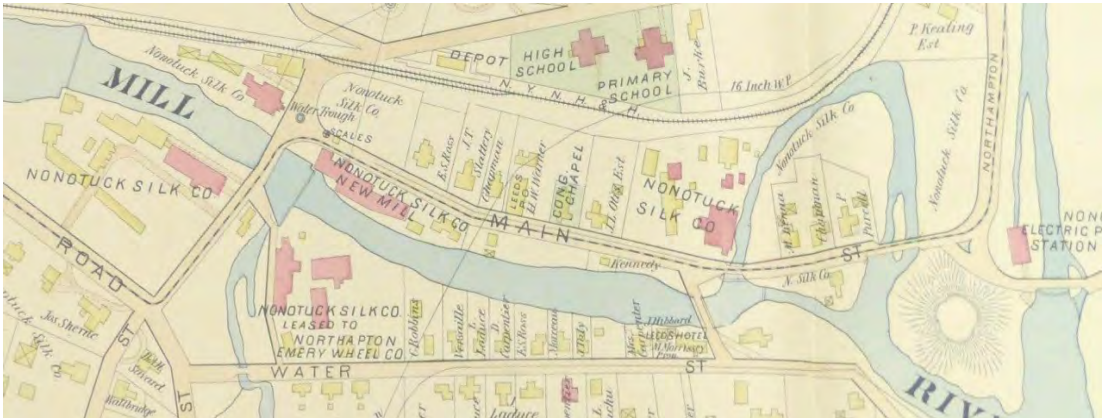
History & Ecology

This conservation area was created not with conservation in mind, but history. In the late 1990s, a small group of local historians



On May 16, 1999, 125 years after the disaster, a monument was erected in Leeds to honor the 51 people from the village who lost their lives during the flood. The plaque provides a short, eloquent and haunting description of how the "rampaging water" roared through Leeds in less than ten minutes, destroying homes, factories, and lives. It also lists the names, ages and family relationships of each of the victims, who ranged in age from just five months to 80 years old. The Fennessey family alone lost seven members of their family, the Fitzgerald family lost six.

decided to erect separate monuments in each of the villages where people died during the Mill River Disaster. Jim Parsons was the amateur historian who spearheaded the Leeds effort and, working in collaboration with the Leeds Civic Association, he asked his long-time acquaintance, Russ Myette, if he would donate a piece of his land for the project. Myette had grown up in the house just below the Hotel Bridge and in the early 1950s, he purchased the narrow strip along Main Street that runs upriver from the Hotel Bridge.



The 1895 map reveals what an important land owner the Nonotuck Silk Company was in downtown Leeds. The aqueduct from the reservoir (now Musante Beach) was installed in 1873. It is probably still under the river, but this pipe is no longer used.

Considering the purpose, Myette's land was an ideal location for a memorial to the flood victims. Not only was it right in the heart of the village, it had been scoured by the Mill River Flood, and furthermore, in 1874, this strip of land was owned by the Nonotuck Silk Company, one of the original investors in the failed dam of the Hampshire Reservoir.



These two aerial views of downtown Leeds along the Mill River (1965 and 2013) reveal how the vegetation along this stretch of the Mill River has grown over the years.

The land was also hardly pristine. The vegetation had been cleared repeatedly, and the portion closest to the road is made up entirely of old fill, which meant that a little more alteration along the road for a memorial wasn't likely to cause any environmental concerns.



This image from 1890 shows no vegetation along the Mill River in the area where the conservation area is now. It was actually taken from the base of Roberts Hill.

Vegetation Patterns

Since the monument was dedicated in 1999, the Leeds Civic Association has maintained the landscaping around the monument, but has left the rest of the land unmanaged. The property now includes about three dozen trees (and yes, it's so small that you can actually count them). Only two of the trees are good-sized: a large red maple and an even bigger catalpa. The rest are smaller and appear to be about ~20-40 years old. Slippery elm is the most common species, but there are also a few black cherry, sugar maple and black walnut.

The understory is a mix of native and non-native plants, but it is dominated by invasive plants. These threaten to displace the natives and they include nearly all of Northampton's most problematic species: Japanese knotweed, Asiatic bittersweet, multiflora rose, Japanese barberry, garlic mustard, Morrow's honeysuckle,



Top: At this time, the quantity of invasive plants makes it almost impossible to even see the river from the road side, let alone access it.. But if some of the non-natives were removed, the view (*bottom*) is what people could experience and enjoy.

winged euonymus. The native species include a greater variety, with some of the most common being staghorn sumac, alternate-leaved dogwood, witch hazel, blackberry, meadowsweet, grape, Virginia creeper, goldenrod, asters, fringed loosestrife, golden alexanders, touch-me-not, sensitive fern, and several different kinds of grasses and sedges.

Wildlife

In spite of its narrowness and compromised nature, this strip along the river is used by more wildlife than might be expected. In addition to the ubiquitous gray squirrel, there was also evidence of rabbits, raccoons, and beavers. In fact, during the last year, beavers have taken down several trees



Japanese knotweed, multiflora rose, barberry and bittersweet are displacing the native species.



Fringed loosestrife, a native species, in bloom.

Slippery elm is the most common tree.

Common Birds at Leeds Memorial	
Common Merganser	Phoebe
Green heron	Red-eyed vireo
Belted kingfisher	Carolina Wren
Grackle	Robin
Cardinal	Song Sparrow
	English sparrow



Fresh beaver chewing of one of the landscaped plantings

and shrubs within the conservation area—including some of the landscape shrubs around the monument!

Management Recommendations

Although the main purpose of this site is as a tribute to the 1874 flood victims, it could become a much more welcoming piece of open space in downtown Leeds if the non-native plants were controlled and better access to the river was created. This plan would obviously require permission from the conserva-

tion commission, but in a matter of hours, half a dozen volunteers and a licensed herbicide applicator could cut out and spot treat the non-native plant stumps. Although most of the property could be left in its “wild” state (i.e. not manicured), a small path could be created just downstream from the monument, which would provide easy-

access to the river’s edge. From there, for the first time in years, local residents and visitors would be able to see the stonework on the other side, look down to the Hotel Bridge, and watch wildlife.

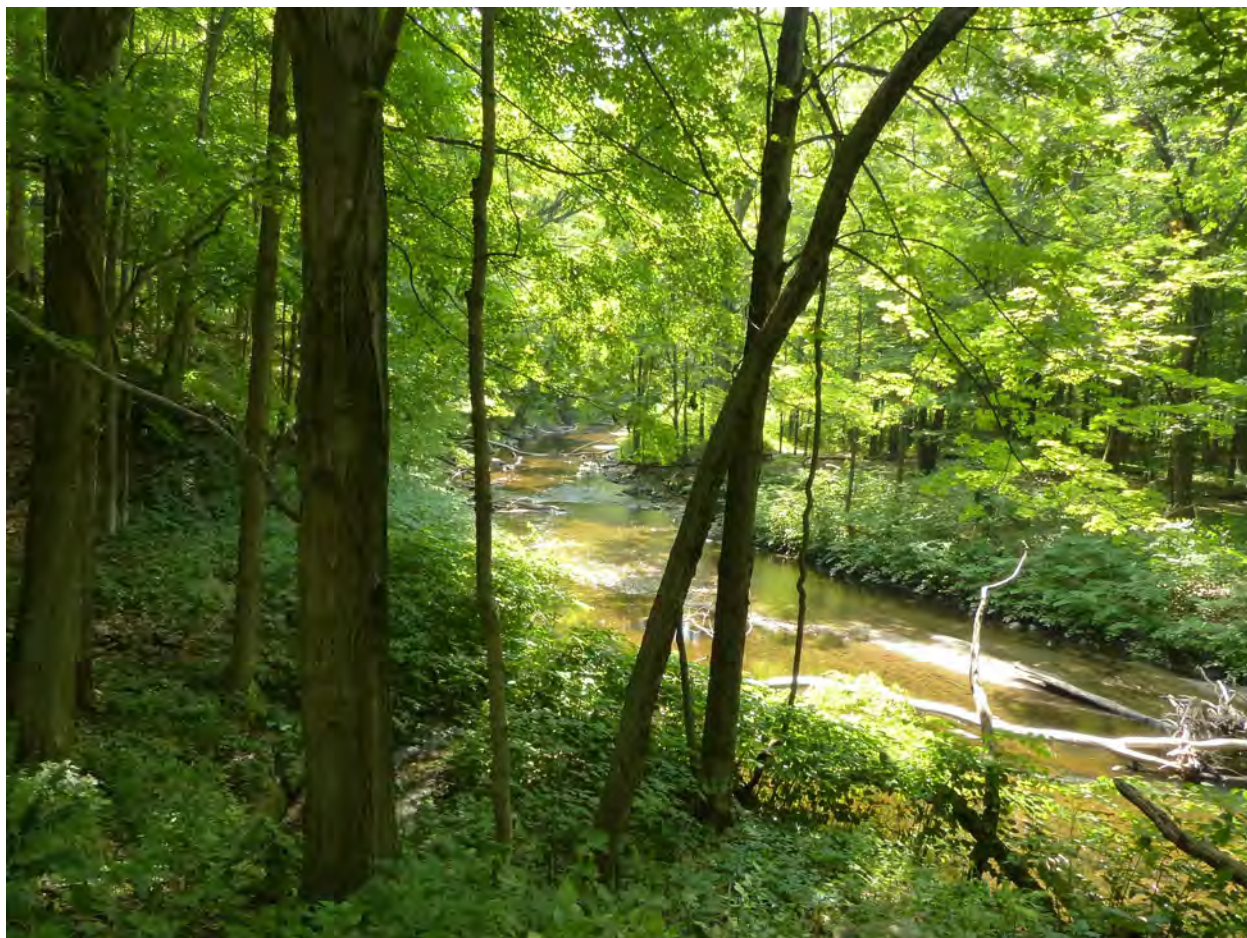
This would be a good project on its own, but in concert with the new historical walking tour, the future trail linking the bike path with Button Factory Greenway and Main Street, and the renewed effort to restore the Hotel Bridge for bicyclists and pedestrians—it makes even more sense.



The view of the conservation area from the Hotel Bridge.



A Natural History of the Button Factory



Button Factory



The Button Factory

From the edge of Main Street in Leeds, this small piece of conservation land along the Mill River currently looks like an impenetrable tangle—a neglected, overgrown lot dominated by invasive plants in the understory and a canopy of black locust and cottonwood. But it's also true that this is a site worth investing some energy in—not so much for its ecological values (although they exist), but more for its aesthetic possibilities, recreation potential, and its relevance to the history of Leeds.

In addition, this site is interesting geologically. If we could travel back in time and visit this spot 14,000 years ago (Figure 1), we would be standing near the rushing, icy gray waters of a much larger Mill River, just upstream from where it poured into Glacial Lake Hitchcock. Looking south, we would have seen an embayment of the lake, with a few small nearby islands (Baker Hill, High Street in Florence, Florence Road) and in the distance, the much larger, linear islands that we now call the Mount Tom and Holyoke Ranges. When Glacial Lake Hitchcock receded, the Mill River continued to flow through the narrow valley that contains Leeds' village center. Over time, the river moved back and forth, reworking and



As seen from the street edge....not too inviting!

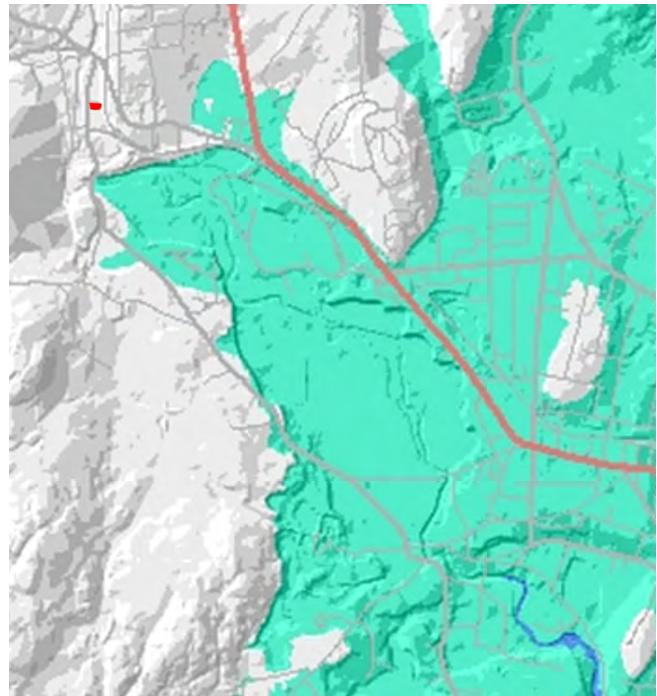


Figure 1. The tiny red dot is the location of the conservation area relative to the position of Glacial Lake Hitchcock. The white areas are either the surrounding uplands or islands within the lake. The two closest islands that would have been visible from the conservation area would be the drumlins that form the center of Florence and Baker Hill, seen here in the southeast corner.

depositing the material left behind by the glacier and leaving behind a river terrace that now underlies most of this conservation area.

Human History

After the last glacial period, significant changes to this site didn't take place until the 19th century and once they began, they didn't stop for more than a century. The first major alteration to the land occurred in 1812. Just three years after building their first woolen mill, the Shepherd family built a second woolen mill on the land that includes this conservation area and the abutting parcel. After the Shepherd's company failed, another wool company took over the operations. When that one failed in 1857, the land and buildings were purchased by Alfred P. Critchlow, who used



Photo by Robert Emrick.
Courtesy of Forbes Library.



The conservation area, outlined in yellow, abuts a small property across the river under conservation restriction and the bike trail (purple). It is also in close proximity to two conservation areas (Leeds Memorial and Robert's Hill) and Look Park.



The 1895 Atlas of Northampton showed the location of the buildings that were on the site, which was then owned by the Nonotuck Silk Mill. At least six are on the current conservation area. The property is opposite the Hotel Bridge and west of the primary school.



A view of the Button Shop, courtesy of Forbes Library Collection. The date of this postcard is unknown so this may be the brick mill that existed from 1871-1874, or the one that was built after the Mill River Disaster. Based on the height of the stack and size of the trees in the rear view, it appears that this may be the mill that was built after the disaster. Compare with the images below.



- (A) Warner's button mill was completely destroyed by the flood. Note the stairway in the back leading to the rail line. This is how many workers escaped. *Courtesy of Digital Commonwealth: <https://www.digitalcommonwealth.org/search/commonwealth:c534g3182>*
- (B) Another view of the button mill, photographed from the rail line, a little ways downstream. *Courtesy of Digital Commonwealth: <https://www.digitalcommonwealth.org/search/commonwealth:c534g3271>*

the building to manufacture buttons. Critchlow had experimented with horn and mountain laurel buttons, but at this site he chose a new material—palm nuts. The nuts were shipped from South America and here at the factory, they were cut, carved and dyed to make buttons. Critchlow was the first in the United States to use them, and his business flourished.

After the all-wood construction factory burned in 1870, the new owner George Warner (who was also Critchlow's son-in-law) built a new one in 1871, this time out of brick. Three years later it was completely destroyed by the 1874 flood.

Although Warner re-built the factory the next year, his operation never really recovered and by 1895, the property had been sold

to the Nonotuck Silk Company (later the Champlain Silk Mill), which operated until 1930. At that time, this part of the property included the flume, wheelpit, a chimney, boiling room, filling machines, a drying room, and a machinery storage area (O'Reilly, Talbot & Okun reports, 9/2010 and 10/2010).



By the 1950s most of the buildings, as seen in this aerial image, had been knocked down.



Today, rock walls, old fill and other debris are the lasting physical evidence of the decades of manufacturing that took place on this site.

Button Factory

After 1940, the property changed hands five different times and sometime between 1939 and 1950, most of the old buildings were razed. In 1982, the Tacy family purchased the lot that included this land, as well as the abutting property. During their tenure, they filled in part of the raceway, but they also let most of the land that now forms the conservation area grow up into trees and brush. In 2010, the Tacy family divided the original parcel and donated this 1.37 acre portion to the City as conservation land. The other property (175 Main Street) is now owned by Alternative Recycling Systems.



Alternative Recycling Systems abuts the conservation area.

Prior to accepting the property, the City had Phase I and Phase II environmental site assessments conducted. Soils and groundwater testing did not reveal any hazardous materials on the site, but noted the likelihood of coal spoils and building debris in the fill on the site.

Vegetation Patterns Today

When viewed as a whole, this property is one where disturbance is a primary factor in determining the plants that grow here—not only in the uplands, but also along the river edge. Throughout the site, the soils have been altered repeatedly—either by people or the river itself. As a result, most of the plants are species that do well in disturbed soils and many of them are non-native, invasive species (Eiseman, 2012.).

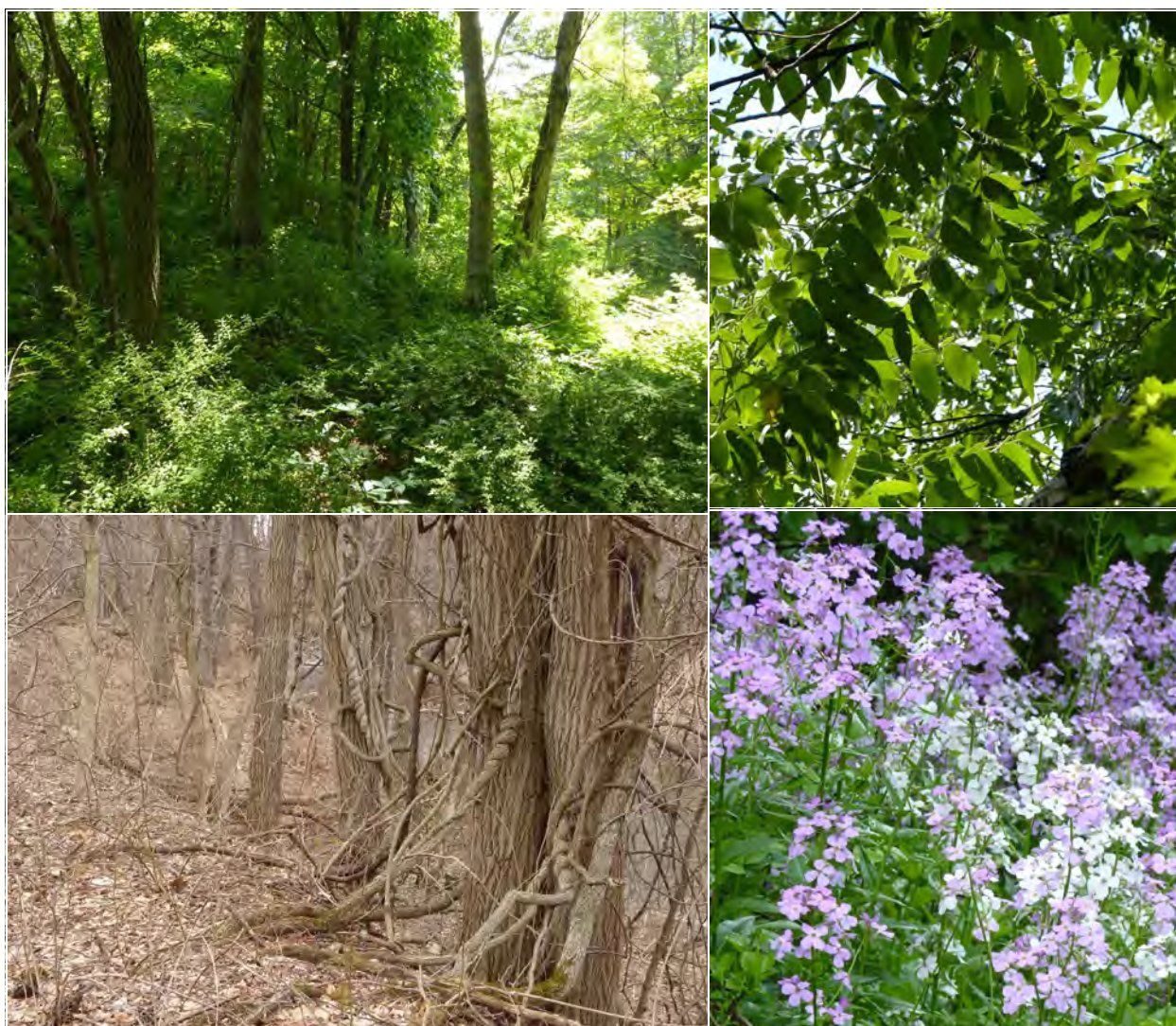


Two views of the property. *Top:* From the bridge in the early spring, the site's industrial heritage is obvious. *Bottom:* The energy and dynamics of the river influence the site's vegetation patterns.

Uplands

Along Main Street, beyond the clone of staghorn sumac, the forest includes a mix of tree species. Black locust is the most common component in the canopy, but other trees include elm, box elder, sugar maple, Norway maple, cottonwood, black cherry, black birch, white pine, a large catalpa and closer to the river, a very large butternut.

Below the canopy, the understory is a mix of native and non-native species, with the non-natives being the most common. They include multiflora rose, Asiatic bittersweet, Morrow's honeysuckle, winged euonymus, privet, barberry, garlic mustard, celandine, Dame's rocket and winter creeper. Native plant species include poison ivy, goldenrod, jack-in-the-pulpit, enchanter's nightshade, asters, grape, and Virginia creeper.



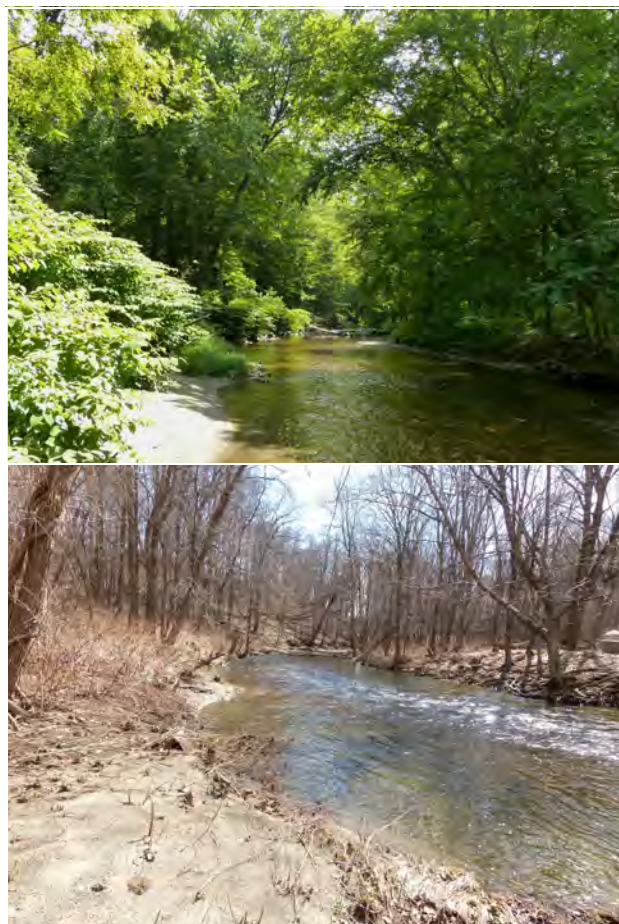
Clockwise: A tangle of barberry grows below the canopy; butternut; Dame's Rocket; a twisting, tangle of bittersweet vines grow up the trunks of black locust.

Button Factory

On the eastern part of the property, there is a small seep near an enormous red oak, then a steep slope. At the top, the property adjoins the former rail line, now bike trail. The slope is underlain by till and is covered by red oak and black locust.

Riverbank and Margin

Although much of the riverbank is steep, there is fairly easy access at the eastern end of the property near the small seep/spring that is surrounded by old stonework. Christmas fern and spinulose wood fern grow in this section, and there are also patches of scouring rush, hellebore, golden alexanders, and along the sandy shoreline, swaths of sedges (*Carex torta*). There is also a sizeable (and growing) patch of Japanese knotweed.

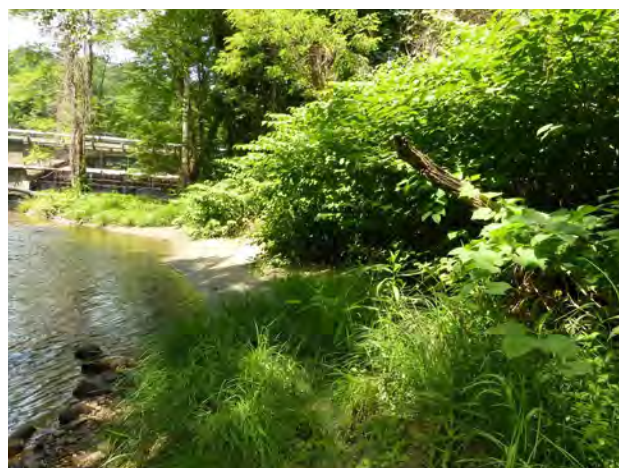


Two views looking downriver, at different types of year.

A lot of the bank has been filled in over the years, and there is a section of old stonework not far from the dam. This is a pretty stretch, as the river curves and its bottom is a mix of sand and cobbles. On the other side of the river is an open floodplain forest that is under private conservation restriction. The latter includes a mix of black locust, sugar maple, yellow birch and red oak. Several large sycamores grow there too, as well as some good sized patches of Japanese knotweed.

Wildlife

Although this property has such a long history of alteration, it is connected to long narrow strips of forested land along the river and is not far from other protected areas (Roberts Hill, Look Park, Broughton's Meadow). Because of this, signs



Japanese knotweed crowds the shoreline. In foreground, *Carex torta*.

of wildlife are easy to find. On my outings, I found evidence of deer, rabbits and beavers. The beavers had even clambered up the steep bank and chewed through several bitter-sweet vines on the old river terrace/mill site. Undoubtedly it is used by many other species

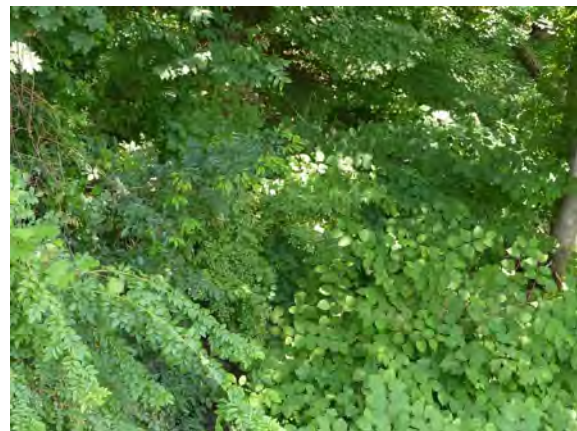
(mink, otter, etc.) and the river itself supports a wide variety of aquatic animals, from fish and caddisflies to stoneflies and crayfish.

Recommendations

This property is already a stop on the soon-to-be-published historical walking trail for Leeds, and its location between the bike trail and Hotel Bridge makes it an ideal link for a future trail. Although non-native species are abundant, many of them could be knocked back to make this area (or at least portions of it) more accessible and usable to the public. A bench could be installed overlooking the river and a small kiosk could be added to explain the property's



Clockwise: Woodpecker holes, probably from a pileated, in a catalpa on the property; raccoon tracks along the sandy shoreline; beaver cutting on a large oak near the seep; a beaver-chewed Asiatic bitter-sweet vine. Go beavers!



A mix of Japanese knotweed, multiflora rose, privet and Norway maple—as seen from the bridge. Yikes.

history and show photos of the button factory, before and after the flood, as well as an image of the buttons themselves. The property could also be renamed Button Factory Greenway, which was one of the 19th century businesses that helped define Leeds as a manufacturing center. The biggest challenge will undoubtedly be controlling the Japanese Knot-weed and this is where a comprehensive strategy for controlling invasive plants along the Mill River Greenway will be useful.



The old railroad line, now bike path, is located above the property.

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A Natural Focus LLC

56 Montague Road
Westhampton, MA 01027

January 5, 2015

Sarah LaValley & Kevin Lake
Conservation Commission
City Hall
Northampton, MA 01060

RE: Mill River Greenway—Ward Avenue to Franklin Street

Dear Kevin and Sarah,

It has been a few months since the natural history walk along the trail near Ward Avenue, and I wanted to send you more information about what I saw then and also earlier during my exploratory survey this past July.

As you well know, this is one of the loveliest and most popular trails in Northampton. And it's really no surprise. The path here has a number of qualities that, when combined, makes it feel more like walking through a private sanctuary than a public space. The river is pretty, the trail is wide and level, and even though it's close to hundreds of homes, it feels like you're in a wilder, more remote setting.

But it's also true that this stretch has some problems. Not only are there troubles with erosion and trampling along the river bank, but the twelve (or so) acres that make up this bend in the Mill River have also become seriously invaded with non-native plants. That invasion took place almost entirely during the last 20 years, and it's a phenomenon that is hardly unique to this property. In fact, there are no conservation areas in Northampton without invasive plants.

Before getting into the details of the current vegetation patterns at this site, I think it is useful—and interesting—to put the more recent vegetation changes into a broader historical context.

Very briefly, change is nothing new here. Ever since the last glaciation, this area has been modified by the river. During the last ten thousand years, it has carved down through deltaic sediments (which were deposited here by an earlier, glacially-charged river), cut through clays left by glacial Lake Hitchcock and finally exposed the unconsolidated glacial till layer below. In addition, over time, the river has meandered back and forth in this section, creating river terraces and floodplains.

But the river hasn't been the only source of change. People have also been modifying this landscape for thousands of years. This trail almost certainly follows the same path, more or less, that was used by the Nonotuck and their an-



In 1888, the City laid one its earliest sewer lines along the present-day trail. Two years later, Charles Warner published *Picturesque Hampshire*, a sort-of gushing history and travel guide about the Valley towns. In it, he included a visit to the “sacred precinct” known as Paradise Meadows and in describing the area, Warner made an appeal:

“We will...take a ramble in the Paradise Meadows, with which too few are acquainted, for here should have been, with the rest of the ‘Paradise’ region, a public park. It is perhaps not too late now to secure it, although the meadows are already partly divided and sold for building lots, which beginning on the brow of the hill, to the north, run down to the river, but which, for building purposes are practically valueless as being liable to overflow in a very high freshet. But it is not our desire to depreciate the value of these lands any more than it is to create a fictitious value for them, though here we cannot resist expressing our opinion—and we are sure our visiting friends coincide with us—that the city should take measures to obtain this territory for a park before it is too late.”

No one took up Warner’s suggestion and by 1895, the land had been subdivided and over the next several decades, dozens of new homes were built along Ward Avenue, Vernon Street, Washington Avenue and the nearby streets. In 1933, the year after Calvin Coolidge died, Grace Coolidge had a new home built where Washington Avenue becomes Ward Avenue. According to a *Historic Northampton* document, during her tenure, Mrs. Coolidge was fond of nature walks and regularly took strolls along this trail, which began right next to her property.

Vegetation Patterns

By the time Mrs. Coolidge died in 1957, the vegetation in the former Meadows had grown into a patchwork, with some open clearing still remaining, some blocks of older forest, and some scruffy stuff in between. Since then, two homeowners have partially cleared their lots, while the rest have mostly let the vegetation on the slopes and floodplain grow back. Today, the oldest and most fertile forest patches in the floodplain are dominated by a mixed hardwood canopy. Sugar maple is the most common species, but several other kinds of canopy trees occur here too, including black birch, hickory, basswood, black cherry, elm, red maple, as well as patches of white pine and hemlock. In areas where the soils are drier and more acidic, the composition of the canopy shifts to red oak, pin oak and white pine, and along the banks of the river and cobble bars, there are several im-



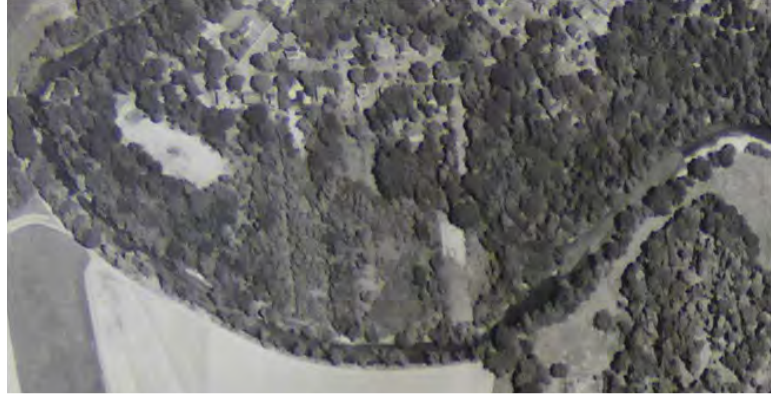
The 1884 map shows the carriage road that looped through Paradise Woods and Paradise Meadows. It began near a home owned by Frederic Kneeland, a local banker and photographer. Kneeland’s property is now the home of the Smith College president.



By the time the 1895 map was done, the hillside and area along the Mill River had been subdivided into lots.

pressive sycamores. In contrast, in the areas that have been cut or disturbed during the last fifty years, black locust is the dominant canopy tree. There is also a small, old planting of spruce.

According to MA NHESP's Natural Communities Classification System, this area, because of its location above the zone of annual flooding and its fertility, would be characterized as a "high-terrace floodplain forest." Right now, the canopy species are consistent with MA NHESP's description of this type of natural community, and there is some ironwood, another hallmark of high-terrace floodplain forest, in the sub-canopy. But based on the limited distribution of ironwood at this site, it appears that this forest used to be much more park-like, with essentially two layers-- a deciduous canopy above and a lush understory of ferns and wildflowers below.



The area along the Mill River near Ward Avenue, above in 1958 and below in 2013.

During the last two decades, however, that's changed. Today, instead of being able to look through the forest understory, the view is obstructed by a variety of non-native shrubs, especially privet, winged euonymus, and Japanese barberry. From an ecological standpoint, these three species are worrisome because of their ability to shade out and displace native vegetation, but the thickets of barberry also pose a public health risk. Research in Connecticut found that barberry thickets have significantly higher numbers of Lyme-disease infected deer ticks than the surrounding woodlands.

Invasive shrubs and vines have also gotten a foothold along the trail and river's edge. But instead of privet, winged euonymus and barberry, the invasive species in these areas are those that do well in sunnier, more disturbance-prone settings—e.g. multiflora rose, glossy buckthorn, Morrow's honeysuckle, autumn olive, loads of Asiatic bittersweet, Amur corktree (a new threat), and the most troublesome of all, Japanese



The trail that Grace Coolidge, Charles Warner and thousands of others have taken over the years begins on Ward Avenue and leads to the Mill River. A sewerline also runs under the road.



(A) Historically, the forest understory probably looked like this—an understory carpet of herbaceous plants overtopped by a canopy of sugar maple. (B) A spreading patch of pachysandra.



(C) A thicket of barberry has taken hold in many parts of the forest, while in others, (D) winged euonymus dominates the understory.



Since the late 1960s, the water quality in the Mill River has improved dramatically. This, in turn, has contributed to the increase in the trail's use. Although that's generally a good thing, the increase in foot traffic has come with some problems, including owners with unleashed dogs, dog waste left behind, and as these pictures show, some serious trampling and erosion along certain areas on the river.

Button Factory

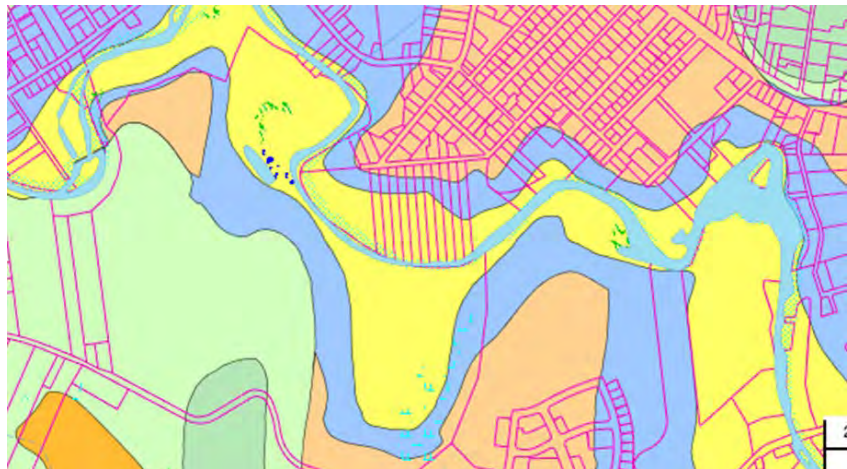
knotweed. During the last twenty years this species has spread extensively in Northampton and it now forms dense, almost impenetrable barriers along big stretches of the river bank, especially on the state hospital side. Its shade precludes the growth of native species (even other non-natives!), reduces the views of the river, and blocks both people and wildlife from getting to the water's edge. For wildlife, it is almost completely valueless--for food, shelter or nesting--, and from a geomorphology perspective, the growth of Japanese knotweed has also changed the way sands and sediments are eroded and deposited along the river.

Finally, the mix of plants growing in the groundlayer has also changed. Although the site's rich woods still support bloodroot, trout lily, jack-in-the-pulpit and dozens of other native wildflowers, all of them are probably less common than they were in Grace Coolidge's day. Many of them have been outcompeted for light and space by the likes of Japanese knotweed and euonymus, and those that remain are also competing with annual and perennial non-native plants in the groundlayer, including goutweed, dame's rocket and increasingly winter creeper, a bittersweet relative in the *Euonymus* genus, which now carpets big swaths of the ground in this forest.

So the question is... what to do? Unfortunately, there are no cheap, easy solutions to control the spread of this suite of inva-



When you walk down the trail from Ward and Washington Avenues, you are walking down the eroded edge of the old delta, down the glacial lake clays and on to the more recent river terraces and alluvium. The Ward Avenue neighborhood, meanwhile, is located on the level surface of the top of the old delta.



The surficial geology of this area is color-coded on this map, which shows bands of color along the Mill River (turquoise blue). Orange is sandy deltaic deposits, baby blue is glacial silts and clays; yellow is recently-deposited river alluvium, light green is till, and the darker olive is a drumlin. *From MA GIS.*



During the last twenty years, the former state hospital land was protected, including the stretch on this side of the river that abuts Franklin Street, under an APR. In addition, Smith College and a private landowner have protected a portion of their land along the Mill River through private Conservation Restrictions.

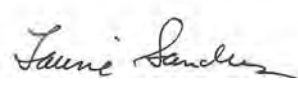
sive plants, and going at them haphazardly isn't a good approach either. Fortunately, this winter the Mill River Greenway Initiative (MRGI), which is headed up by John Sinton and Gaby Immerman, plans to convene a working group that will develop a comprehensive plan to address what, when, where and how to manage non-native plants within the entire Mill River greenway. In planning for that, it would be helpful to contact the 17 landowners in this stretch and determine if they would be interested in participating in the comprehensive planning process. That planning phase might also be a good time to also address the issues of trampling and riverbank erosion along this stretch.

Ultimately, the success of any future invasive species control effort will depend heavily on the commitment of a nearby core group. Given the number of people who love the Mill River trail and live in the Ward/Washington/Vernon Street neighborhood, I imagine that there will be some energetic and dedicated volunteers.

In wrapping up, I want to emphasize that although invasive species are a serious problem, this is not just a good-versus-bad issue. Even Japanese knotweed, which I really dislike, has some value in storing carbon. In addition, it is important not to get so focused on invasive plant problems that you lose sight of the beauty of the trail and this stretch along the Mill River. The area has been and will continue to be a special place. True, Grace Coolidge or Charles Warner would probably find the changes bewildering. But at the same time, they'd also be delighted by the cardinals, tufted titmice, and the song of the Carolina wrens—all of which have also arrived since the 1950s. They'd be stunned to see deer and beavers, and they'd be shocked and thrilled to find that the Mill River is swimmable and fishable for much of the year. And most of all, they would be thoroughly pleased to discover that so many people still visit and appreciate this place that was so dear and special to them.

Please let me know if you have any questions or feedback. I'd be more than happy to respond.

Sincerely,



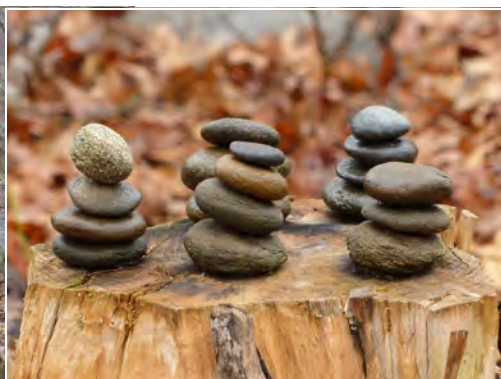
Laurie Sanders



In the 1980s the DPW replaced the sewerline, which runs underneath much of the trail.



A Natural History of the Upper Leeds Rail Trail



Upper Leeds Rail Trail



Upper Leeds Rail Trail

Overview

Although only slightly more than four acres in size, this corridor of conservation land includes 1500 feet along the Mill River, a portion of the historic New Haven Railroad line and the wildest, rockiest stretch of the Mill River in the City. From a management perspective, it is in remarkably good shape, with almost no trash, no manmade erosion, nice trails, and (so far) few invasive plants—just a handful of Asiatic bittersweet vines, a scattering of barberry bushes, and relatively few patches of Japanese Knotweed along the river margin. It is also within a Bio-Map Core area and Priority Habitat for Rare Species, so safeguarding its ecological integrity is important.



History

It is hard to know what this conservation area was like when Northampton was first settled by the English. By the late 1700s, Williamsburg was settled and one of its primary farming areas was the flat meadows along Beaver Brook, which lies just over the hill to the east (Massachusetts Historical Commission, Report on Williamsburg, MA, 1982). But even bigger changes were to come in the early 1800s. In 1809,

the Shepherd family constructed a sawmill, as well as a cotton and woolen mill where the Chartpak parking lot is located. Presumably, the dam to power all of

Leeds Dam is today. During the next decade, this property as well as all of the nearby forest would have been cut, not only for timber and firewood, but also to clear the land and

Natural Resource Summary	
Estimated Habitat for Rare Species	Yes
Wetland Pools	Yes
Supporting Natural Landscape	Yes
Coldwater Fisheries	Yes
Climate Change Resilience	No
Water Supply	No

those operations was in the same spot as the upper
Bio-Map

create more pasture for livestock, principally sheep. The sheep were raised partly for meat, but mostly for wool to meet the needs of Shepherd's mill and the other textile and carding mills in the area. From about 1810-1830, this region, like much of Massachusetts and New England, underwent a sheep-raising craze.

By the 1830s, land clearing was at its peak in Massachusetts and Shepherd's Hollow (as Leeds was then known) was a bustling factory village, with multiple mills and houses. In addition, several more mills had been built up-river in Haydenville, Skinnerville, Williamsburg and Searsville. The growth of these factory villages put additional pressure on both the forest and river. The factory dams altered the flow of the river, and the water itself was increasingly polluted. Erosion from cleared, unstable slopes in the upper

portions of the Mill River caused sedimentation problems in the tributaries and mainstem, but even more damaging to the river's ecology were the wastes from the villagers and factories. Just in Haydenville alone, there was a gold pen factory, a tin shop, brass works, and a cotton mill right along the river. By the time the railroad was punched in along the slope in 1868, there were probably very few creatures living in the Mill River except the most pollution-tolerant.

During the first few years of the railroad's operation, the land along the tracks would have been kept open, either by men cutting the young trees manually or just as likely, by fires started by sparks thrown from the train. Furthermore, any trees that had begun growing on the steep slopes would have all been torn away during the 1874 Mill River flood. On May 16, 1874, the earthen dam that had been built in



An aerial image from 1958, showing the conservation area, with Beaver Brook flowing in along the western boundary, the Mill River and River Road to the north and the still-operating railroad line along the southern boundary.

Conway in the late 1850s gave way, releasing 600 million gallons. Within two hours, a wall of water roared downriver, sweeping up trees, livestock, factories, houses and people in its path. When it was over, 140 people were dead and more than 100 houses and factories were damaged or destroyed. According to historian Elizabeth Sharpe, this stretch of the Mill River was so clogged with debris, it was almost unrecognizable (Sharpe, pers. comm.).

In the wake of the Mill River Disaster, many of the upstream factories chose not to rebuild. The demand for passenger and freight travel to Williamsburg declined and it never recovered. By 1922, the railroad sent the last passenger rail down the line to Williamsburg, and forty years later, in



A large, old trunk of a black locust grows along the steep bank above the Mill River.



Old bricks and other debris from the Mill River flood are still easy to find in the river bed. Among the more interesting artifacts are the broken fragments of graphite molds from the Haydenville brass-works.



A few old railroad ties can still be found along the abandoned line.

1962, it abandoned the stretch between Florence to Williamsburg altogether.

Since then, with the exception of pulling up the ties and rails, this stretch of railroad line has been left idle, and in the absence of alteration, the land on either side of the old rail line has been reclaimed by forest.

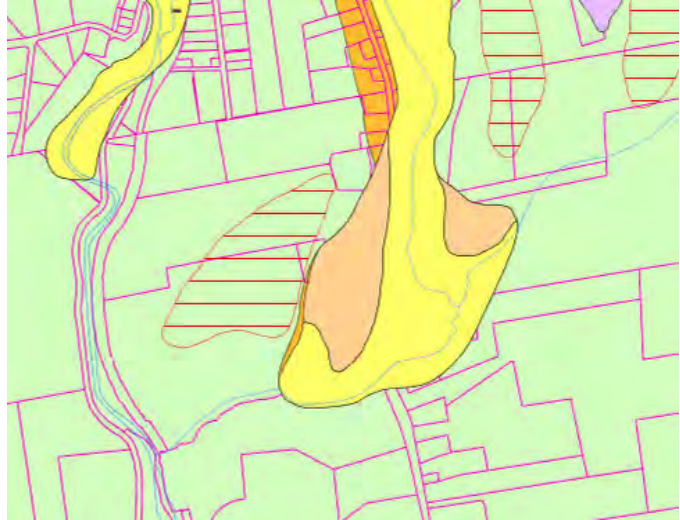
Geology

Within this short reach, the Mill River flows through a weak, north-south lineation in 450-million year old bedrock, quite possibly the intersection between more calcium-rich metamorphic rocks to the west and more acidic-pelitic rocks to the east. It has probably flowed here for millions of years, gradually cutting down through the weaker zone and creating the ravine that distinguishes this reach from the rest of the Mill River in Northampton.

Much more recently, during the Pleistocene, glacial erosion and deposition modified this area, smoothing and rounding the underlying bedrock and covering most of it with a thin veneer of till.

During the time of Glacial Lake Hitchcock (15,000-12,000 years ago), this conservation area was located not far from the lake's shoreline. During those years, the Mill River would have roared down through this ravine, carrying sediments to the lake that lay 100 feet below.

Since the lake drained, the Mill River has continued to eat down through the till deposits, but within this stretch, the river was sharply confined by the surrounding bedrock. Still, wherever it could, it has moved back and forth, cutting and depositing sand, gravel and cobbles. Near the southern boundary of this conservation area, these deposits have formed a 1.5-acre lobe that provides easy access to the river.



Light green shows the till deposits that characterize this conservation area. Other colors and hatching show other types of post-glacial deposition.



Behind the loose rocks and young trees is an exposure of bedrock. These rocks are metamorphic and about 450 million years old.

Vegetation Patterns

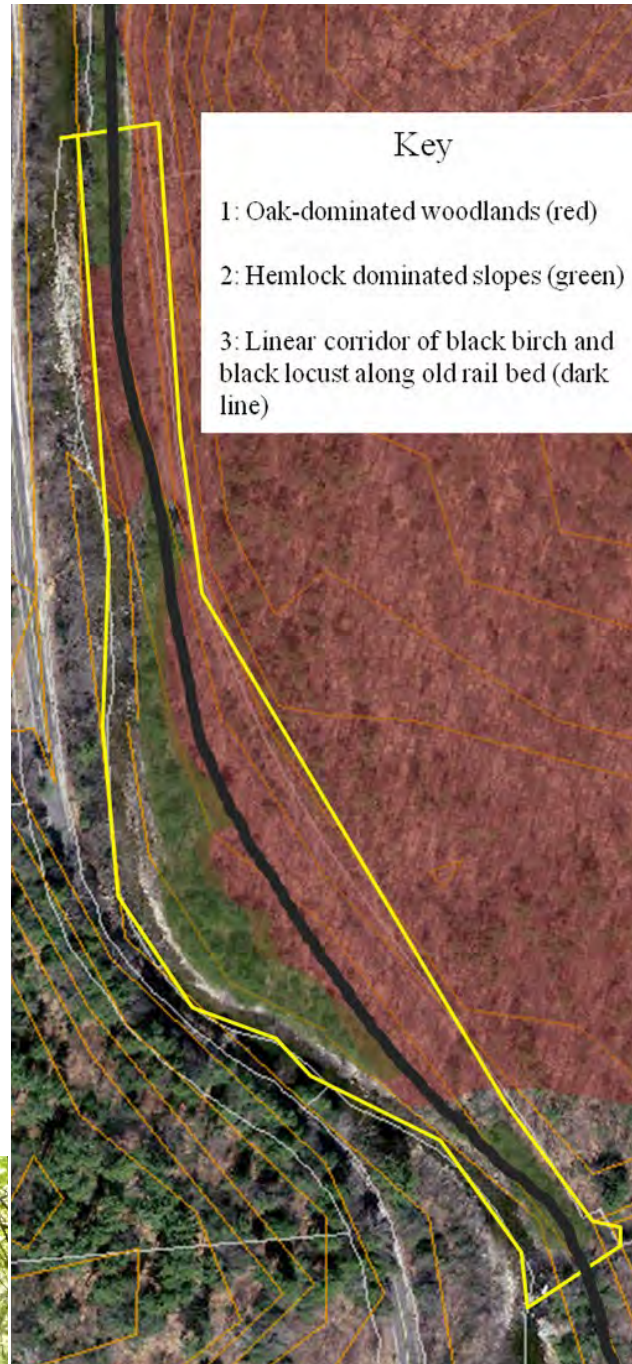
As previously mentioned, during the last century, the land along this stretch of the Mill River has reforested, with many of the trees establishing during the fifty years since the rail line was formally abandoned. Today, the composition of the vegetation can be separated into three major divisions: Hemlock dominated; Oak, Black Birch and other Hardwoods, and Black Locust/Black Birch.

Hemlock Dominated

Stands of hemlock cover large sections of both the steep slope along the Mill River as well as a portion of the more level lobe near the property's southern boundary. All of these trees are dying because of the insect known as hemlock woolly adelgid, and as these trees succumb during the next two or three decades, these stands are expected to transition to black birch and other hardwoods. For the time being, there are almost no plants growing below the hemlock's shady canopy.



Moss-covered rocks and fallen leaves cover the forest floor, now deeply shaded by the hemlocks above.



Within the yellow boundary of the property, there are three major vegetation groupings: Reddish overlay is oak/black birch/hardwoods; green is hemlock stands, and the black line along the old rail line is dominated by young black locust and black birch. Orange lines are topographic lines.

Oak, Black Birch and Other Hardwoods

Most of the property—and most of the surrounding land—is covered by a mix of red oak and black birch, with scattered black locust, white pine, beech, and lesser amounts of other hardwoods.

Mountain laurel and witch hazel are both abundant in the shrub layer, and the understory includes a typical assemblage of shade-tolerant species that can survive in acidic soils, including partridgeberry, wintergreen, ground pine, Indian cucumber root, asters, and wild sarsaparilla.



Mountain laurel is one of the most common understory shrubs. Witch hazel is also very common.

Black Locust/Black Birch

During the last fifty years, the land bordering the abandoned rail line has grown up into a mix of black birch and black locust, both species that require scarified soil and high light environments to germinate. Other common tree species within this narrow corridor include red maple, white oak and sassafras. Near the



A mix of black birch and black locust have grown up along the old abandoned rail line.

arched bridge are a few small bittersweet vines and a curiosity—a single pitch pine, a legacy from the time period when this area was open and experienced frequent fires. The pitch pine was unfortunately cut down this past summer.



Two other pitch pines can be found at the end of Grove Avenue. Their “witchy” architecture is distinctive and in the winter, these two trees are easy to spot. They got their start here decades ago, either after a fire or after the ground was cleared down to the bare soil.

Ecological Attributes & Issues

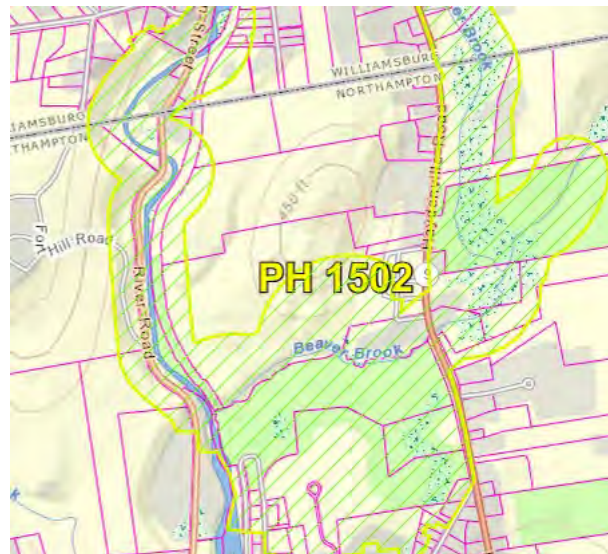
Within this reach, the river is a mix of rocky shallows and deeper, sand bottomed pools. Cobble bars are present upstream and down, many of them cluttered with tree trunks and branches that have been washed downriver.

Since the late 1960s, the water quality conditions in this section (and further downstream) have gotten much better. This stretch is now listed as Cold Water Fishery and is also within BioMap Core Habitat and the Priority Habitat for Rare Species. Nevertheless, in spite of these improvements, this stretch continues to be listed as a Category 5 surface water within EPA’s 303D list of impaired waters. This means that it is “not expected to meet the surface water quality standards after the implementation of technology-based controls” and that it requires a Total Maximum Daily Load (TMDL) be calculated and approved by the EPA and MA DEP. Expressed more simply, it means that there are still troubles from pollutants, stormwater sediments, excess nutrients, bacteria, etc. The good news is that the upper reaches of the Mill River, above Williamsburg, have been assessed as “attaining some uses” and are listed as Category 2; the bad news is that there is no set timetable for establishing the TMDL for this stretch of the Mill River.

Another issue—and a more immediate one—is the potential spread of invasive plants. Japanese knotweed, Japanese barberry and Asiatic bittersweet are all present either in or immediately upstream, and



Common mergansers, like this preening female, are now frequently seen in the Mill River, breed in the hollow trees nearby and feed on the small fish that live in the river.



Yellow-hatching denotes critical habitat for rare species as calculated by MA Natural Heritage and Endangered Species Program.



The bank of the Mill River along the “lobe.”

stilt grass may establish here during the next decade as well. At present, the biggest worry in the conservation area is the Japanese knotweed.

A final long-term issue is the anticipated death of hemlock within the next few decades in Massachusetts. As these trees die, here and elsewhere in the watershed, how will water chemistry and temperature be affected? And will their death allow more invasive plants to establish?

Recommendations

1. At this point, the invasive plants within this section can—and should—be managed.
2. Aside from the rail trail line, there is a small informal loop trail that extends into the more level lobe of land and provides easy access to the river.
3. From a conservation perspective, the protection of the adjacent church-owned property would be a major asset. It has a network of well-used trails that connect to the rail trail near the arched stone bridge, the remnants of a tiny quarry, and much of the forested land is free of invasive plants. Invasives occur in the wet-lands behind the cemetery and along the stonewalls behind National Grid, where bittersweet is widespread. In addition, an area to the north has been timbered and many more invasive plants are present here as well.



Due east of the old rail line, along the crest of the hill and beyond the City-owned property grow a series of massive white oaks. Their open, branching architecture reveals their history: they began as trees in an open pasture and the surrounding forest grew up around them.



This large and interesting-shaped rock is positioned right along the edge of the rail trail path.



The conservation area lies on the other side of the Mill River, rushing here after a summer thunderstorm.



Dense stands of knotweed grow along River Road, but within the conservation area, it is less common and occurs as “relatively” small scattered patches along the river’s margin—at least so far! Controlling Japanese knotweed and other invasive plants should be a priority.



A Natural History of the Vistron Section



Vistron Section



The Vistron Section

Overview

Only half an acre in size, the rectangular-shaped Vistron section has not changed much in the twenty years since the first inventory. Viewed from the roadside edge, it still looks rather uninviting—a mish-mash of trees, its wild growth framed by a parking lot and dumpsters. But portions of the interior of the property are quite nice and the view of the river especially so.



The scruffy edge of the conservation begins behind the dumpsters and parking area.

History

This conservation area is located along a stretch of the Mill River that has been a manufacturing focal point since the late 17th century. In 1681 the town granted permission for a sawmill just upriver from where the Nonotuck Dam now stands. This was Northampton's fourth sawmill, and during the next century, there were various owners. In 1810, the sawmill was converted into a linseed oil and grist mill, and then in 1835, it was sold again, this time to the newly established Northampton Silk Company.

During the next five years, the Northampton Silk Company purchased land, planted mulberry trees, and in 1837, the directors built a large, brick factory to house their equipment for reeling and weaving silk thread. A small part of this initial building program remains: the Braid Mill that abuts the conservation area was part of it.

Raising silkworms and producing profit-



The Vistron property borders the river and is just a couple hundred feet away from Maine's Field (blue), which was donated to the City in 1922 by Florence resident and local philanthropist Julius Maine. The gift was made in honor of his brother.



Three images from Charles Sheffield's *History of Florence, Massachusetts*, published in 1894.

able silk was a difficult task, and the Northampton Silk Company became insolvent in 1840. A year later, the former company's extensive holdings were sold to the leaders of the Northampton Association of Education and Industry. Known as the Community and built on abolitionist and utopian principles, its members also tried their hand at producing silk. After five years, the Community also dissolved and the factory was sold to a handful of

its former members. This time, rather than raising their own silkworms, the new owners began importing raw silk and by the late 1800s, their silk thread became world-renowned. By 1895, the Nonotuck Silk Company owned most of the property in the vicinity, and the land that now constitutes the Vistron Conservation Area held storage buildings.

During the next few decades, the silk manufacturing operations changed names—from the Nonotuck Silk Mill to the Corticelli Silk Company, then to Belding to Belding Hemenway. By the 1920s, the company began to suffer economically. In 1930, in the wake of the depression, the manufacturer of silk thread on the property ended production after nearly a century of operations.

The buildings were subsequently purchased by Pro-Phyl-Lac-Tic (or Pro-Brush), a long time local manu-



This 1895 map shows a series of storage buildings associated with the Nonotuck Silk Mill on near the property.



In the 1950s, the property (shown here in yellow) was an open clearing.

facturer that produced different kinds of brushes (toothbrushes, hairbrushes, shaving brushes, etc.) as well as many other products made of plastic. In the early 1970s, Pro-Brush was acquired by the Vistron Corporation, which donated this small section to the City as conservation land in 1974.



Although this is a very tiny conservation area with a long history of alteration, it has been left more or less on its own since the 1950s. The black locusts have grown into good-sized canopy trees, and the view of the river in spring is wild enough that it makes it hard to reconcile that you're otherwise surrounded by homes and businesses.

Geology

The soils at this site have been altered over and over during the last 200 years, but originally, they were clays, fines and sands deposited during the period of Glacial Lake Hitchcock (15,000-12,000 years ago.) These sediments were subsequently reworked by the Mill River.

Vegetation

By the time the land was donated in 1974, the former mill buildings were mostly gone and the vegetation had begun to grow back. Since then, it has been left virtually untouched and the major vegetation patterns that were observed in 1993 are still present today. The canopy, for instance, continues to be dominated by black locust, with a few sugar maples, slippery elm, and black walnut. Along the eastern property line, the single basswood and impressive sycamore that were growing twenty years



Various outbuildings associated with the nearby silk mills were constructed on the property during the 1800s. Today you can still find pieces of old broken junk, as well as the broken-down remains of stairs to the last building.

ago are still healthy and going strong. A lone black willow grows near the riverbank.

The understory is also similar in composition and appearance compared to twenty years ago, and remains a patchy mix of shrubs and small openings. The shrub layer includes several native species (silky dogwood, chokecherry, blackberry, and staghorn sumac) as well as an abundance of non-native species (Morrow's honeysuckle, privet, winged euonymus, and Japanese barberry). There is still a good-sized patch of multi-

flora rose and what was once a single, uninterrupted clump of Japanese knotweed is now two, with the original patch being even larger. Asiatic bittersweet has also increased in both abundance and size, with large vines now twisting up into the canopy and many smaller ones threatening to do the same. In addi-



Young shoots of Japanese knotweed, one of the most aggressively spreading non-native plants in the eastern United States.



Vistron Section

tion to these old familiar invasive species, a “new” invasive has appeared as well. A member of the bitter-sweet and euonymus family, it is known as winter-creeper or spindle vine. It was brought to the United States intentionally and has escaped from the garden and spread into many of the forested settings, especially along the Mill River.

The herb layer also continues to be a mix of native and non-native, invasive plants, with natives making the greatest contribution to the site’s overall diversity. Among the most common are spotted touch-me-not, true solomon’s seal, violets, bedstraws, trout lily, avens, goldenrods, Virginia creeper, fringed loosestrife, jack-in-the-pulpit, enchanter’s nightshade, poi-



Wintercreeper wraps around a trunk near the river.



Clockwise, from the top. Japanese knotweed stalks in the spring; purple violets; a patch of Scilla; young poison ivy leaves.

son ivy, raspberry, asters, and river grape. Garlic mustard is extremely abundant and widespread on the property, and there are also broad patches near the neighboring houses of scilla and daylilies. In essence, the area remains a reservoir for non-native species, including nearly all of the most troublesome and worrisome species.

Wildlife

In terms of wildlife, the property's small size and urban setting limit its value to wildlife. The river, however, provides an important corridor and many common birds can be observed here (cardinals, chickadees, Carolina wrens, blue jays and titmice) and the area is undoubtedly visited by raccoons, skunks and opossums.



Animal scratch marks on a fallen trunk.

Management Recommendations

One of the biggest limitations for this property is that it remains land-locked with no public access or parking. That said, it still seems like a good idea to work with local residents and the owners of nearby businesses to remove the non-native plants and help to create a small “park” that would allow access to the river. Although the bank length is short (just 75 feet!), consists of mostly rock riprap, and has a city sewer and water line, it is actually pleasant and the shade from the locust trees makes a nice picnic spot or place to relax. A sign describing the history of this portion of the Mill River—particularly related to Northampton's silk industries—could also be installed. In addition, if the owners of the Braid Mill agreed, the path from their parking lot could easily be made wheelchair accessible.



The idea of a semi-natural park is also more possible after the mostly-good news from a Phase 1 Site Assessment. Conducted in 2005, the study was commissioned by the City and was strictly based on historic records and a visual search of the property. Based on their findings, the authors did not recommend a complete Phase II assessment. They did, however, suggest the soils in the eastern portion of the property and near the stone foundation be analyzed to confirm that no hazardous residues remain in the soil.



A pipe from a neighboring property discharges at or near the boundary of the conservation area.



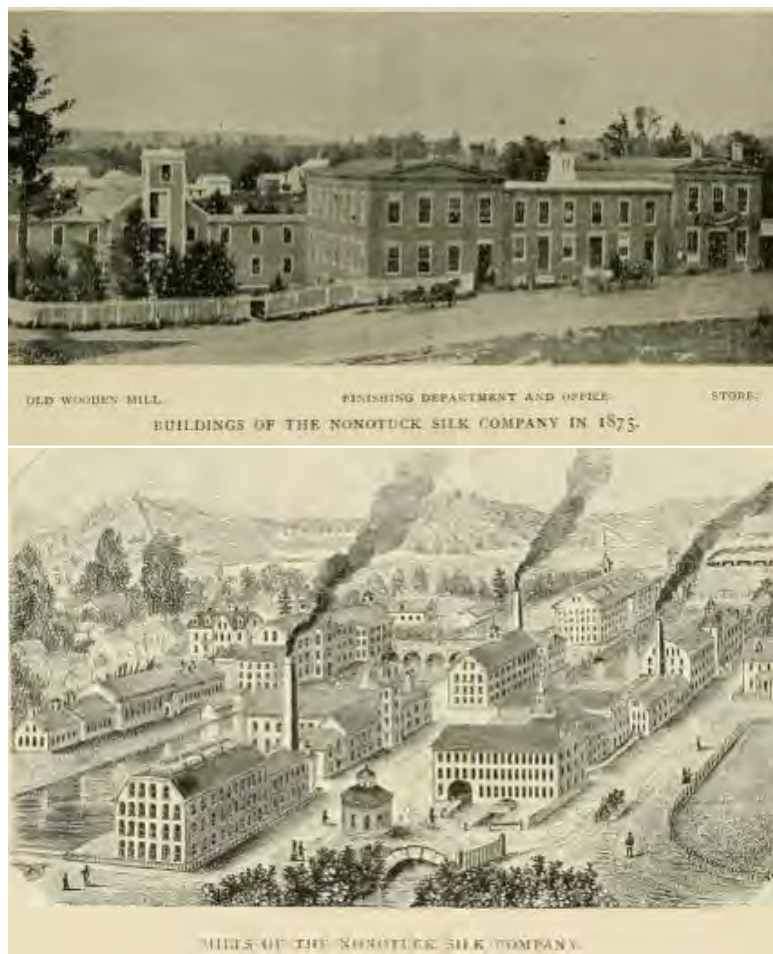
Sources

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Tonry, Claire. 2005. Phase 1: Environmental Site Assessment, Vistron Section of the Mill River, Riverside Drive, Florence, MA. pp. 1-9.



Asiatic bittersweet vines twist into the canopy.



Images of the Nonotuck Silk Mill, in real life and an artist's rendition, loosely based on reality.
From Sheffield's History of Florence.

A Natural History of the Yankee Hill Section



Yankee Hill Section



Yankee Hill Section

Located half a mile downstream from the Clement Street Bridge, this five-acre arc of conservation land hasn't changed much during the last twenty years. Its steep slopes are still characterized by gullies and ridges, landslides and slumps are common, and the forest remains dominated by hemlock.



Yankee Hill was donated in 1989 by James H. Graham, co-owner and co-founder of Yankee Hill Ma-chine Company. In the 25 years since, several other nearby properties have been protected, including the former state hospital lands.



Geologically, this steep-sided conservation area is the only place along the Mill River that is subject to frequent landslides and slumps. These, in turn, create unusual, ephemeral habitats that provide special microhabitats for plants. They are also one of the few places where plant succession is due to natural disturbance versus manmade.

What is different today is the variety and frequency of non-native species. Twenty years ago, the only non-native plants growing in the vicinity were garlic mustard and Asiatic bittersweet and they were *only* found in the rocky floodplain at the furthest point downstream. Now, garlic mustard and Asiatic bittersweet occur in many places, and they have been joined by Japanese knotweed, Japanese barberry, multiflora rose, false indigo bush, Morrow's honeysuckle, and catalpa. Most of the non-native plants are found in the wetter slumps and along the river's edge, but their arrival and spread at this site will affect plant succession and may even impact the geological processes of slumping and erosion.

Beyond this, the hemlock forest that dominates so much of this steep-sloped conservation area has been seriously weakened by hemlock wooly adelgid. Ecologists expect that most of the hemlocks in our area will be dead within the next few decades. At a site like this, the question is: what plants will replace them?



A small cluster of Japanese knotweed is growing at the top of slump. It is in the center of the photo.



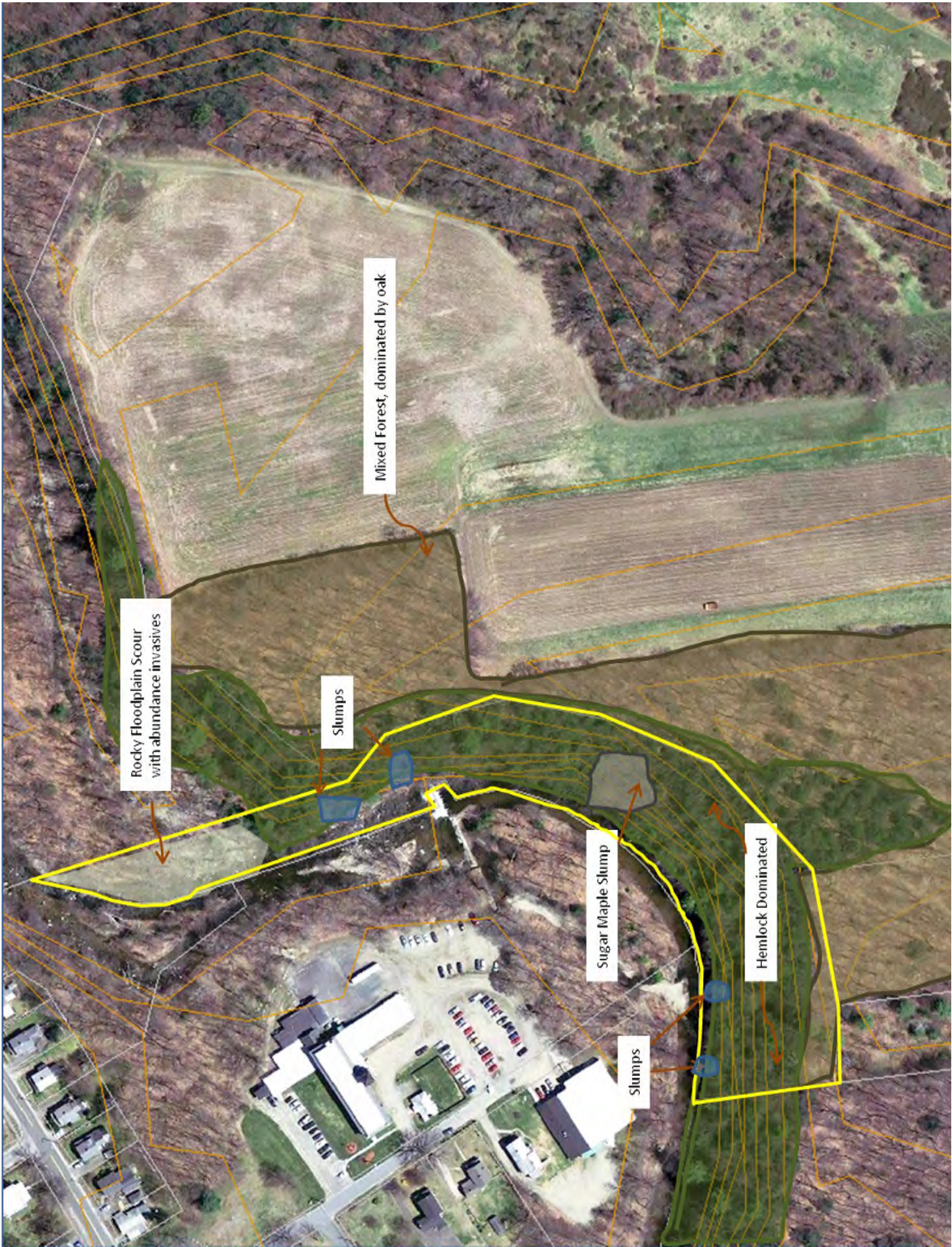
The hemlocks along Yankee Hill already have thinner canopies due to the presence of hemlock wooly adelgid.



Yankee Hill Section

“Hemlock wooly adelgid remains the single greatest threat to the health and sustainability of hemlock as a forest resource in the eastern United States. This non native pest has impacts comparable to those of the gypsy moth, Dutch elm disease, and chestnut blight. It has the potential to remove a major ecological component from eastern forest that is important for maintaining clean water and supporting wildlife.”

USDA Hemlock Woolly Adelgid Coordinated Commitment to Improved Management and Restoration of Hemlock: 2014-2018



Yankee Hill Section



Clockwise: Along the top of the ridge is a beautiful woodland trail that leads to the river's edge (*next*) and connects to the MA DAR land (*bottom*).

What follows is a more detailed description of the property, beginning at the ridgetop at the west end of the property, descending to the river and heading downstream.

At the west end of the conservation area is a ravine, and in this section the forest is mostly oak (some of them quite massive), black birch, white pine, hemlock and occasional black locust. Woodland asters, Canada mayflower and wild sarsaparilla are among the most common groundlayer plants, but in general the vegetation in the understory is sparse and frequently absent.



Below the trail the land falls off steeply to the Mill River, and in fact, some portions of the slope are so steep that you have to really scramble to avoid sliding. The forest on this north-facing slope is dominated (for now) almost exclusively by hemlock, with occasional black birch, oak, and red maple, with striped maple, mountain maple and hobblebush in the under-story.



This entire hillside is a series of gullies and ridges (*see inset on next page for explanation and images below*). And while the ridges are either devoid of vegetation or covered with a thin coating of moss, the moister, more open gullies have a much more diverse flora. Wetter slumps include striped maple, spicebush, a variety of ferns (lady, spinulose, interrupted, sensitive, Christmas) as well as number of wildflowers (hog peanut, false solomon's seal, jack-in-the-pulpit, lion's foot, red trillium, asters).



Yankee Hill Section

The Geology of Yankee Hill

This conservation area remains the only site in Northampton with active land-slides. This is because of the interaction between the Mill River, the site's glacial history and groundwater.



In this part of Northampton, the Mill River has carved its channel into an area underlain by compact glacial tills, including a top layer that was deposited 20,000 years ago by the Wisconsin glacier and an even more compact, clayey till left behind 140,000 years ago by the Illinoian glacier. In both cases, the till layers are mainly composed of boulders, cobbles, gravels and sands, but they also include layers of impervious clay. When groundwater reaches these clay seams, it follows the gradient and eventually emerges as seeps along the bank. In the process, the clay layers are lubricated, setting the stage for landslides. After heavy rains, the earth above these slippery layers can become so waterlogged that a section of the hillside gives way.



Of botanical interest is the presence of some richer pockets where you can find species that are otherwise uncommon in Northampton, such as red baneberry, gooseberries, and false spikenard. What's worrisome is that Asiatic bittersweet and Japanese knotweed (*see photo*) have begun to creep into these slumps too. Knotweed is especially concerning because its shade will limit the growth of native plants and its extensive root system may stabilize the till and actually change the geological processes that define this slope, making it less prone to landslides and slumping.



Heading downstream, there are a series of ridges and gullies, with slides of varying age. One of the largest landslides appears to have occurred about 50 years ago and today supports a more open forest dominated by sugar maple and black birch, with occasional ironwood and striped maple. As-ters, Canada mayflower, scouring rush, wild sarsaparilla, sedges, poison ivy, and a variety of ferns (New York, marginal, Christmas, lady) are common in the understory. During the last twenty years, Japanese barberry has also invaded here, and there are also a few scattered stems of depauperate looking Japanese knotweed.



Just downstream is an area underlain with sandy soil that supports dense young hemlocks and a few white pines, and then two more active slumps. Twenty years ago these areas supported only native species (blackberry, touch-me-not, goldenrods, and grasses), while today added to that list are several aggressive, non-native invaders (Japanese knotweed, multiflora rose, Japanese barberry, Asiatic bittersweet and Canada bluegrass).





Although this site was undoubtedly logged in the 1800s when a sawmill was nearby, since then, many of the trees have been allowed to grow and it is likely that some of them are more than 150 years in age. The photo below shows the site was entirely forested in the 1950s.

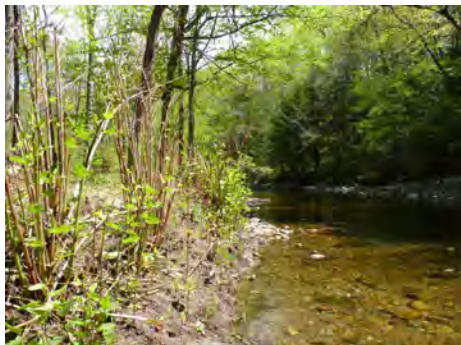


Yankee Hill Section

A little further downstream, below the breached dam, is a small, level area with white pine, hemlock, black locust and oak. It is easily reached by the trail and is a popular spot for picnickers, hikers, and swimmers. Just downstream, at the border of the conservation area, the river has created a broad, rocky floodplain. Within this higher energy reach grow sycamore, red maple, elm, sugar maple, along with occasional basswood and cottonwood. Witch hazel is common in the understory, but even more common is multiflora rose, Asiatic bittersweet, scattered clumps of Japanese knotweed, false indigo (*Amorpha fruticosa*) and catalpa saplings. In the understory, you can find asters (*Aster* spp.), poison ivy, touch-me-not, monkeyflower, smartweeds, dogbane, goldenrods, tickseed sunflower, a variety of sedges (*Carex torta* especially), as well as the non-native garlic mustard (*Alliaria officinalis*) and tansy (*Tanacetum vulgare*).

Recommendations

1. Non-native plants are present here, but are currently at manageable levels. More serious problems with Japanese knotweed exist on the opposite side of the river on the land owned by Yankee Hill Machine Company (*see photo below*).
2. Given the ruggedness of the hillsides, trails should not be created along the slopes.



3. A new walking path that extends from the state hospital lands could be established to encourage more people to experience the views from the ridgetop trail, the impressive views from the fields, and the beauty of the Mill River.
4. Continue to acquire land along the Mill River to create a trail that begins at Clement Street and continues to Smith College.





(A) Glacially –rounded cobbles and boulders lie strewn on the surface. (B) The up-and-down of the ridge and gully terrain. (C,D) Because of the steep hillsides, many of the trees are leaning over and partially collapsed. (E) A mix of hardwoods and hemlocks cover the steep hillside in this section. (F) A strand of barbed wire buried in this hemlock reveals that this area was once open to cows.

Yankee Hill Section



On the top of the ridge, some of the wooded land is owned by the MA Department of Agricultural Resources. This area is nearly level and is covered with a mix of oak, white oak, sugar maple, red maple, black birch, black cherry, and scattered hickory. In the understory, witch hazel, maple-leaved viburnum, sassafras and patches of mountain laurel are common. The ground layer varies, shifting from broad patches of hayscented fern to more open patches, dominated by a dried layer of leaves and scattered Canada mayflower and wild sarsaparilla.



8 The Natural History of the Mineral Hills Greenway



Chapter Table of Contents

	Page
<i>Overview of Mineral Hills</i>	8-1
Bedrock Geology	8-4
Glacial Lake Hitchcock	8-6
Surficial Geology: Big Picture	8-6
Surficial Geology: A Closer Look	8- 7
Ecological Value	8- 8
Ecoregion	8-11
Wildlife Value	8-12
Vernal Pool	8-13
Rare Species Habitat	8-13
Interior Forest Core	8-14
UMASS CAPS	8-14
Aesthetic Value	8-16
Zone II: Aquifer	8-17
Outstanding Resource Water	8-17
Recreation Value	8-18
Agricultural Value	8-19
 <i>Part I: A Natural History of the Quarry & Vicinity</i>	 8-20
History & Conservation	8-21
Vegetation Patterns	8-28
Uplands	8-30
Quarry Detail	8-36
Wetlands	8-41
Recommendations	8-44
 <i>Part II: A Natural History of the Bookend North (formerly Sarafin/Clapp Farm)</i>	 8-46
Conservation of the Clapp Farm	8-47
History	8-48
Vegetation Patterns	8-53
Uplands	8-54
Wetlands	8-56
Recommendations	8-57
 <i>Maps</i>	
Vegetation Patterns Map of Turkey Hill Road & Vicinity	8-29
Vegetation Patterns Map of Bookend North (Former Sarafin)	8-52
 <i>Appendix 1: Forest Stewardship Plan —Forest Stands 2010 (Mauri)</i>	 8-61
<i>Appendix 2: Forest Stewardship Plan 2013—Forest Stands (Mauri)</i>	8-62
 <i>Part III: A Natural History of the Ridge Mineral Hills Greenway</i>	 8-63

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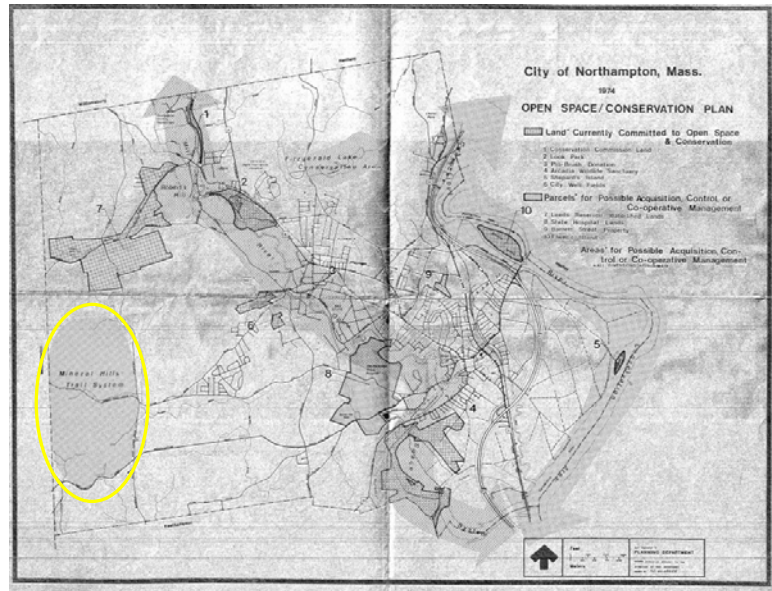
In addition, I relied on Mike Mauri's forest stewardship plans (2010, 2013), Molly Hale's 2006 ecological report for the Jedoron property, deed records & plans from the Hampshire County Registry of Deeds, court documents (Civil Action 00-226, 00-271), MA GIS data, as well as many other records that are available in Northampton's public file cabinet.



The Natural History of the Mineral Hills Greenway

Overview

In 1974, as part of Northampton's first comprehensive master plan, the Conservation Commission was asked to identify areas around the City that they thought should be protected as conservation land. Their final plan (*right*) was impressive for many reasons, but especially for its ambition. The highlighted areas encompassed several thousand acres and included a large block of land in the Mineral Hills.

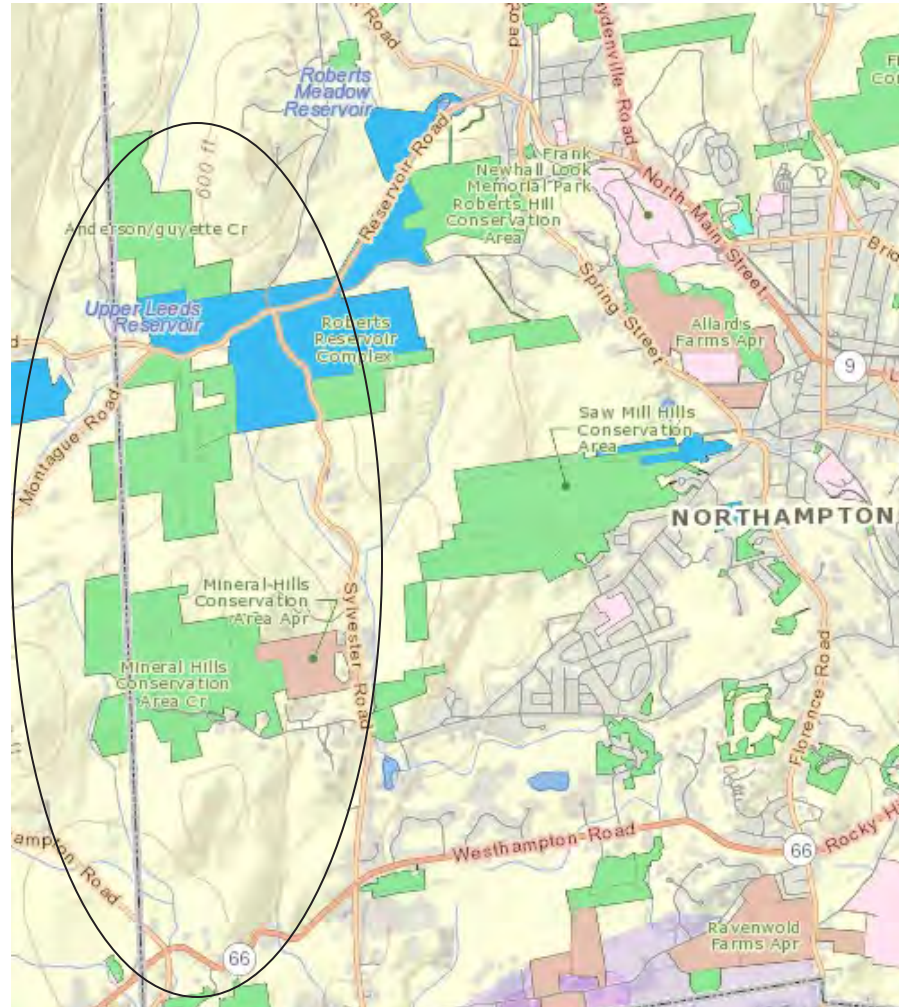


Over the next twenty years, the City's conservation program took off. By 1994, the City owned more than a thousand acres of conservation land spread across more than a dozen different conservation areas. And that year, thanks to the generosity of Armand and Rosel LaPalme, it also owned conservation land in the Mineral Hills.

The LaPalmes had moved to Northampton in 1953, purchasing 88 acres along Sylvester Road. The land included farm land along the road and woods up on the hills. In 1994, after stewarding the land for forty years, the LaPalmes approached the City with an offer to sell the 65 acres around their home to the Conservation Commission for a discounted price—in fact, just 10% of its market value. Their reason was simple: they loved the land and they didn't ever want it to be developed. The couple had few stipulations when it came to the sale, but one of them was that the new property be called the Mineral Hills Greenway. The Conservation Commission had the final say, but it was in complete agreement.

During the next decade the LaPalmes' property became the anchor in the Mineral Hills and a source of inspiration. Many people credit them for the conservation successes that have followed—and there are

an impressive number of them. In fact, in the twenty years since their gift, land protection along Northampton's western boundary has proceeded at an unprecedented pace. Since then, the City has worked with the Town of Westhampton and Kestrel Trust and has helped to protect another 750 acres, with 638 acres in Northampton and 112 in Westhampton. This acreage, when viewed from above, form two core areas within the Mineral Hills: a 415-acre block contiguous with the LaPalme property and centered around the now-abandoned quarry and another 587-acres to the north that includes city-owned watershed land and property owned formerly or currently by the Clapp family (90 acres owned in fee as conservation land; 280 acres held under private conservation restriction). What now separates these blocks is a single parcel.



The protected land within the Mineral Hills (circled) in context to other nearby conservation land. The Mineral Hills includes a mix of conservation land (green), APR land (light red), and watershed land (blue). When all of these parcels are tallied, their collective total exceeds 1,000 acres. When the DPW and conservation land along Chesterfield, Sylvester and Reservoir Roads is added in, the number jumps to more than 1,500 acres.

All of that land protection work in the Mineral Hills has added up to multiple

Acres of Protected Land in the Mineral Hills in Northampton and Westhampton (as of March 2015)			
Northampton Conservation and APR Land	Contiguous DPW-owned Watershed Land (Bounded by Chesterfield and Sylvester Roads)	Private Conservation Restrictions (Northampton Only)	Contiguous Protected Land in Westhampton
413	191	290	112

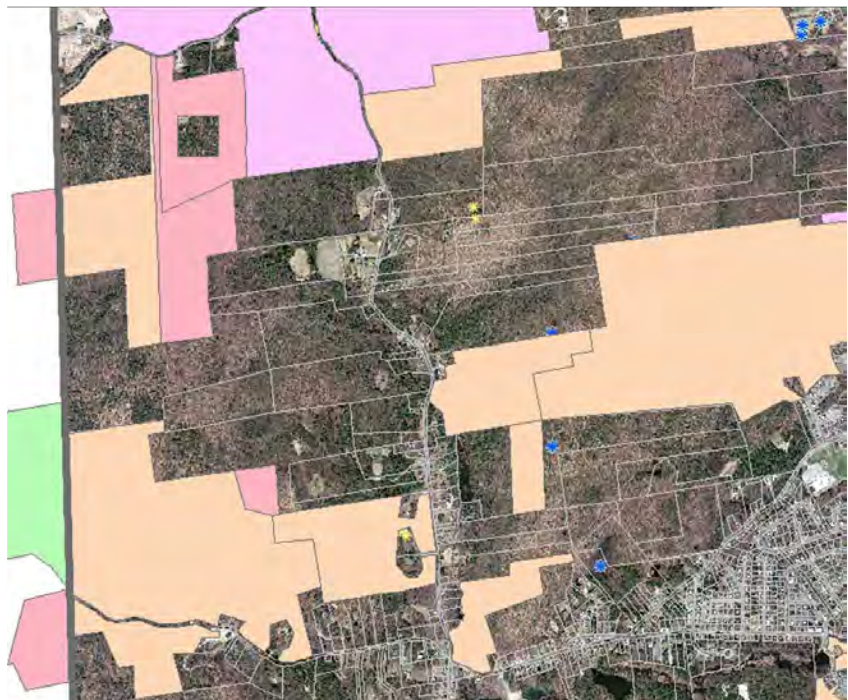
benefits. These include not only the usual set—miles of trails, pretty views, improved water quality, impressive wildlife habitat, active farmland—but also some geological and ecological treats. There is the now-abandoned quarry, which has both raw beauty and also some weird and unusual (i.e. interesting) microhabitats that have developed following disturbance. In addition, because the underlying bedrock includes calcareous (limey) inclusions, Mineral Hills is the only place in Northampton where you can find an oak-hickory forest. This special natural community type is uncommon in the Commonwealth and from a parochial perspective, it provides habitat for several plants that occur nowhere else in Northampton.



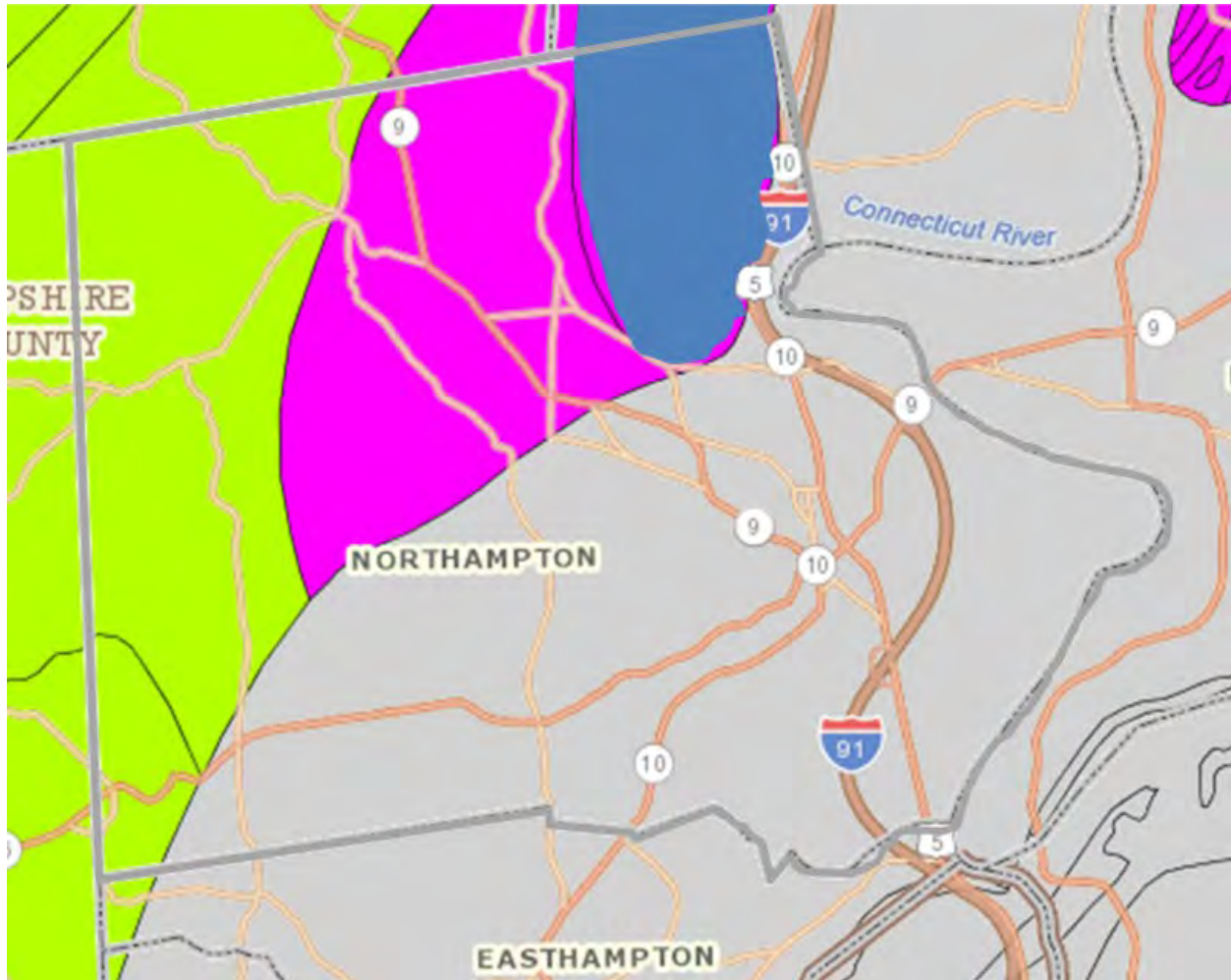
The edge of the farm field, below the LaPalmes' house, is one of the places within the Mineral Hills that is loaded with invasive plants: Japanese knotweed (*seen here*) as well as multiflora rose, Autumn olive and Asiatic bittersweet.

Finally, while invasive plants do occur in the Mineral Hills, they are found in relatively few areas—mostly in former pastures, along roadside edges and trails, and in and around the old quarry.

The remainder of this report provides an overview of the natural history of the Mineral Hills, followed by more detailed descriptions of the two primary areas that have been protected—the conservation land in and around Turkey Hill Road Quarry and the land that was once part of the Clapp Farm. More information about invasive plants and recommendations are included in the specific sections.



The Jigsaw Puzzle of Protected Land: Only one privately held parcel now separates the northern portion of Mineral Hills from the southern portion around Turkey Hill Road.



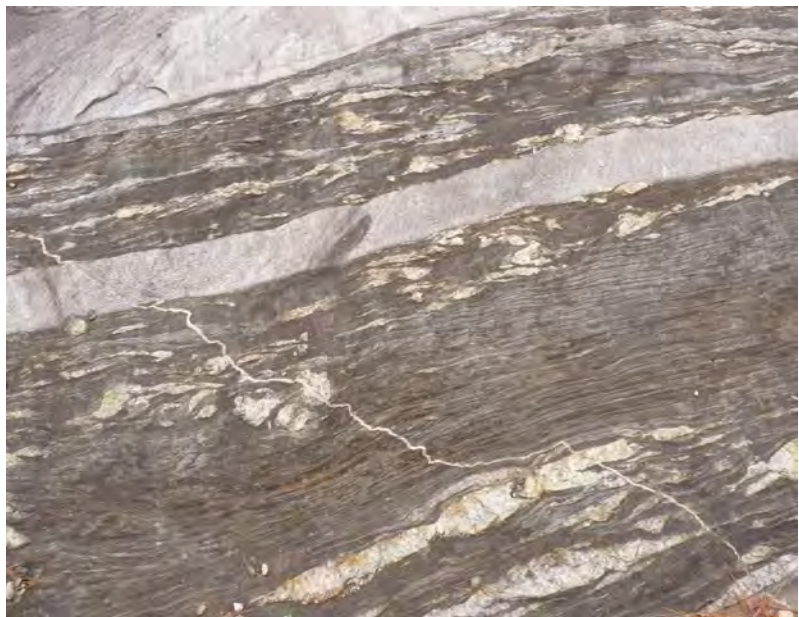
Bedrock Geology

Among the reasons that the Mineral Hills is interesting geologically is the fact that the rock type underlying these hills is different than the bedrock in other parts of Northampton. In the very simplified image above, the bright green is the Gile Mountain Formation. This is metamorphic rock that is mostly phyllite/schist with beds of light gray quartzite. What makes it interesting from a botanical perspective is that within the core matrix are calcareous granofels, quartzose marble and vein quartz. Translation: these rocks were metamorphosed (changed from the ocean sediments and volcanic they once were) during one of several episodes that had island arcs and even entire continents crushing against the proto-North American continent, eventually creating the super continent Pangaea. Some of those original ocean sediments were calcareous (limey). As these rocks weather, the calcareous minerals partially neutralize the soil, which increases its fertility and the diversity of plants that can exist here.

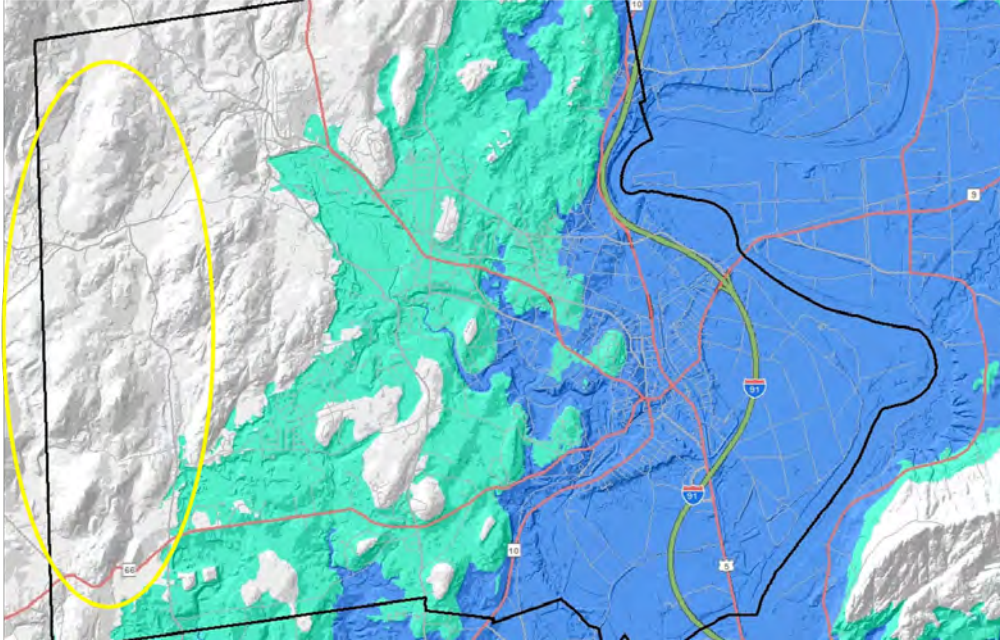
The name Mineral Hills was first given to the hills further to the south near Route 66 and near the border of Southampton, Easthampton, Westhampton and Northampton and where minerals like lead and barite were mined during the 17th, 18th and 19th centuries. As new maps were made, the entire band of hills became known as the Mineral Hills. And while the mines have been closed since the 19th century, two new rock quarries are now located on Turkey Hill in Westhampton, due west of the now-abandoned quarry that is within the conservation area.



The size and steep walls of the now-abandoned quarry are the features that attract most people's attention in this part of the conservation area. But there is another geologic feature of note close-by. It's a surface exposure (because of past gravel mining) of the underlying bedrock that tells several stories. John Brady, a geology professor at Smith College, brings his students every year to see the quarry and in particular, to see this exposed bedrock outcrop. In a letter to the City's planning department in support of the property's acquisition, Brady described it as an outcrop with a "glacially smooth surface that displays wonderfully-folded metamorphic rocks intruded with Williamsburg granodiorite, which is an igneous rock."

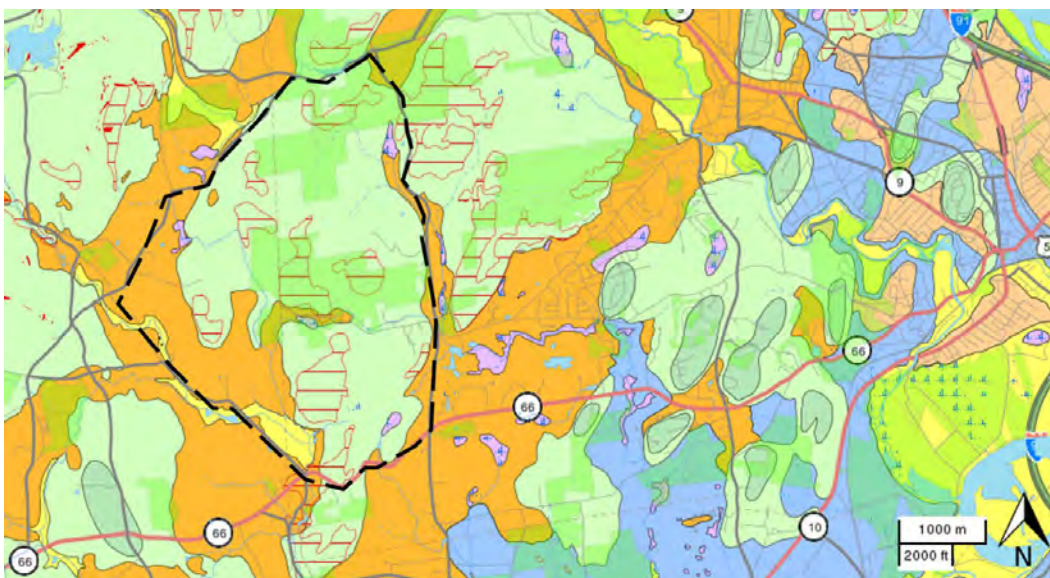


The outcrop can be found in the abandoned gravel pit, a little southeast of the quarry.



Glacial Lake Hitchcock

Although the Mineral Hills were too high to be covered by the waters of Glacial Lake Hitchcock (~15,400 to 12,600 years ago), a small stretch of land along West Farms Road and Turkey Hill Road was part of the lake's shoreline. In fact, part of that old shoreline/beach/outwash plain forms the small cemetery on West Farms Road .

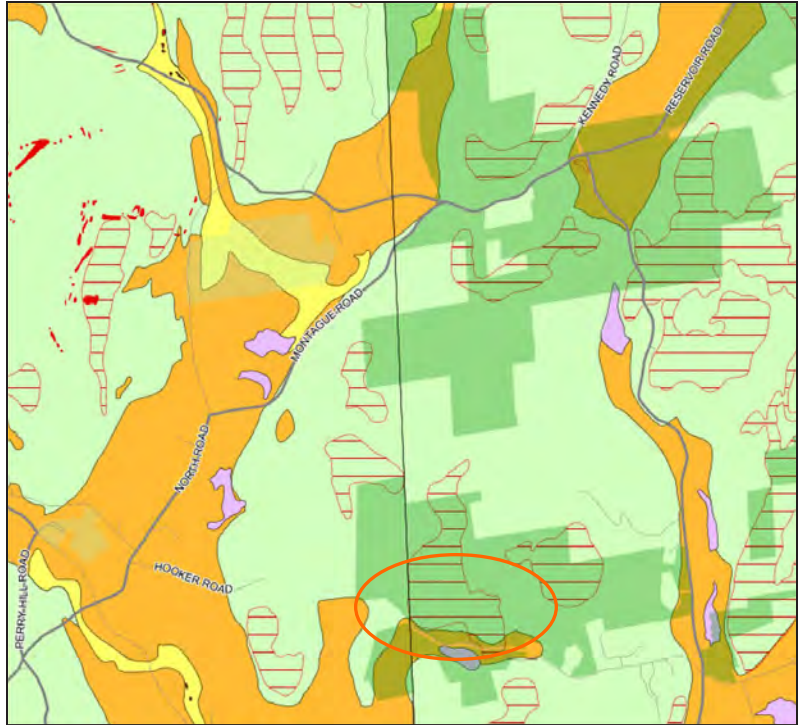


Surficial Geology—Big Picture

The Mineral Hills (outlined by dashed lines on local roads) are covered mostly with glacial till (light green) and marked by prominent rock outcrops (red hatching). Around the base of the hill are deposits of water-sorted sands and gravels (orange), which were deposited ~15,000-12,000 years ago as deltas, outwash plains and possibly some beach deposits.

Surficial Geology: A Closer Look

This image focuses in on the surficial geology underlying the City's conservation and watershed lands (darker green). As seen in the broader view, almost all of the Mineral Hills are underlain by till deposits (lighter green), with bed-rock (red hatching) frequently at or near the surface. Note that the small-scale sand and gravel mining that took place along Turkey Hill Road, before the rock quarrying, was located in a finger of glacial outwash sediments (circled in red). The lavender and yellow areas are recent organic deposits and alluvial sediments.



For early farmers in West Farms, the till-derived soils on the hillsides provided challenges and resources. Although all the rocks made growing crops difficult, they were useful when it came to making stonewalls to keep in sheep and other livestock. Most stonewalls were constructed at the peak of land clearing (1820-1850) when timber was so scarce that wooden fences were harder to come by. This stonewall is located on the former LaPalme property.



Part of an old gravel pit is located to the southeast of the quarry.

Ecological Value

Underlain by phyllite/schists/quartzite with some calcareous minerals and covered with till deposits, the hilltops, slopes and wetlands in the Mineral Hills support a mix of habitat types—a sampling of which are profiled here and on the following pages. All told, sixteen natural communities were identified. Of particular interest are the circumneutral rocky summit and oak-hickory communities, which are found nowhere else in Northampton. Good examples of these communities occur within the conservation area, while even bigger examples occur on the prominent knob south of Turkey Hill Road.

In addition to natural communities, the Mineral Hills also contain a few anthropogenically-generated habitats, including some small grassy clearings, three old gravel pits, and the quarry floor. Biologically, these are interesting, ephemeral and often strange habitats. The quarry floor, for instance, provides habitat for a few native plant and animal species that are only known in Northampton from other abandoned gravel pits.

Natural Communities in the Mineral Hills

(follows MA NHESP Classification of Natural Communities)

1. Acidic Rocky Summit/Rock Outcrop
2. Circumneutral Rocky Summit/Rock Outcrop
3. Acidic Rocky Cliff*
4. Circumneutral Talus Forest
5. Acidic Talus Forest/Woodland*
6. Oak-Hemlock-White Pine Forest
7. Successional White Pine Forest
8. Mixed Oak Forest
9. Ridgetop Chestnut Oak Forest/Woodland
10. Oak-Hickory Forest
11. Dry, Rich Acidic Oak Forest
12. Red Oak-Sugar Maple Transition*
13. Red Maple Swamp
14. Deep Emergent Marsh
15. Hemlock Hardwood Swamp
16. Woodland Vernal Pool*

* Found within the Mineral Hills region, but not currently within the protected land



Circumneutral rocky summit/rock outcrop. Open and park-like, this is one of the most biologically diverse and interesting natural communities within the entire conservation area. It supports a variety of spring wildflowers, including early saxifrage and wild columbine, which are shown here.



Oak-Hemlock-White Pine



Red Oak-Sugar Maple Transition



Successional White Pine (Seriously Thinned)



Circumneutral Talus Slope (Holyoke Range in distance)



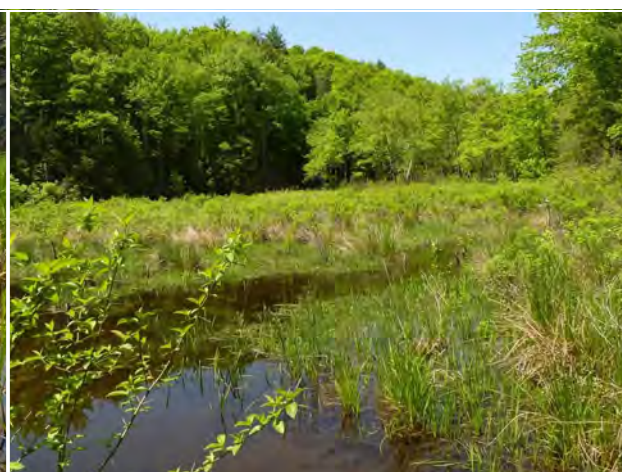
Hemlock-Hardwood Swamp



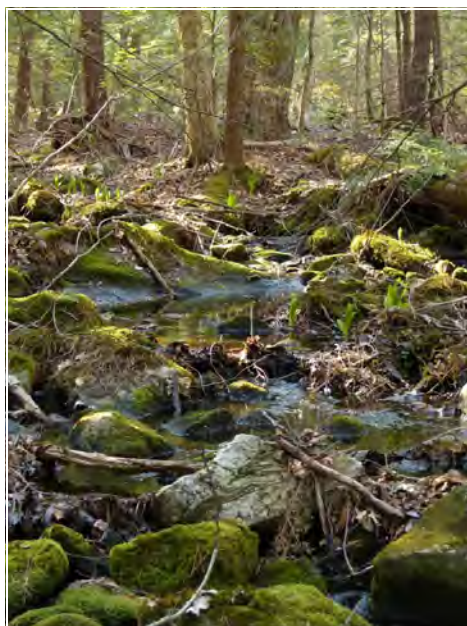
Red Maple Swamp



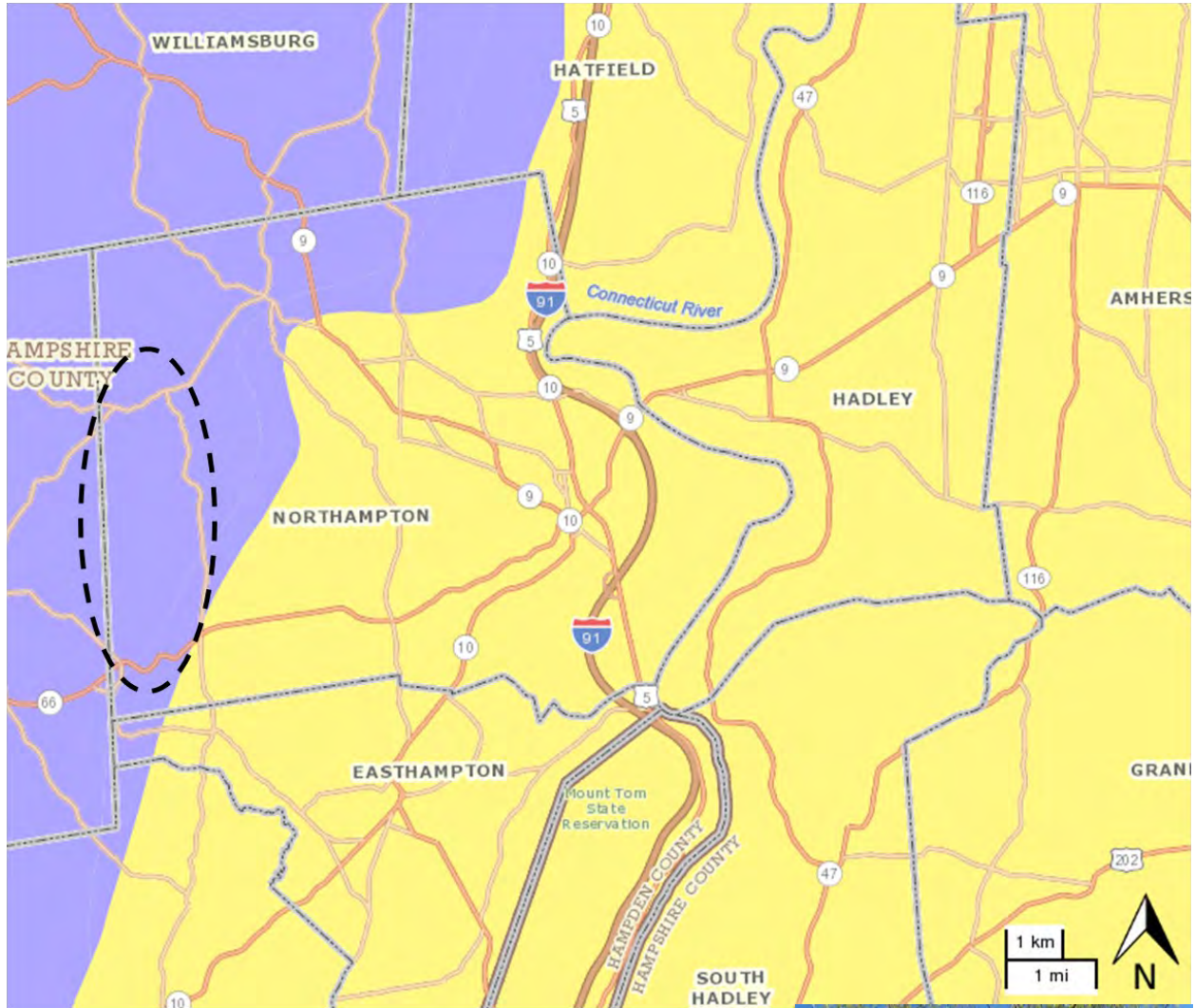
Anthropogenic Deep Marsh Habitat (in the abandoned quarry)



Natural Deep Marsh Habitat (created courtesy of beavers.)



Intermittent Streams vary from rocky, hemlock-covered waterways to sandy bottomed streams within deciduous forest.



Ecoregion

The Mineral Hills are associated with an ecotone that lies between the Connecticut River Valley lowlands and the Berkshire Plateau and is called the “Berkshire Transition.” This band of hills is not only higher in elevation, but cooler than the milder temperatures typical closer to the Connecticut River. It is also far enough away from the Connecticut River to feel the effect of its moderating influences. This extends even to fog conditions: the Mineral Hills, for instance, are seldom bathed in the fogs that regularly engulf the lower valley in the spring and fall.

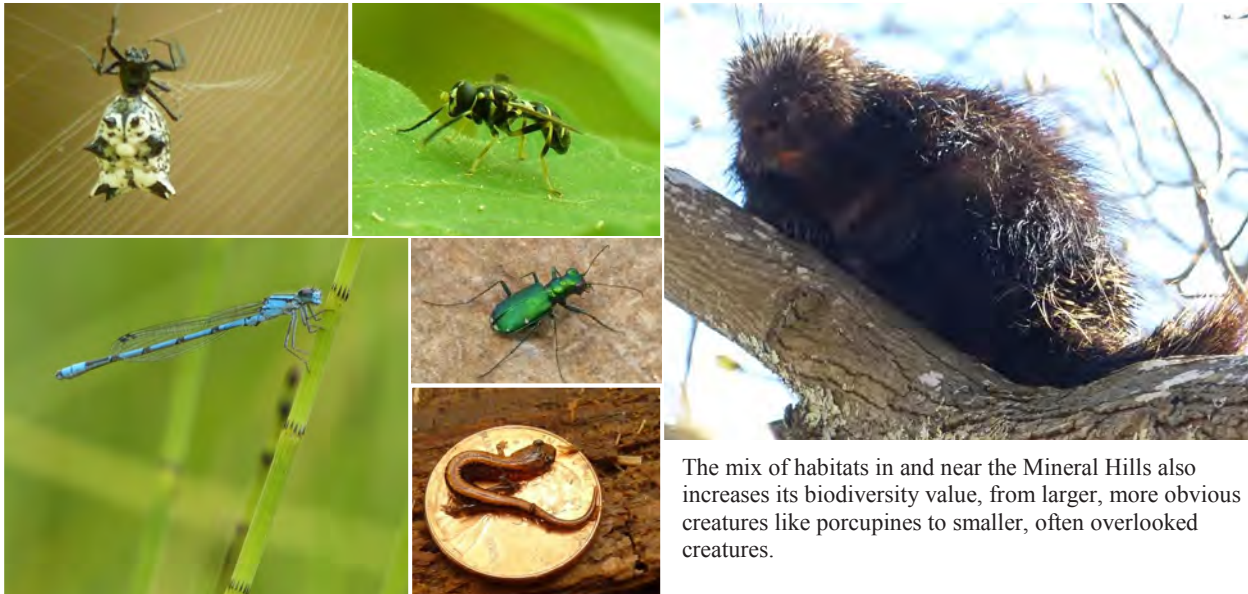
American beech (*right*) is an example of a species that is more typical of northern forests. It occurs in low numbers within the Mineral Hills.





Wildlife Value

The Mineral Hills encompass a large block of forest that includes roughly 1,500 acres in Northampton and another 700 (or so) acres in Westhampton. On its own, the size of this wooded tract makes it valuable to forest-dependent animals, especially to species like wood thrush and rose-breasted grosbeak, which are suffering from population declines. In addition, the area's wildlife value is further enhanced by its proximity to two other big blocks of uninterrupted woodland: the Sawmill Hills to the east, with 1,500 acres, plus thousands more wooded acres to the north and west. These qualities--large size and connectivity--are critical factors in terms of this area's ability to maintain biodiversity and ecosystem function over the long haul. Put simpler, bigger is better—especially now with impending climate change.



The mix of habitats in and near the Mineral Hills also increases its biodiversity value, from larger, more obvious creatures like porcupines to smaller, often overlooked creatures.

Vernal Pools

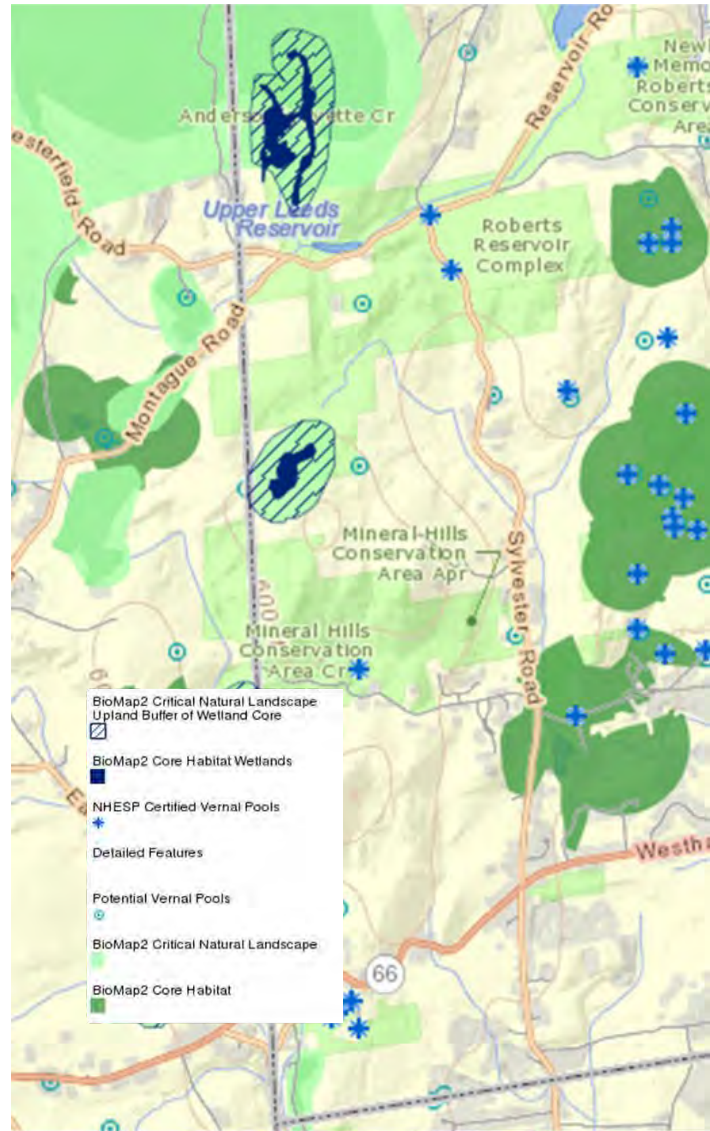
Of the 99 certified vernal pools in Northampton, only two have been certified within the Mineral Hills, one on the DPW property just off Sylvester Road and the other is located at the north end of the quarry. The main pond in the quarry does not qualify as a vernal pool under MA NHESP's criteria because goldfish were released there and have been able to overwinter for at least ten years. That said, the pond does provide breeding habitat for gray tree frogs, pickerel frogs, green frogs and bull frogs. In addition, a very small depression near the northern rim does contain enough water to act as a vernal pool.

Only four “potential” vernal pools have been mapped within the Mineral Hills, but others probably exist. More work on vernal pools could be done within the Mineral Hills.

Rare Species

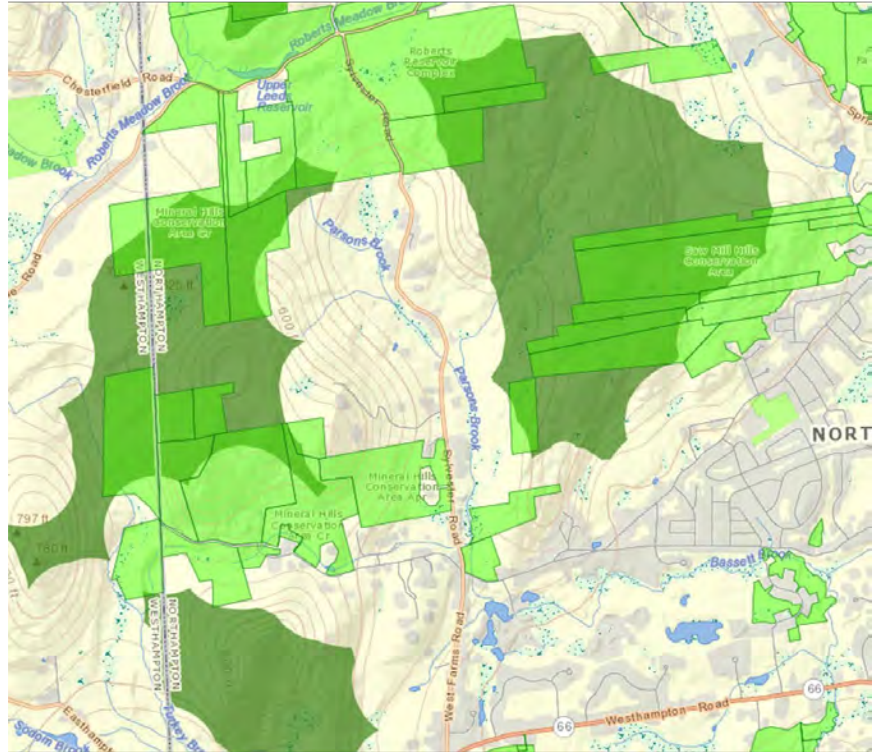
So far, only one state-listed species (wood turtle) has been confirmed within the existing conservation area and it was observed close to the intersection of Montague and Chesterfield Roads. Additionally, one state-endangered plant (Rock buttercup (*Ranunculus micranthus*)) and two watch-listed species—Early Buttercup (*Ranunculus fascicularis*) (pictured) and Rock Spikemoss (*Selaginella rupestris*)—are known to occur in the Mineral Hills (but outside of the existing conservation land).

Aside from taxa tracked by MA NHESP, a few other species that are uncommon in the state have been in or near the City's conservation land. The quarry, as disturbed a setting as it is, provides habitat for two species that were historically tracked by MA NHESP: the Red-belly Tiger Beetle (*Cicindela rufiventris* var. *rufiventris*) and Varied Scouring Rush (*Equisetum variegatum*). The band of oak-hickory forest in the Mineral Hills is also the only known site in Northampton for four-leaved milkweed (*Asclepias quadrifolia*) (pictured right), squawroot (*Conopholis americana*) and wood violet (*Viola palmata*). Two uncommon terrestrial snails are also found only in this habitat type.



Interior Forest

This map that shows the least fragmented interior forest cores (dark green) in relationship to protected land (bright green). Interior forest areas are recognized as critically important to species that are sensitive to forest fragmentation (scarlet tanagers, many warblers). These areas are “becoming increasingly scarce in highly populated states like Massachusetts,” according to MA NHESP. As such, knowing the location of interior forest helps prioritize properties for land acquisition, whether the focus is resilience to climate change or forest-dependent species.

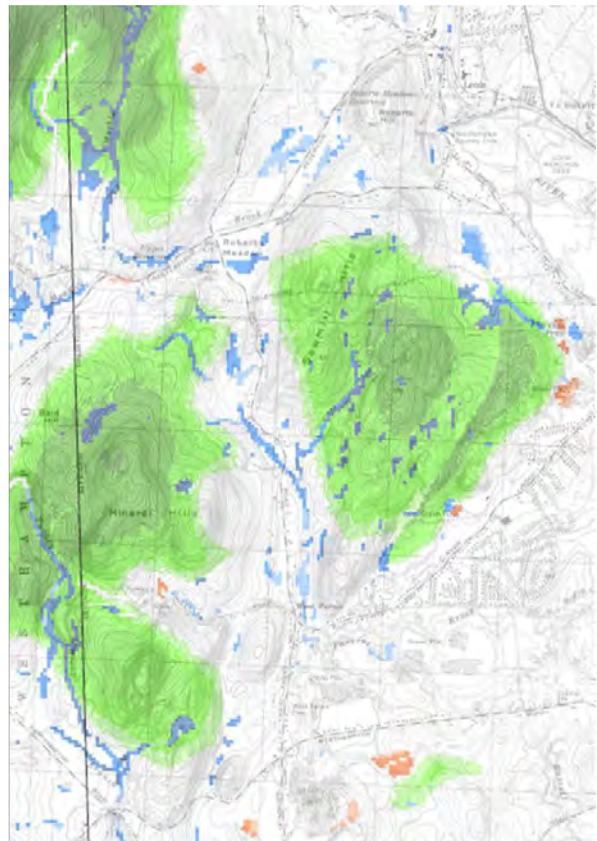


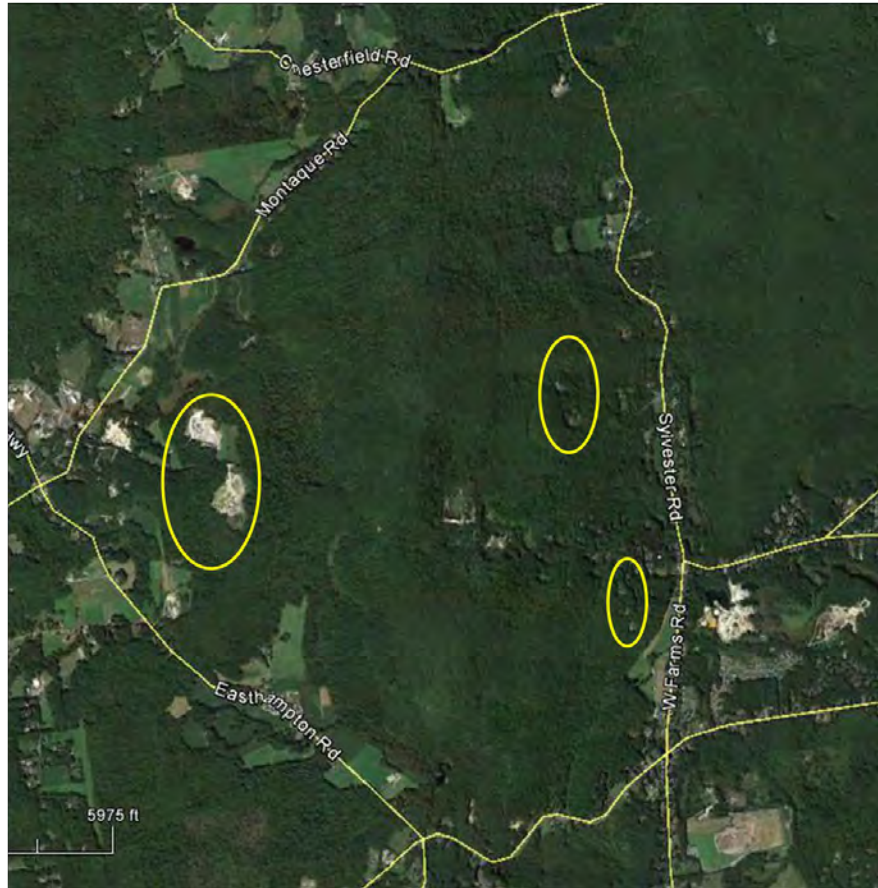
UMASS Conservation Assessment Prioritization System (CAPS)

Researchers at UMASS have developed computer software (CAPS) that analyzes the landscape and prioritizes land based on its ecological integrity and long term sustainability. The integrity of interior forests is one of the metrics that this model measures, but it also takes into account many others.

Based on a CAPS analysis, the Mineral Hills are one of the highest ranking areas in Northampton in terms of its ability to sustain ecosystem processes and maintain biodiversity over the long-term. Like “Interior Forest” above, CAPS is yet one more way to measure a landscape’s value and in this case, it provides support for the continued acquisition and protection of properties within Mineral Hills.

In this image, the colored areas are better than average based on CAPS analysis, with blue representing aquatic habitats, red is shrub and grassland, and green shading is forest. White areas are below average based on CAPS. The darker the color, the “better” it is in terms of its biodiversity potential.





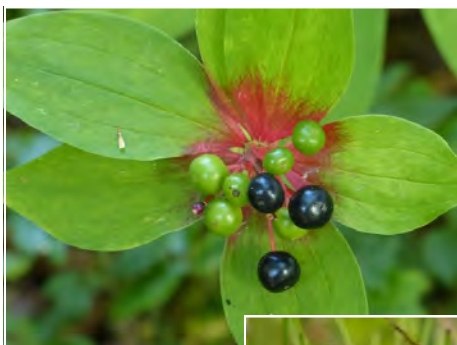
Although much of the Mineral Hills has now been protected, its interior forest core is still at risk from fragmentation. During the last fifteen years, two new hard rock quarries were created along the western edge in Westhampton (largest yellow circle) and during the last 25 years several new homes with long driveways were built along the eastern slopes (smaller yellow circles).

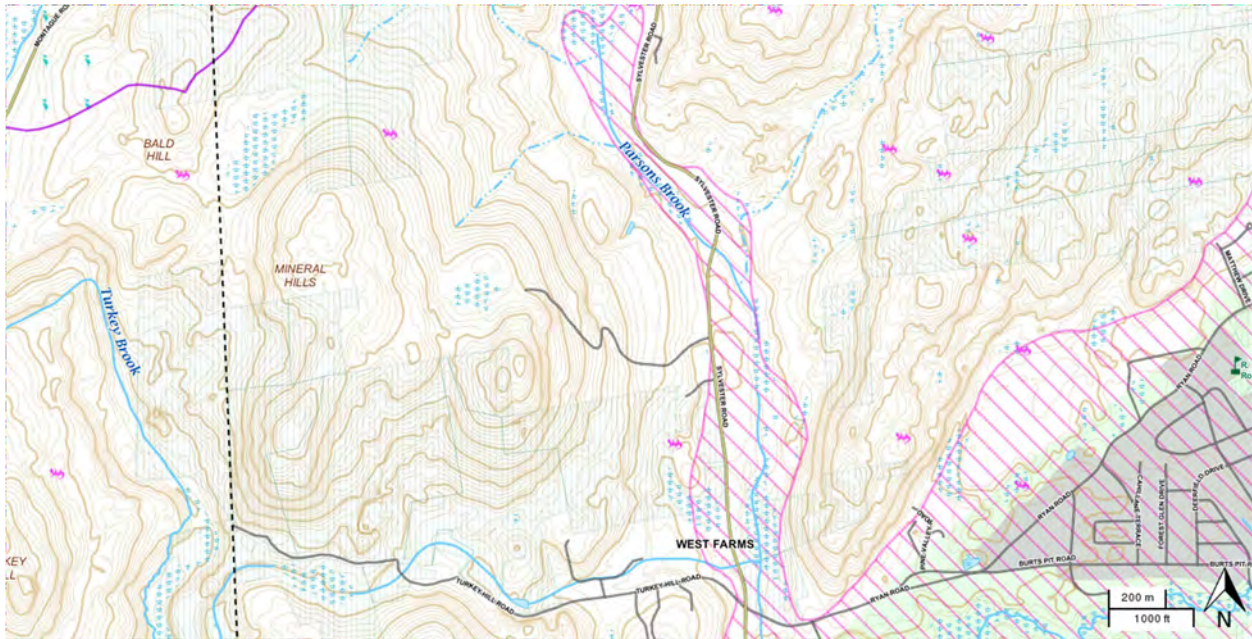




Aesthetic Value

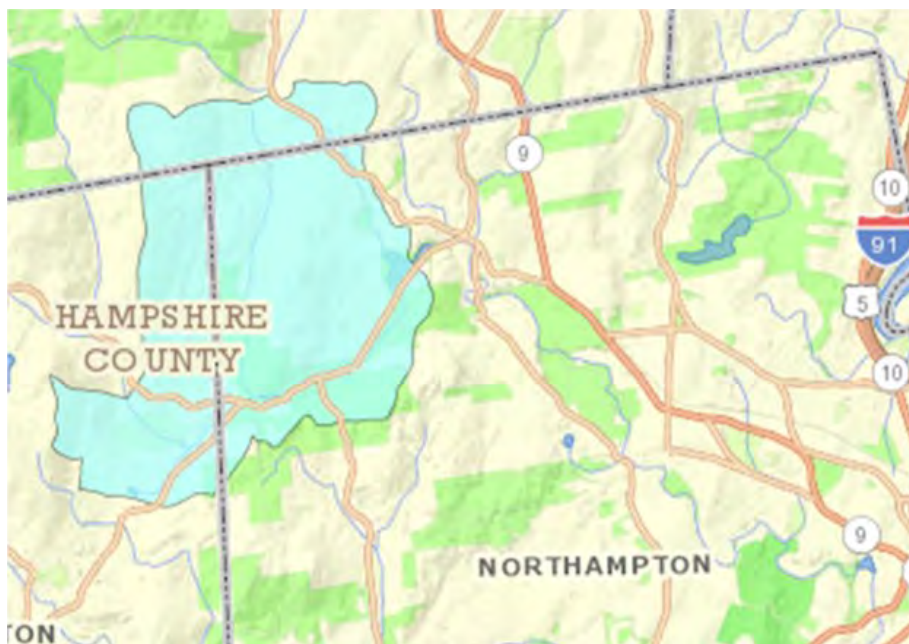
The beauty of the Mineral Hills can be appreciated from a distance and experienced firsthand within the conservation area.





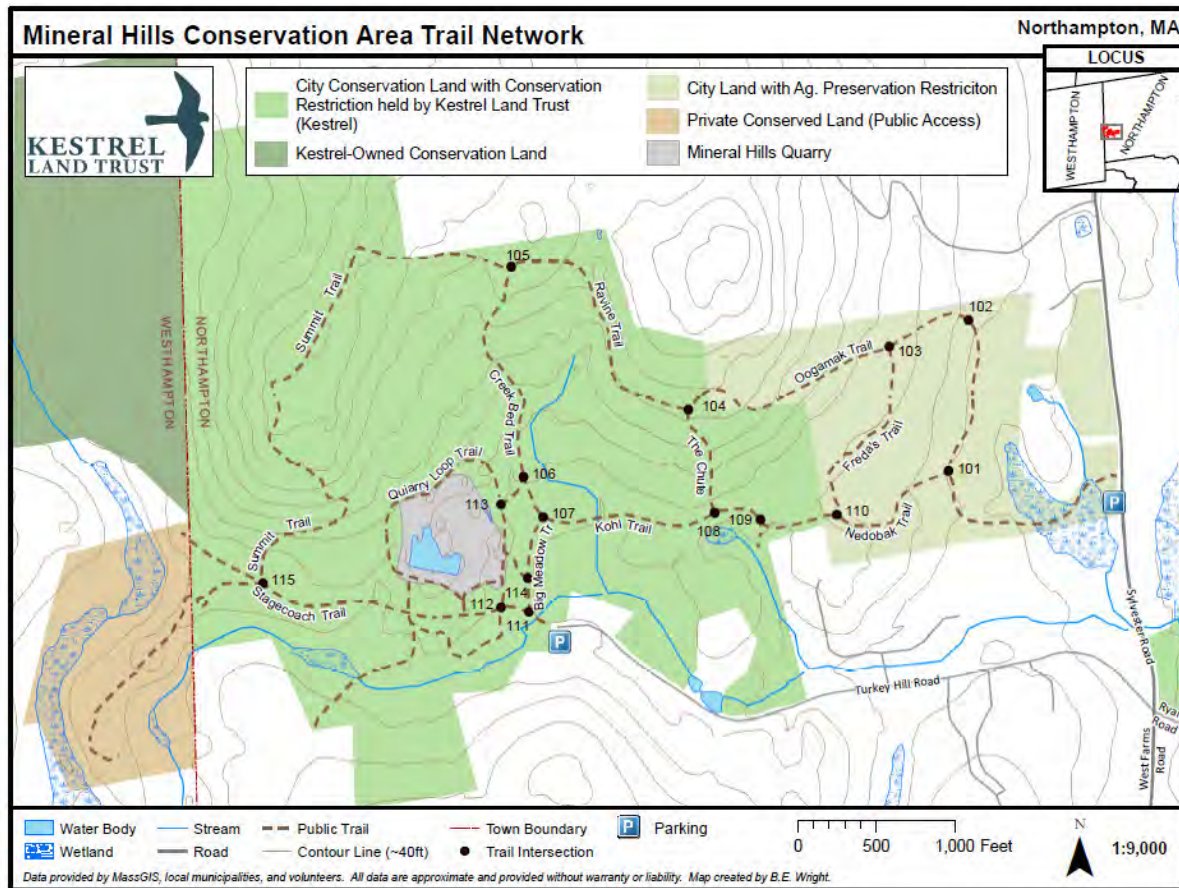
Zone II Aquifer

The narrow band of water-sorted sediments left behind during the era of Glacial Lake Hitchcock is an outlying finger of a Zone II aquifer and contributes to the recharge and quality of Easthampton's aquifer. A small portion of Mineral Hills Greenway along Sylvester Road is within this area.



Outstanding Resource Water: Tributary to a Surface Water Reservoir

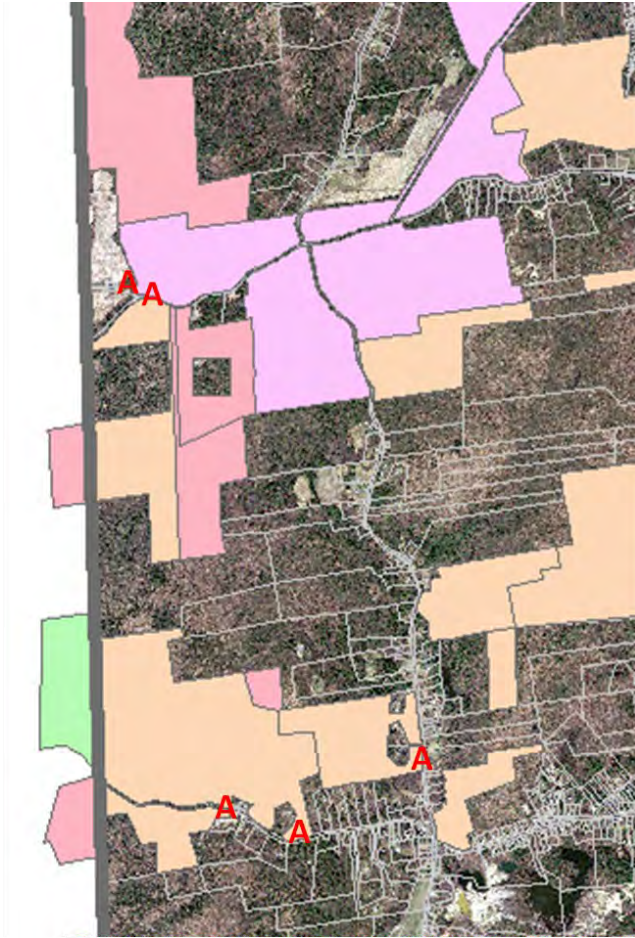
A small portion of the Bookends parcel (formerly Sarafin/Clapp Farm) drains to Roberts Meadow Brook, which is the principal tributary to the Roberts Meadow Reservoir. On this map what looks like a giant lake is the drainage area for the streams that have been designated by DEP as Outstanding Resource Waters. Today the reservoir is an emergency water supply, but in the 1800s it was the City's primary source for drinking water and fire protection.



Recreation Value

Although still unfamiliar to many Northampton residents, the Mineral Hills includes an elaborate network of old wood roads and footpaths. Of these, the best marked trail system is located within the 413-acre core property. It includes an old wood road that connects to other trails, one of which leads into Westhampton (A) and another that links with the trail at the north end of the Mineral Hills. Other trails (B) within the Clapp Farm have been obscured by recent logging activity and without some attention, they will soon be overwhelmed and lost. The trails are maintained by the Friends of the Mineral Hills, an all-volunteer group.





There are currently five access points into the conservation land, including three parking areas.

Turkey Hill Road/Sylvester Road

- Parking is available on Sylvester Road. There is a trailhead and kiosk here.
- Parking is also available at the end of Turkey Hill Road, which is discontinued from this point. This is the simplest way to reach the quarry and ridge trails.
- A footpath on Turkey Hill Road begins near the ponds and connects to the network of trails.

North Bookend (Clapp Farm)

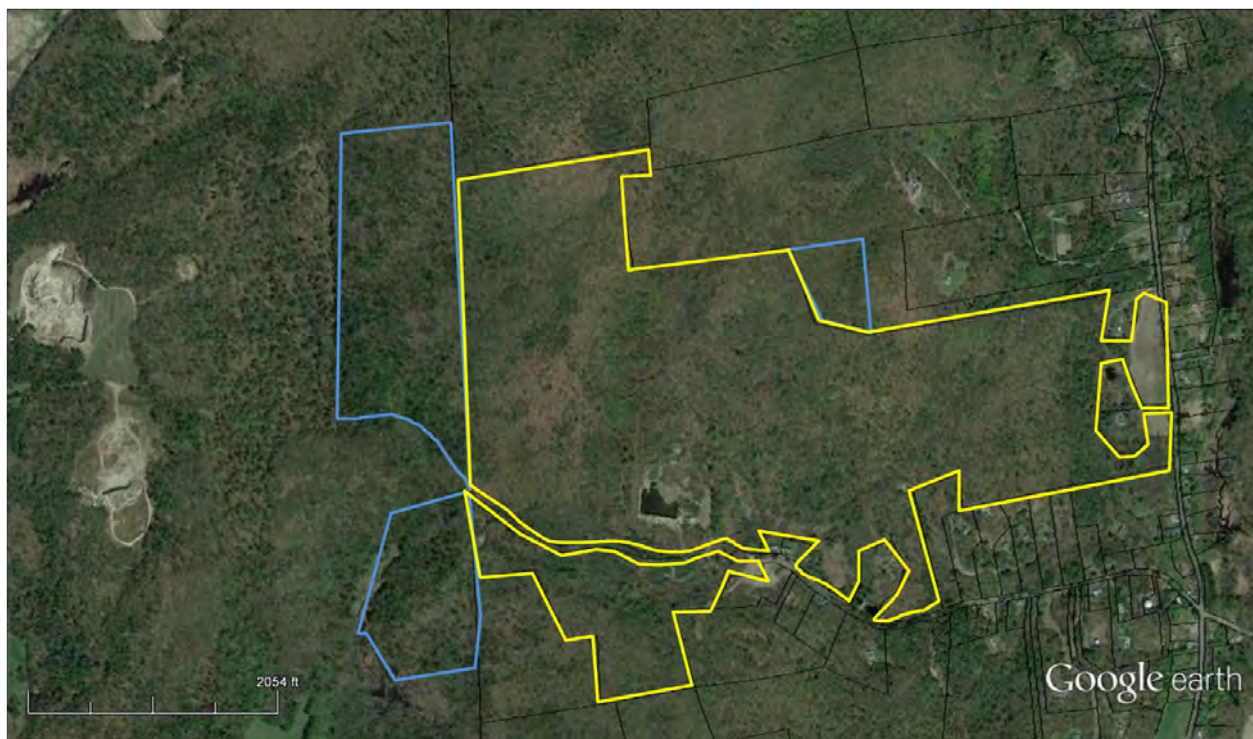
- Marginal parking is available by pulling off the road near the stop sign at the end of Montague Road. A trail leads into the protected conservation land. Across the street, on the west side of Roberts Meadow Brook, is a wood road that leads to the 168 acres held through a private conservation restriction. This road was historically known as Mosquito Hollow Road. In the 19th century Judson Marble lived about 1/2 mile in along this road. A small stream in this vicinity now bears his name and is a tributary to Roberts Meadow Brook.

Agricultural Value

Prime farmland can be seen around the margins of the Mineral Hills. Within the conservation land, about 13 acres are still farmed. This includes the 7-acre field that was formerly owned by the LaPalmes and is now farmed by Henry Parsons of Mayval Farm in Westhampton. The remaining six acres is a hayfield that is mowed by John Clapp and is part of the original Clapp Farm.



Part 1: A Natural History of the Quarry & Vicinity



Mineral Hills Greenway near Turkey Hill Road is outlined in yellow, with land under conservation restriction out-lined in blue. The westernmost conservation restrictions are in Westhampton. Just west of these areas are two hard rock quarries that have opened since the closing of quarry on Turkey Hill Road.





The Quarry & Vicinity

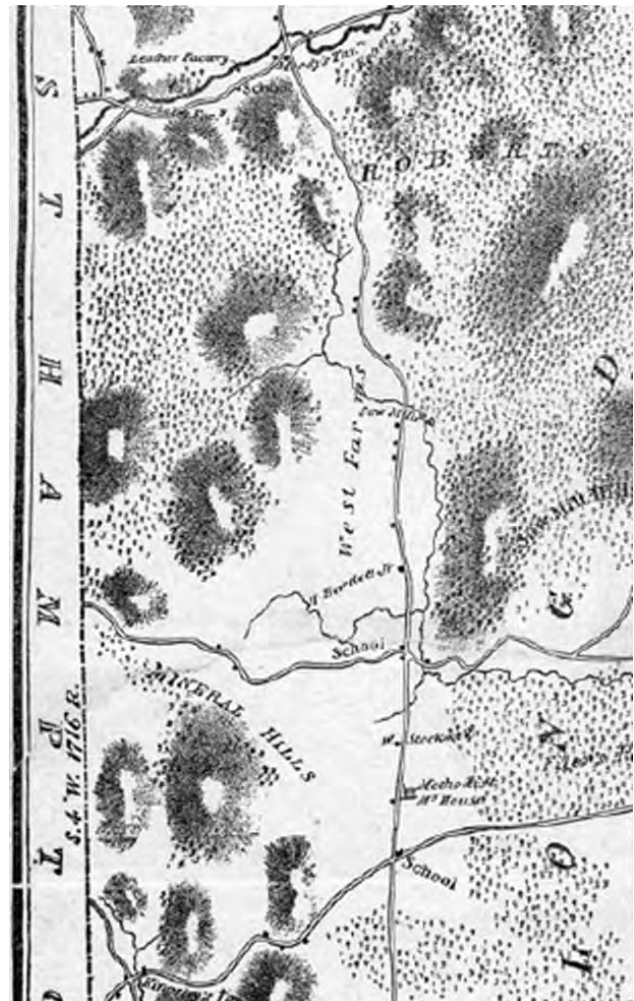
History & Conservation

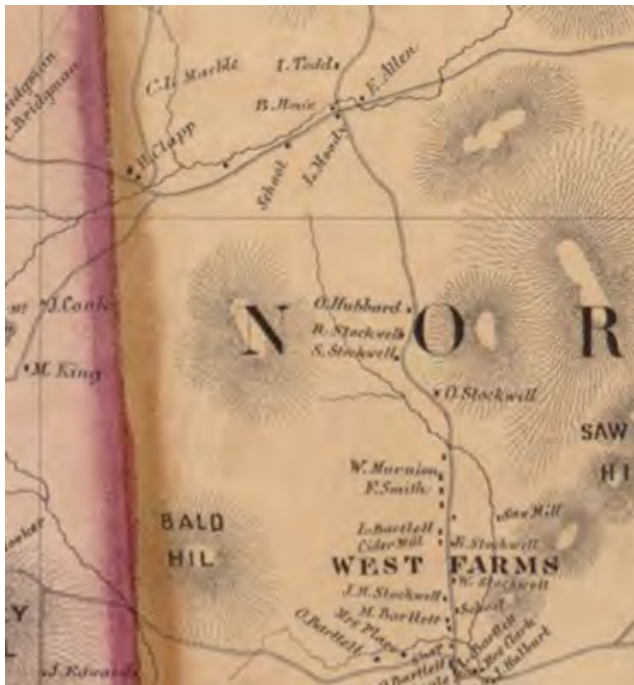
Unlike some other parts of Northampton, news from West Farms was seldom reported in the Gazette during the 19th or even early 20th century, probably because this region was sparsely settled and its primary activities of farming and logging weren't viewed as particularly newsworthy.

In spite of that, it's possible to make some good guesses as to what West Farms and the Mineral Hills were like. Based on the descriptions of early English explorers, it's likely that the Nonotuck used this area infrequently and not for farming, but for hunting and gathering. In addition, like most upland areas, they probably burned the wooded slopes every few years. This would have created a forest with relatively little undergrowth and old, widely spaced canopy trees.

Once the English arrived and settled in Northampton, they continued the practice of intentional burns in some parts of town (especially along the rivers), but they also adopted rules on cutting trees and prohibiting fires in the uplands. In the early days of settlement, this part of Northampton was set off as part of the Long Division and until the 1680s, it was held in common. During those years, the early settlers probably used it intermittently (if at all) as a place to harvest firewood, candlewood and timber.

Judging from nearby settlement patterns, the first full-time residents probably didn't arrive in





No name is given to the hills north of Turkey Hill Road in the 1831 map (shown on the previous page), but by the time the 1856 map is created (above, left), the knob where the now-abandoned quarry is located is called Bald Hill. On the 1939 topographic map (above, right), the name Mineral Hills is used to describe this entire range, from Route 66 north to Chesterfield Road. Meanwhile, the place name “Bald Hill” is now given to a lower-elevation knob further to the north. Today’s topographic maps are consistent with the 1939 map.

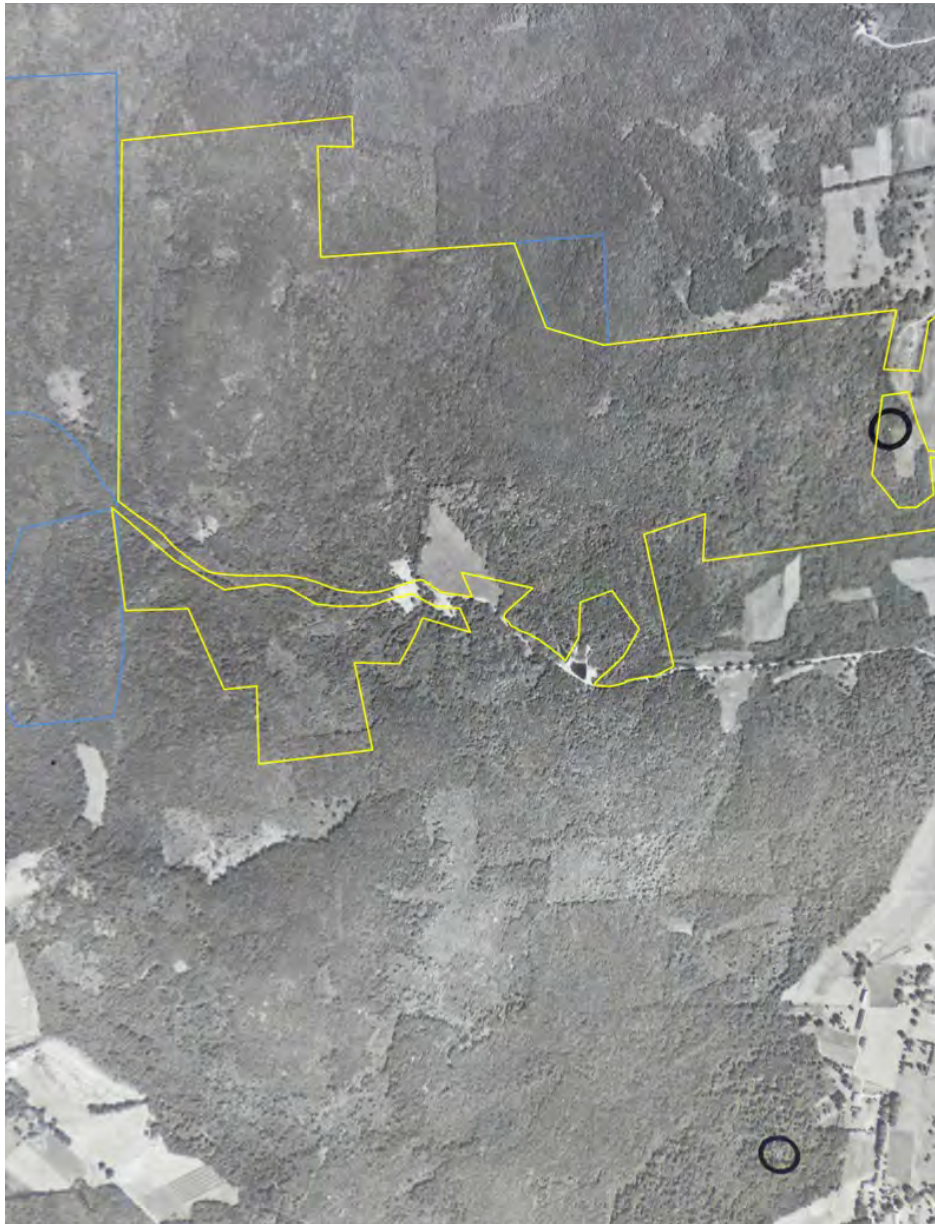
West Farms until the mid to late 1700s. (Westhampton’s first settlement was in 1762 and Florence was settled in 1778). The relatively gentle slopes and broad flats along Parson’s Brook were good pasture and the brook itself provided water power to run a sawmill. By the time the 1831 map was produced, several families were living here, much of the area was cleared, Turkey Hill Road connected to Westhampton, and the area had become known as West Farms. This district also had its own school, a church and a sawmill on Parson’s Brook (which was then known as Sawmill Brook.) The residents of West Farms could visit with their neighbors to the north in Roberts Meadow District, which also included several farms, two small manufacturing operations, a school and a tavern. To the southwest, Loudville was as busy or busier, with mills, mining operations and a tavern.

During the 19th century, West Farms didn’t



Workers at Bartlett’s Sawmill in the 1880s. They harvested wood from the Mineral Hills as well as the Sawmill Hills. Photo copied from *Images of Northampton* by James M. Parsons.

change much. Although some new homes and names appear on the historic maps, it remained sparsely settled. In fact, it wasn't until after WWII that change began to take place—but only modestly. In 1947, John Omasta, who had grown up in West Farms (his descendants still own and operate the family farm) bought land with his brother along Turkey Hill Road and opened up a small sand bank, which was located just south of the now-abandoned rock quarry. Several other sand and gravel operations began in



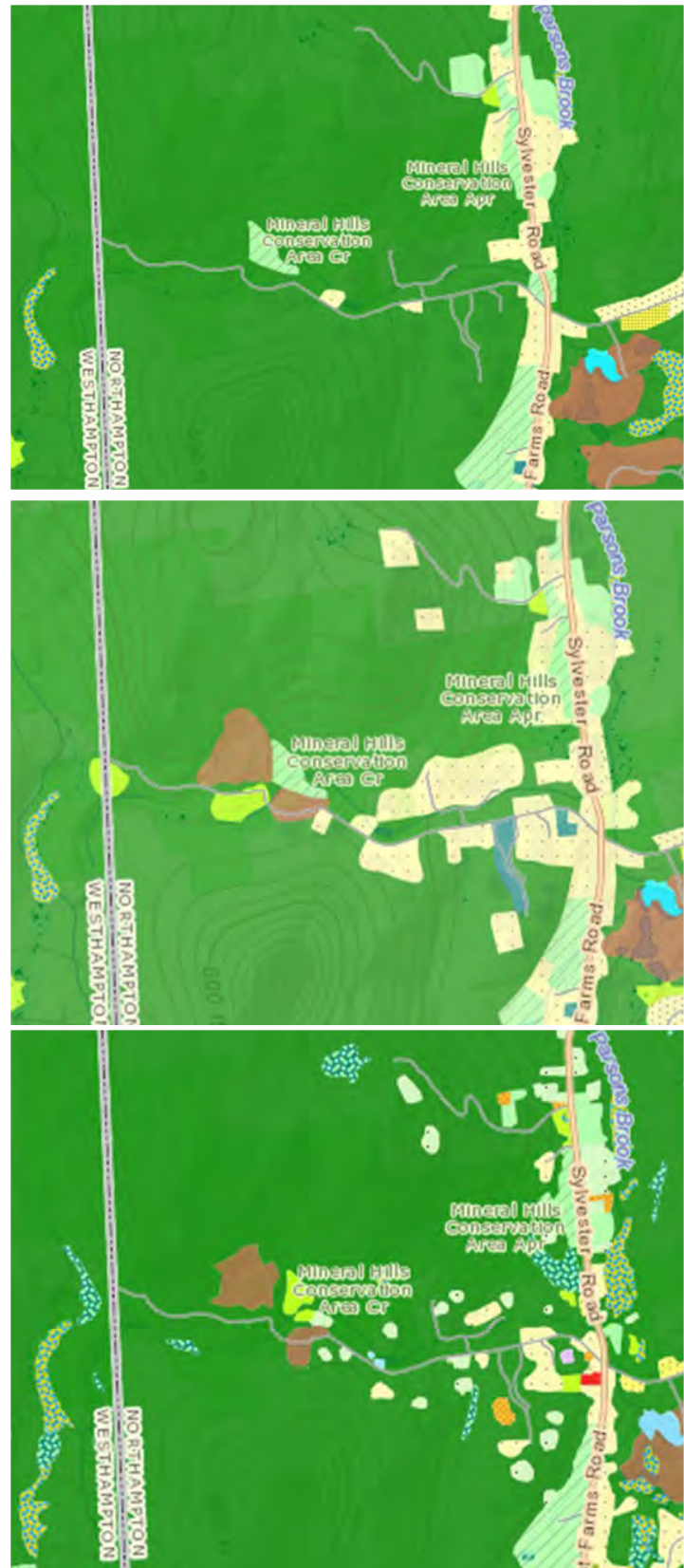
The conservation area, roughly outlined, and the surrounding landscape as it appeared in 1952. What's worth noting is the patchwork of forest, which reflects this area's logging history and different aged stands. In addition, this image shows the small sand quarries opened by the Omastas on Turkey Hill Road in 1947/48. The sand banks are located at the "end" of Turkey Hill Road, south and west of the large hayfield that can be seen in the center of the image. Today this former hayfield includes two single family homes along Turkey Hill Road, while the rest has become wet meadow and shrub swamp.

the vicinity around the same time: the area off of Burts Pit Road owned by Bill Willard, the former gravel pit that became Northampton's land-fill on Glendale Road, and the gravel pits owned by the Brakey family, also on Glendale Road.

Over the next three decades, the Omastas and subsequent owners continued on-and-off small-scale sand and gravel mining. In 1971, the land was purchased by James Wzorek, another gravel operator, who ramped up the sand and graveling operations. In addition, during the next three years, Wzorek bought three more nearby

properties and by 1975, had stitched together 195-acres of land. By then, he had hit ledge while graveling and had begun quarrying the highly fractured rock. Although hard rock quarrying was technically outside of the special permit that allowed him to remove “gravel, sand and topsoil,” no one stopped him. By 1978, he was operating a stone crusher on the site, which allowed him to break up the rock before hauling it away.

Wzorek continued mining gravel and quarrying rock until 1986, when he sold all of his land to a Connecticut-based gravel and stone business known as Valley Aggregates. It continued operations and in 1988, the company requested a permit from the City to build a cement plant on the site. This was denied and two years later, Valley Aggregates asked for a permit to expand their stone crushing on-site to include secondary and tertiary processing. Until then, only primary crushing was done in the quarry. This request was also denied and in 1990, in the wake of the second denial, Valley Aggregates appealed the local decision to Superior Court. In his decision, the judge not only ruled in favor of the City, but he also noted that the stone quarrying operation and stone-crushing were non-conforming and “unlawful”

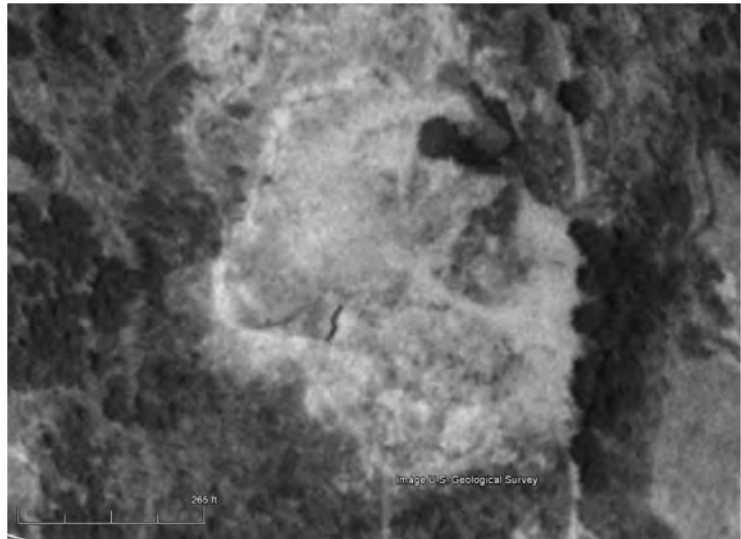


Land use changes along Turkey Hill Road from 1971-2005. Top image 1971, middle image 1999, bottom image 2005.

uses. In spite of the judge's ruling, quarrying and graveling continued.

But between 1990-1998, the operation was minimal. The local zoning rules were part of the reason, but so was a slow economy. During those years, the company blasted just five times. But in 1999, they ramped up their operations, detonating three times between April and December. The following year, they blasted five times. Meanwhile, to keep up with the added quantity of material, eighteen wheelers were now making multiple daily runs up and down Turkey Hill Road.

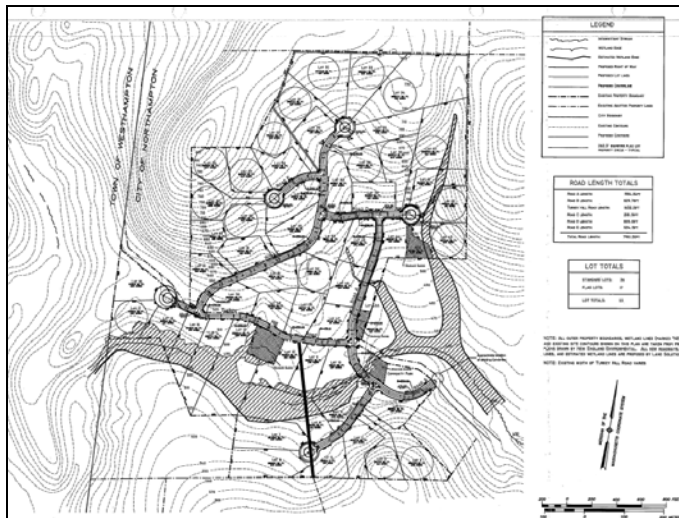
Not surprisingly, the neighbors were upset. Since Wzorek began quarrying in the early 1970s, a dozen plus homes had been built along Turkey Hill. And as the number of large trucks and blasts increased, the neighborhood pulled together. They were concerned about the safety of their families with all of the added traffic. They were alarmed by the noise from the blasts and the crushing machine. And finally, they were worried about structural damage to their homes from the blasting. Already, some people had noticed cracks in their ceilings.



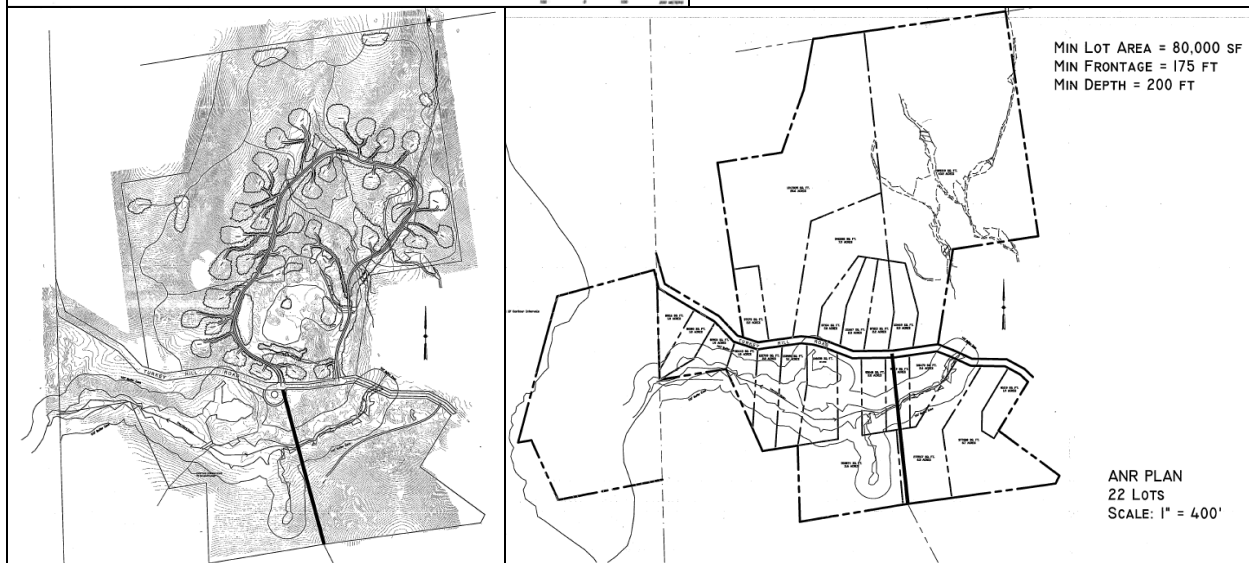
The quarry in 1995 (*top*), 2001 (*middle*) and finally, in 2005 (*bottom*), a year before it was protected as part of 150-acre conservation project.

In 2000, the neighbors sought help from the City and the building inspector, after visiting the quarry, cited Valley Aggregates for a lack of permits and issued a cease-and-desist order. The company appealed, and the next few years were full of meetings, lawyers and court proceedings.

Although there were some stretches when work at the quarry was required to stop, mostly it was business as usual. Then, in 2003, Ron Dahle, the owner of Valley Aggregates, informed neighbors that he was planning a significant expansion, with 6-10 blasts per year and 70 truck trips per day. Based on projections, he said, the quarry could operate for a century. Faced with this news, the neighbors asked if he would consider closing the quarry and putting in a housing development instead. But the quarry, they were told, was worth much more than as a development.



In spite of this information, neighborhood reps kept reaching out to Dahle, encouraging him to shut down the quarry and consider a subdivision. It's unclear exactly when along the timeline he changed his thinking, but by 2005, Dahle had agreed. Unfortunately his initial plan was almost as alarming as the quarry's continued operation: nearly 60 homes and more than a mile



Three potential subdivision layouts for the land in and around the quarry, showing 57 homes (*top*), 37 homes (*above, left*) and 22 homes (*above, right*). In the end, an even smaller scale project was built that protected 150 acres of land.

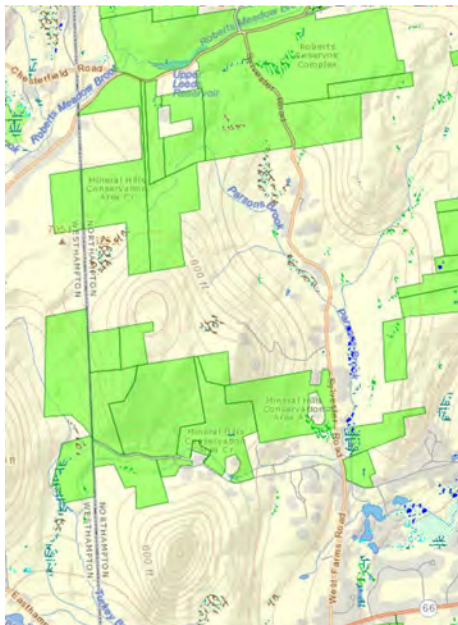
of new road threading throughout the entire property. But as site constraints and negotiations continued, the plans were revised and scaled down, first to 37 homes, then 22 and finally to 11 units (3 triplexes and two single family homes) on 22 acres, with most of the remaining land—150 acres—sold for conservation purposes (30 acres in Westhampton and 120 in Northampton).

To pay for the conservation portion, the City secured a self-help grant and the neighborhood and other conservation groups raised the balance. The neighborhood effort was particularly stunning. In less than two months, hundreds of individuals sent in a total of \$186,000, with contributions coming from as far away as Illinois, Texas and Alaska.

Finally, in late 2006, the 30 acres in Westhampton land were protected, and in early 2007, the 120 acres in Northampton—including the quarry--were transferred to the City's Conservation Commission. After fifty years of gravel mining and more than 30 of quarrying, the sand and rock operations on Turkey Hill Road in Northampton were over.

Since 2006

Since the acquisition of the 150 acres around the quarry, the City has continued buying land in the Mineral Hills. In the last ten years, it has completed five more transactions in the Turkey Hill area, including a purchase two years later that linked the LaPalme property to the 150 acres in and around the quarry site. All told, the City has helped to protect another 400 acres in the Turkey Hill/Sylvester Road neighborhood, with 87 of those acres in neighboring Westhampton and the remainder in Northampton.



Vegetation Patterns

Of the two core areas of protected land within the Mineral Hills (Clapp Farm and Turkey Hill), this southern 413-acre block is much more biologically diverse. In addition to the old quarry and abandoned gravel pits, it includes a former field/wet meadow and beaver pond, rock outcrops, red maple swamp, and several kinds of forest communities. In



The changing look of the quarry as vegetation creeps in, in September 2011.

many of these areas, there are few management or stewardship issues. The trail system is well-maintained by the Friends of the Mineral Hills, ATV traffic has mostly ended, parties seldom happen at the quarry (once an incredibly popular party spot), and the bulk of the property is free of invasive plants. There are some troubles, however, as noted by Molly Hale in a write-up she prepared in 2006 for the City's Self-Help grant and also by forester Mike Mauri, who prepared a forest stewardship plan in 2010. What follows are detailed vegetation descriptions, which are based on multiple visits to the conservation area during 2014 and Mike Mauri's findings. The descriptions correspond to the Vegetation Map on the next page.



Indian Cucumber Root

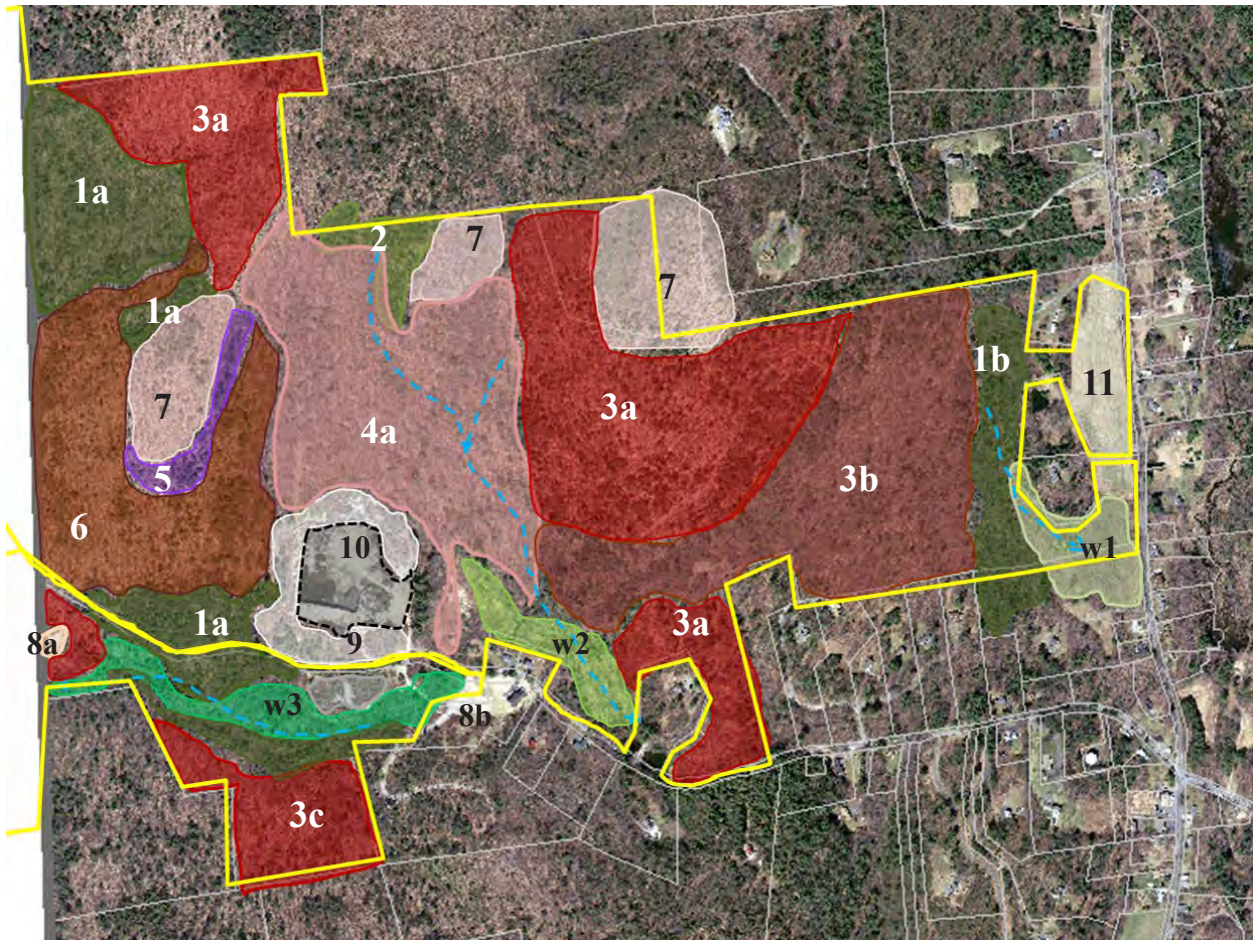


American Spikenard



Whorled Loosestrife

Vegetation Patterns Map



Uplands

- 1a: Hemlock dominated with mixed hardwoods, some springs
- 1b: Hemlock with mixed hardwoods, some seeps and some Japanese barberry and Asiatic bittersweet
- 2: White pine dominated with mixed hardwoods
- 3a: Mixed oak (red oak, black oak, scarlet oak, with some chestnut) dry slope dominated hardwoods
- 3b: Mixed hardwoods (oak dominating) with history of cutting and wood roads
- 3c: Mixed hardwoods with oak, black birch
- 4a: Northern hardwood mix with black birch, some sugar maple, red maple, hickory, occasionally pine and hemlock
- 5: Circumneutral oak-hickory forest, rich with some talus—open and park like
- 6: Oak-hickory-dry slopes, abundant rock outcrops
- 7: Ridgetop Oak, with chestnut oak dominating. Low bush blueberry, huckleberry in shrub layer
- 8a: Former sandbank, white pine, quaking aspen, etc. kept open by ATVs
- 8b: Former sandbank, rock exposures, white pine and gray birch abundant, growing in; Japanese knotweed
- 9: Highly altered former clearing with young white pine, gray birch, black birch, etc. bittersweet and multiflora rose
- 10: Former quarry
- 11: Active farmland, with abundant invasive plants along edges and roadside border

Wetlands

- W1: Red maple swamp
W2: Wet meadow, shrub swamp and former beaver impoundment
W3: Watershed divide swamp with some invasives (east draining side) and richer flora (west draining side)

Uplands (*Numbering Corresponds to Vegetation Patterns Map, page 29*)

1. Hemlock Dominated Forest

1a: Dense stands of dying hemlock. The stand to the south includes some huge pines, plus scattered red oak, black oak, red maple, black birch and hickory. The stand to the north is on a slope and at its base of the slope, there are more hardwoods (including sugar maple) plus multiple springs and seeps. This area is free of invasives.



A shady stand of hemlock.

1b: This hemlock stand also includes scattered white pine, shagbark hickory, red oak, white oak, ash, sugar maple, black birch, big-toothed aspen, and some tulip trees. The understory is varied and shifts with moisture and topography. In drier areas, the shrub layer includes mountain laurel, maple leaved viburnum, striped maple, and hazelnut, while the ground layer includes New York fern, hayscented fern, Canada mayflower, wild oats, Indian cucumber root, partridgeberry, starflower, false solomon's seal and Christmas fern. Interestingly, along the stonewall near the former LaPalme pond, the soil is more fertile and the plants include wild geranium, red trillium, perfoliate bellwort, white baneberry, and poke milkweed. In wetter areas, spicebush, hog peanut, and various violets, grasses and asters can also be found. Some Japanese barberry and Asiatic bittersweet have invaded near forest edge not far from the LaPalme's former home.

2. White Pine Forest

This small patch is dominated by white pine, but also includes a mix of oaks and other hardwoods. Rock outcrops are common here.

3. Mixed Oak/Hardwoods (3a, 3b and 3c)

3a: An oak-dominated forest (red oak, black oak, chestnut oak, and some scarlet oak) with a mix of red maple, hickory, black birch and scattered pine and hemlock. The drier areas have swaths of Pennsylvania sedge, huckleberry, and lowbush blueberry and more chestnut oak. American chestnut resprouts can also be found here, suggesting that historically chestnut was an important component in the canopy. Exposed rocky outcrops occur here, and there are occasional patches of little bluestem, wild basil, pussytoes and different asters and goldenrods. This rich zone deserves more botanical exploration.

3b: Some of these woods have been cut fairly recently. There are cut stems and an abundance of resprouts. More generally, this area includes a mix of oak (red, black, white), white pine, black birch, pignut hickory,



red maple, big-toothed aspen, paper birch, and hemlock. There is also some sugar maple, shagbark hickory, beech. The shrubby understory includes mountain laurel, striped maple, maple-leaved viburnum, and beaked hazelnut. Ferns are bracken, hayscented, New York and Christmas fern, and in wetter spots, interrupted fern. Wildflowers include Virginia creeper, spotted wintergreen, common cinquefoil, wild licorice, pipsissewa and woodland asters. It includes a network of trails and wood roads, an old log landing/small clearing and some old test pits. The clearing and old test pits should be monitored for invasive plants; they are ideal sites for Asiatic bittersweet to get a foothold.



(A) The dead trunk of a red cedar can be seen in the center of this image, a telltale sign that this area was once open. (B) A view of the oak forest on the drier slopes, with clumps of huckleberry, lowbush blueberry and barren patches of dry leaves.



(C) Black birch, hemlock and several other species are common in this forest typically dominated by oak. (D) This healed wound on this tree is a clue of past logging operations: it was caused by a skidder.

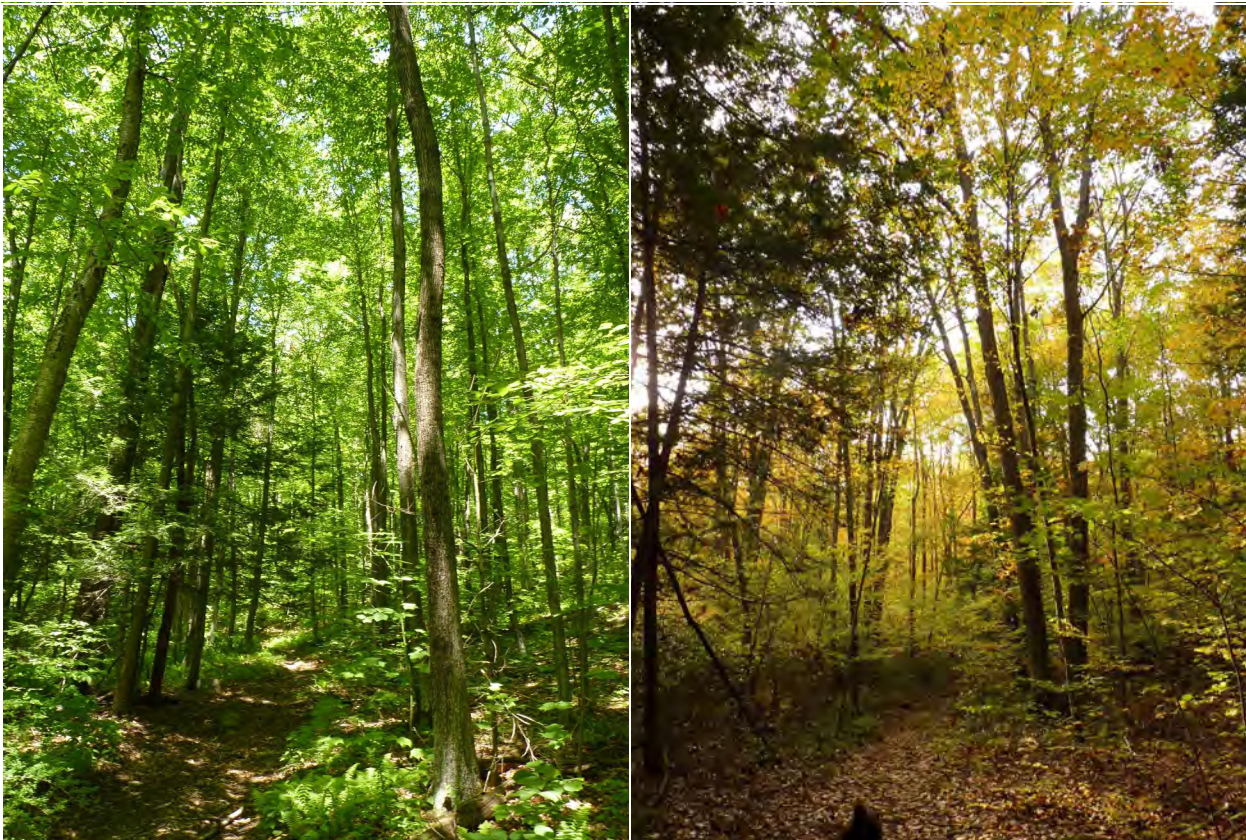
3c: Located on the south side of the wetland, this forest slope includes a mix of red oak, black oak and other hardwoods (red maple, black birch, ash, hickory, poplar, as well as some black cherry and yellow birch). Hemlock and pine are less common. Mike Mauri estimated that the forest east of the Cowls access road was last cut around 1920, while the forest to the west (mostly red maple, black birch and paper birch) was cut in the 1960s. Finally, next to the old gravel bank (Stand 7) in the westernmost section of the property, the mixed oak woods include black birch, red maple, and paper birch. Mauri estimated that these trees were about 25 years old.

4. Long-Ago Pasture/Mixed Hardwoods

A few old sugar maples, wolf pines, dead red cedars, and strands of barbed wire indicated that this area was a pasture long-ago. The area is varied topographically, with mostly gently sloping hillsides, a steep ravine, and two small streams. Overall, the forest is a mix of northern hardwoods, with black birch, sugar maple, red maple, ash, hickory and some hemlock in moister areas and black oak and red oak in drier areas. There is also some beech. Mauri estimated the different ages of the forest, with the western half cut around 1930-1950 and the eastern portion last cut around 1910.

The understory plants are typical of the Mineral Hills. When present, the shrub layer often includes mountain laurel, witch hazel, striped maple, maple-leaved viburnum, and beaked hazelnut. Spicebush is common on the wetter slopes, along the streams and in the seepy areas. Grape vines are present in more fertile areas. Hayscented, NY fern, lady fern and Christmas fern are common and often abundant. Partridgeberry, Indian pipe, true solomon's seal, wild sarsaparilla are among the common wildflowers.

The ravine includes a mix of hemlock, red maple, dying ash, sugar maple and mountain laurel, witch hazel and striped maple. There are broad swaths of New York fern and hayscented fern, as well as



Two views of the deciduous forest along the trail that loops through the long-ago pasture, now hardwood forest.

Christmas fern, interrupted fern and also wild oats and white baneberry.

Although most of this area is free of invasives, some can be found closer to the quarry (e.g. Japanese barberry and bittersweet).

5. Circumneutral Oak-Hickory Forest

Perhaps the most visually enchanting and botanically interesting, this narrow band includes abundant rock outcrops and an open, park-like forest. Hickory, chestnut oak, and hop hornbeam are common and red cedar, both stumps and some living specimens, can be found here. The understory includes swaths of Pennsylvania sedge and several kinds of grasses. The rockier slopes, meanwhile, provide habitat for several plants that are otherwise unusual for Northampton, including wild columbine, early saxifrage, several sedges (including *Carex plantaginea*), gooseberry and red-berried elder. Nearby, on slightly drier ground, grow four-leaved milkweed, ebony spleenwort, round-leaved ragwort, blue-stemmed goldenrod, tick trefoils and other oddities that make this area interesting to explore. Unfortunately a few invasive plants have also become established here and should be removed (e.g. Japanese barberry, Asiatic bittersweet, winged euonymus, garlic mustard). Monitoring should be done here to ensure that these unwelcome invaders do not overrun this special habitat.

This area was probably burned in the distant past, either through lightning strikes or carelessness, but the presence of old wire fencing also reveals that it was once used as pasture.



Four views of the circumneutral oak-hickory forest.

6. Dry, Oak-Hickory-Sugar Maple Slopes

Adjacent to the circumneutral oak-hickory forest are drier, less rocky slopes that include a similar, but slightly different mix of oak, sugar maple, red maple, birch, hemlock and occasional white pine. The forest is taller and its patchy understory includes open grassy/sedgy clearings as well as thickets of huckleberry, deerberry and lowbush blueberry. The understory plants include asters and goldenrods that are less commonly found in Northampton, as well as wild basil, four-leaved milkweed, perfoliate bellwort, early violet, enchanter's nightshade, and white snakeroot. This area is also one of the few known sites in Northampton for round-leaved dogwood. No invasive plants were found within this habitat.

Some old bricks, daylilies and the remains of an old boat can be found near an old foundation located along the trail that leads through this forest to the ridge.



(A) Wire strung now embedded in a large hickory. (B) The remains of an old rowboat lie adjacent to the trail. (C) A typical view of the rich, dry oak-hickory-sugar maple slopes. (D) Ebony spleenwort (*Asplenium platyneuron*), a species that survives in drier, richer sites and within Northampton, known only from the Mineral Hills.

7. Ridgetop Oak

Three areas within the conservation area are characterized as ridgetop oak communities and are dominated by oaks (mostly chestnut oak, but also white, scarlet, and black oak). Red maple is also fairly frequent and white pine is sometimes present. The understory is mostly huckleberry and lowbush blue-

berry. The conditions on the ridge, with droughty, thin soils, are so stressful that the trees are dwarfed and only about 20-25 feet in height. At this point, there are no invasive plants known from this area.

8. Abandoned Sandpits

8a: This former sandpit remains a mix of open sand, with a margin of gray birch, white pine, black birch, and sweet fern. The barren soils support few plants, but include frostweed, whorled loosestrife, bluets and red clover. Although anthropogenic in origin, this area provides habitat for certain species, especially insects. Butterflies regularly seek these areas for basking, and tiger beetles and native bees depend on areas like this for nesting. Turtles from the nearby beaver pond might also use this area for nesting. In recent years, this spot has been unintentionally kept open by ATVs. It would be good to keep this area open (but not by ATVs!). Volunteers could cut the vegetation back, and while they're at it, they could cut out the few Morrow's honeysuckle that have established. They could also monitor this area to make sure other invasive plants haven't become established.

8b: This sandpit includes rock exposures and some exposed sand. Much of it has grown in with pine. There is a patch of Japanese knotweed within this highly altered area.

9. Highly Altered Land Immediately Around Quarry

This is a highly altered area that was cut and in some areas, scarified. It is now a brushy area with a mix of white pine, black birch, gray birch, pin cherry, quaking aspen, wild grape, sweet fern and blackberry. Asters, goldenrods and various grasses are common, as are patches of bracken and Polytrichum moss. Although invasive plants in this area were treated in 2007, Asiatic bittersweet and multiflora rose are still present and should be controlled.

In 2009, Brian Kitley, a native of Northampton and writer, published a novel called The River Gods. In it, he brings his ancestors and relatives to life, writing from their personal perspectives. One of them includes a journal entry in 1852, "written" by the "Sage of Mineral Hill:

...Northampton below from Mineral Hill is as remote as the Northwest Passage. We live on what we find, the dog and me-service berries in June, tart strawberries, carrots that taste of metal. What is any man's discourse to me, if I am not sensible of something in it as steady and cheery as the creak of crickets? In it the woods must be relieved against the sky. Men tire me when I am not constantly greeted and refreshed as by the flux of sparkling streams. Surely joy is the condition of life.



Gray birch, *Betula populifolia*.



The trail around the quarry rim growing in with sweet fern, gray birch, pine, blackberries, oaks and other species.



10. Now-Abandoned Quarry

- (a) *Open Water*: Fed by groundwater and rain-water, the pond now supports a mix of cattails (*Typha latifolia*, *T. angustifolia*) as well as bladderwort and pondweed (*Potamogeton* sp.). Along the margins grow three kinds of willows, a variety of sedges, bulrushes and grasses, and also several different wild-flowers (tickseed sunflower, marsh bedstraw, groundnut).



Gray tree frogs, American toads, bullfrogs and green frogs all use the open water in the quarry for breeding.



- (b) *Quarry Floor/Wildflowers*: This area was seeded with wildflowers years ago and now includes a mix of grasses (timothy, orchard grass) and wildflowers (St. Johnswort, sweet white clover, sweet yellow clover, hop clover, black medic, red clover, white clover, bird's foot trefoil, yarrow, ox-eye daisy, brown-eyed susan, common speedwell, common milkweed, wild alfalfa, Queen Anne's lace, asters, etc.)



Two of the many species of wildflower planted in the floor of the quarry. Although many of these wildflowers are non-native, they do not spread into natural communities, but are essentially confined to disturbed settings like this. Aside from their inherent beauty, the wildflowers attract a wide array of insects.

- (c) *Quarry Floor and Rim*: These areas of the quarry have revegetated on their own and are now dominated by sweetfern, with patches of blackberry, winged sumac, raspberry, gray birch, white pine, quaking aspen, bracken, goldenrod and asters. The vegetation within the quarry should be mechanically cut back to provide shrub habitat. Otherwise it will all grow up into brush and forest.



Sweet fern is a relative of bayberry and not a fern at all. It thrives in settings like the quarry floor and around the rim. In some parts of the old quarry, species like sweet white clover and daisy fleabane have established in the more open clearings. Unless this area is managed, the sweet fern and other woody species will spread into these areas.

(d) *Quarry Rock Walls*: Black locust, staghorn sumac, black birch, quaking aspen, gray birch, pin cherry, plus coltsfoot, yarrow, ladies' tresses (in wet areas)...and some tangles of Asi-



(A) The quarry walls are highly varied—some are tangled with vegetation—like this bittersweet—while others (B) are completely open. Ravens have been nesting on one of these open ledges for the last five or so years.

atic bittersweet.

(e) *Vernal Pool & Wetland*: A small seep and depression form a vernal pool (certified) and the surrounding area includes wet ground that has revegetated since 2006. This area includes an interesting mix of plants, including various violets, swamp candles, seedbox, meadowsweet, steeplebush, round-leaved sundew, marsh fern, blue-eyed grass, field horsetail, scouring rush, variegated horsetail (only known from one other site in Northampton). It also includes a mix of sedges, rushes, sphagnum moss, cattail and a small patch of *Phragmites*, which should be controlled.



This diminutive variegated horsetail (*Equisetum variegatum*) is known from only one other site (also a gravel pit) in Northampton. (B) The small depression that holds water and is a certified vernal pool is threatened by the spread of *Phragmites*, seen here.

- (f) *Open Gravel*: Scoured open areas with sands, gravel and exposed ledge are found just outside the quarry entrance and on its southern rim. These areas are mostly open, but include patches of sweet fern, quaking aspen, gray birch and winged sumac. There are also broad patches of Polytrichum moss as well as other grasses, violets, blue curls and some other hardy plants. More concerning is that these areas also have some Asiatic bittersweet and



autumn olive.

- (g) *Tree Islands and Formerly Cut Forest*: These areas are former spoil piles that have been allowed to grow back and now include: big-toothed aspen, gray birch, sweet fern, willows, white pine, red maple, hayscented fern, whorled loosestrife, coltsfoot and sedges. These areas also host several invasive plants, including Morrow's honeysuckle, Asiatic bittersweet and multiflora rose.



Weedy patches along with white pine, birches and aspen characterize these young stands found in the quarry. These are places where Morrow's honeysuckle, seen here in fruit, has established.

- (h) *White Pine/Sugar Maple*: Located along the entrance road, this area is dominated by white pine and sugar maple. Also present are hemlock, some oaks, and one of the largest shagbark hickories I have seen in Northampton. Canada mayflower, wild oats, sedges, red trillium,



(A) This remnant patch of pine and sugar maple forest has little growing in the understory. (B) Japanese knotweed grows along the edge of the parking area at the end of Turkey Hill Road.

and woodland asters grow in the understory. The road in this area is eroding.

- (i) *Former Hayfield/Shrub Meadow and Parking Lot Edge*: Once a hayfield, this area is now a wet meadow with a mix of grasses, young shrubs (panicked dogwood, alder, willow). The nearby parking lot edge shares some species, but it is generally drier, with a history of more alteration. It was once part of a much larger gravel bank. On its margin grow both native and non-native plants. Cottonwood, staghorn sumac, willows and goldenrods are among the more common natives, while Asiatic bittersweet, multiflora rose, Japanese knotweed and tree-of-heaven are very abundant non-natives.



The open hayfield shown in the 1952 aerial photo is now a mix of wet meadow and shrub swamp.

These should be controlled—and since the invasions are still small enough, they could be.

- (j) *Wet Meadow*: A soggy, more open stretch along the stream with sedges, bulrushes, touch-me-not and other common wetland plants.

11. Agricultural Fields

Although the bulk of this land is under cultivation, the field's brushy borders, below the former LaPalme home and along an old stonewall, include a mix of young trees and shrubs as well as an abundance of invasive plant, including a large and expanding patch of Japanese knotweed, as well as multiflora rose, autumn olive, Morrow's honeysuckle and quite a bit of Asiatic bittersweet. Controlling these invasives

will be difficult because the vegetation in this area is so dense. There are also several young butternut along the edge; these should not be cut.



The edge of the farm field includes a mix of non-natives, a few of which are seen here: Japanese knotweed, multiflora rose and autumn olive.

Wetlands

Although wetlands and streams make up a relatively small portion of the property, their contribution to the site's overall biodiversity is disproportionately large. In addition to the old quarry site and the intermittent streams draining through the hardwood forest, there are three other wetlands on the property.

w1: A swamp dominated by red maple, winterberry and spicebush, this wetland also includes hemlock, black birch and yellow birch in the canopy. Silky dogwood, highbush blueberry, ironwood and mountain laurel as well as a variety of grasses, sedges, wildflowers and ferns fill in the understory. Sphagnum and other mosses are abundant.

w2 This wetland varies from open, wet meadow to shrub swamp (alder, willow) to a former beaver pond that at this point is drained. The beavers, which arrived ~2003, used an old stonewall as the base for their dam. During their tenure, all of the trees were killed by flooding or chewing. Today, the former beaver pond includes fewer trees and more shrubs.

w3: Portions of this wooded wetland varies dramatically and it includes a watershed divide. The invasive plants are all found on the east side, close to an old gravel pit.

Wetland Draining to East

Closest to the old gravel pit and parking area, the drier, altered margins include quaking aspen, cottonwood, willow, and big-toothed aspen. There is a small pond near the old access road that includes cattail, alder and tussock sedges, as well as Phragmites and Japanese knotweed. This area has been highly altered (gabions, culvert), but the small depression provides breeding habitat for toads and green frogs. Other plants in the area are silky dogwood, red maple, sensitive fern and several grasses. There is also some bittersweet.

Moving away from the highly altered area, the wet forest includes a mossy stream that is very pretty. The bordering land is moist and includes hemlock, red maple and sugar maple. In the understory, there is witch hazel, spicebush, witch hazel and a variety of wildflowers and ferns (golden saxifrage, touch-

me-not, violets, wood anemone, dwarf ginseng, jack in the pulpit, Virginia creeper, Indian cucumber root, hellebore, as well as hayscented fern, Christmas fern, lady fern and interestingly, even a little maidenhair fern.

Moving still further from the areas that were once disturbed, the stream becomes deeply shaded and dissecting. There are occasional seeps, and the vegetation shifts to more hemlock, with white pine, red maple and yellow birch. The forest floor now includes partridgeberry, foam flower, golden ragwort, wood anemone, poison ivy, bluebead lily, cinnamon fern, turtle head, and lots of dewberry. The rocks are more moss covered and to the south, there is a small area where the hillside is covered with rocks and dominated by hemlock, with scattered ash and red maple. Bluebead lily, Canada mayflower, gold thread and cinnamon fern are very common here.

The character of the wetland shifts again and now includes more yellow birch, as well as black ash and scattered hemlock. Cinnamon fern, royal fern, swamp saxifrage, Canada mayflower, poison ivy, and a sedge called *Carex bromoides* are the most common in the understory. Several other less commonly observed sedges are present here as are a number of other wildflowers.



Swamp Forest draining to West

At the watershed divide, the character of the wetland changes and becomes very rocky and dominated by hemlock. A gurgling stream can be heard below and then emerges. There is much less cinnamon

fern (than in the east draining wetland) and lady fern is much more common, as is silvery spleenwort. Leatherwood, a species that prefers neutral soils, is common here, and the canopy includes yellow birch, red maple, black ash, with an abundance of mountain laurel and witch hazel on the drier borders. Touch-me-not, hellebore, foam flower, golden ragwort, enchanter's nightshade and broad beech fern are also present as well as some mountain maple. The topography changes and the stream enters a narrow, tight ravine with hemlock borders. The 30-foot right of way for the Cows lot crosses the wetland in this vicinity.

As the topography flattens out, the stream winds through a hemlock swamp forest with abundant sedges, wood horsetail, poison ivy, cinnamon fern, various sedges and grasses. It eventually drains into Turkey Brook in Westhampton.



The access road to the Cows land.



Two botanical indicators of richer soils: (A) leatherwood and (B) silvery spleenwort.



The intermittent stream draining to the west flows into this beaver pond in Westhampton, which is protected through a private conservation restriction.

Recommendations

Mike Mauri's forestry stewardship plan for this property included several management recommendations, several of which are echoed here.

1. Control existing invasive plants & monitor for new invasions

At present, there are four primary areas with invasive plants: along the parking lot at the end of Turkey Hill Road, in and around the quarry, along the farm field edge of the former LaPalme property, and within the narrow band of circumneutral oak-hickory forest. From an ecological perspective, controlling invasives in the rich oak-hickory zone is most important. It is also the most easily accomplished; at this point, the number of invasive plants is still low and one or two people could remove all of them in less than a day. In contrast, the other three areas will require more effort over a longer period of time. Although volunteers could make a big difference, the invasive plants in these areas are particularly difficult to eradicate (e.g. Japanese knotweed, Asiatic bittersweet, multiflora rose, autumn olive, *Phragmites* and Morrow's honeysuckle), which means that until a biological control is found, any volunteer efforts would need to be followed up with herbicide spot treatments.

2. Maintain the shrub habitat and open meadow in and around the quarry and in the adjacent gravel pits by using a Brontosaurus and/or brush hog.

3. Fix the erosion on the trail leading to the quarry.

4. Work with Smith Vocational, volunteers, or a tree service to clear one or two views at the top of the ridge.

5. Remove the ugly, old silt fence and fix the clogged culvert at the end of the Turkey Hill Road.

6. Continue to control ATV use.

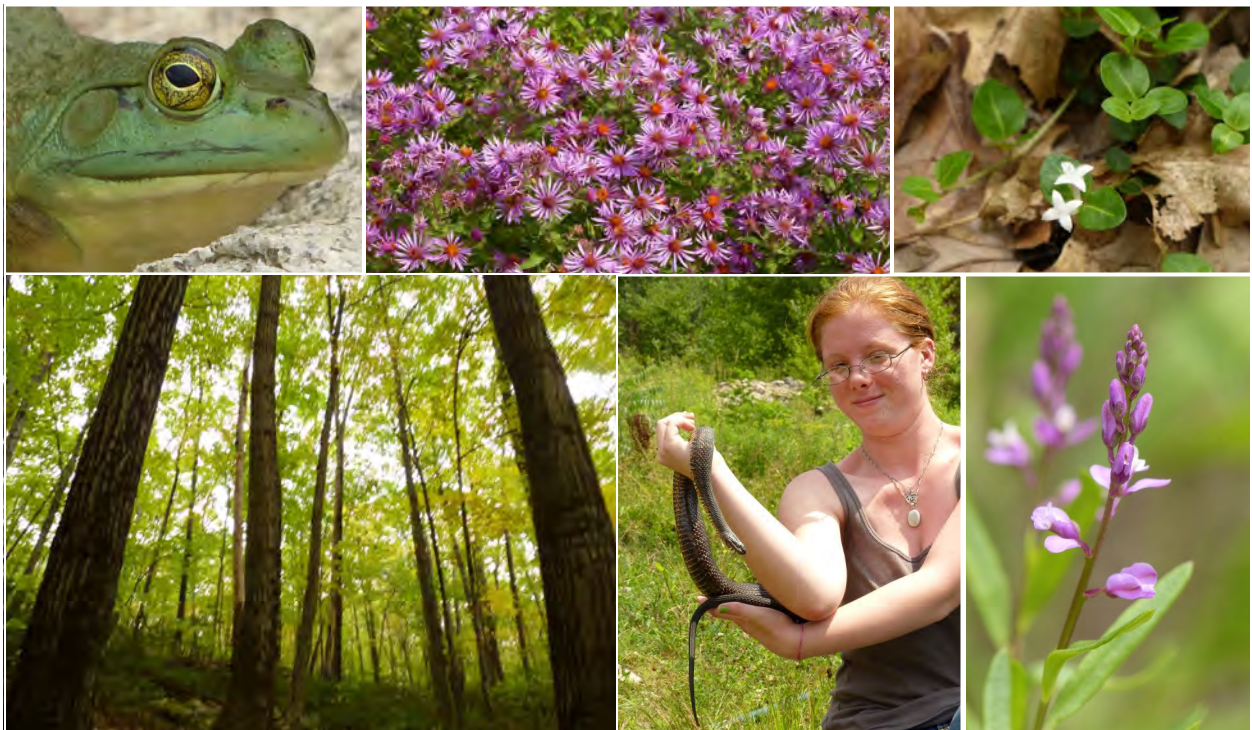
7. Keep trails wide to reduce the chance of encountering deer ticks.



Deer ticks!

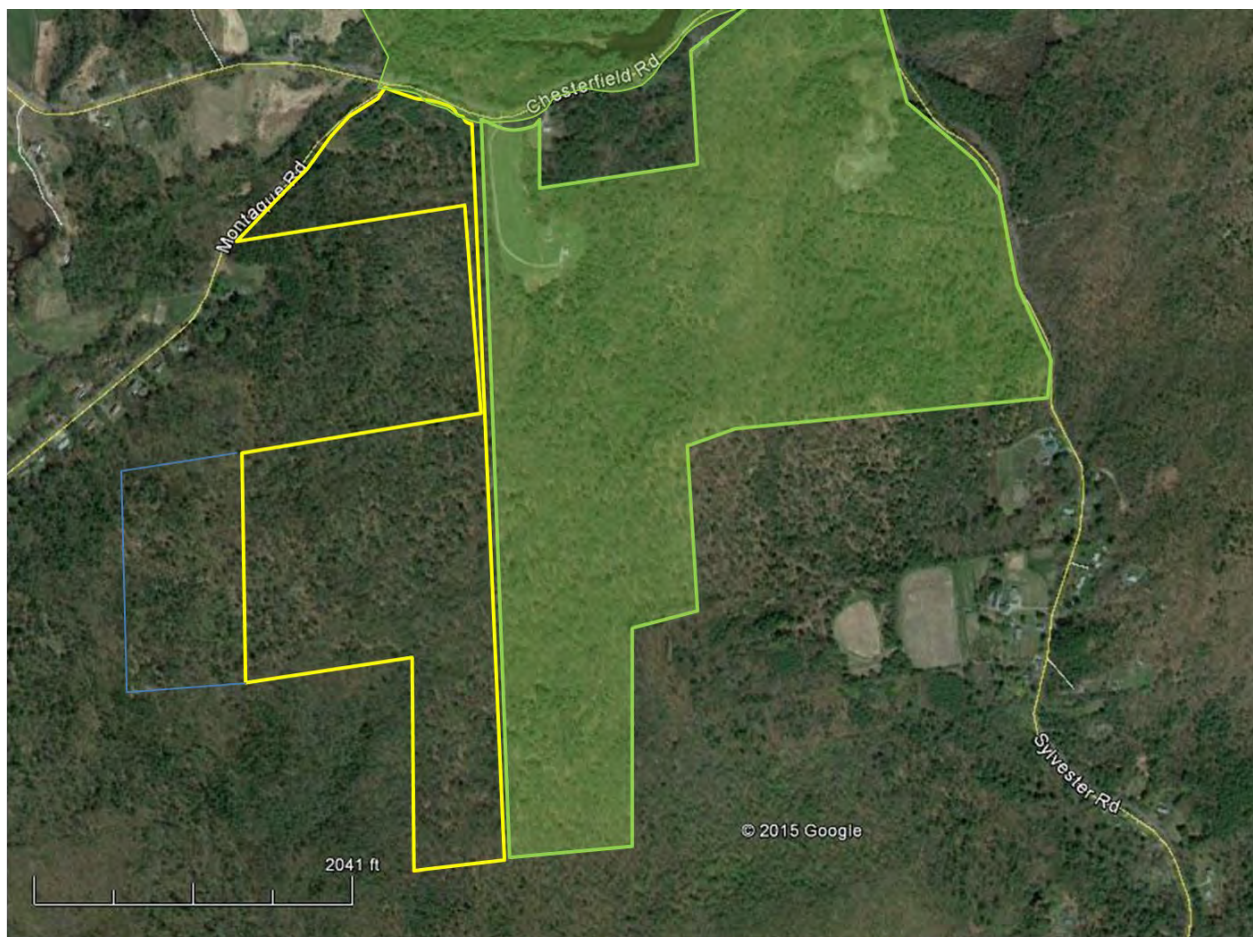
8. Certify/investigate potential vernal pools in and near the conservation area.

9. Extend a trail to the beaver pond in Westhampton and to the old gravel pit that has the nice exposure of bedrock.
10. Conduct a detailed natural history inventory of the plants and animals within Mineral Hills Greenway.
11. Record/video tape interviews with Armand and Rosel LaPalme, Paul Foster-Moore, Mark Carmien, JoAnne Bessette, Wayne Feiden, and others about the conservation of this part of the Mineral Hills.
12. Provide support and guidance to the Friends of the Mineral Hills.





Part 2: A Natural History of the Bookends Parcel (Formerly Sarafin/Clapp Farm) ~ 90 acres



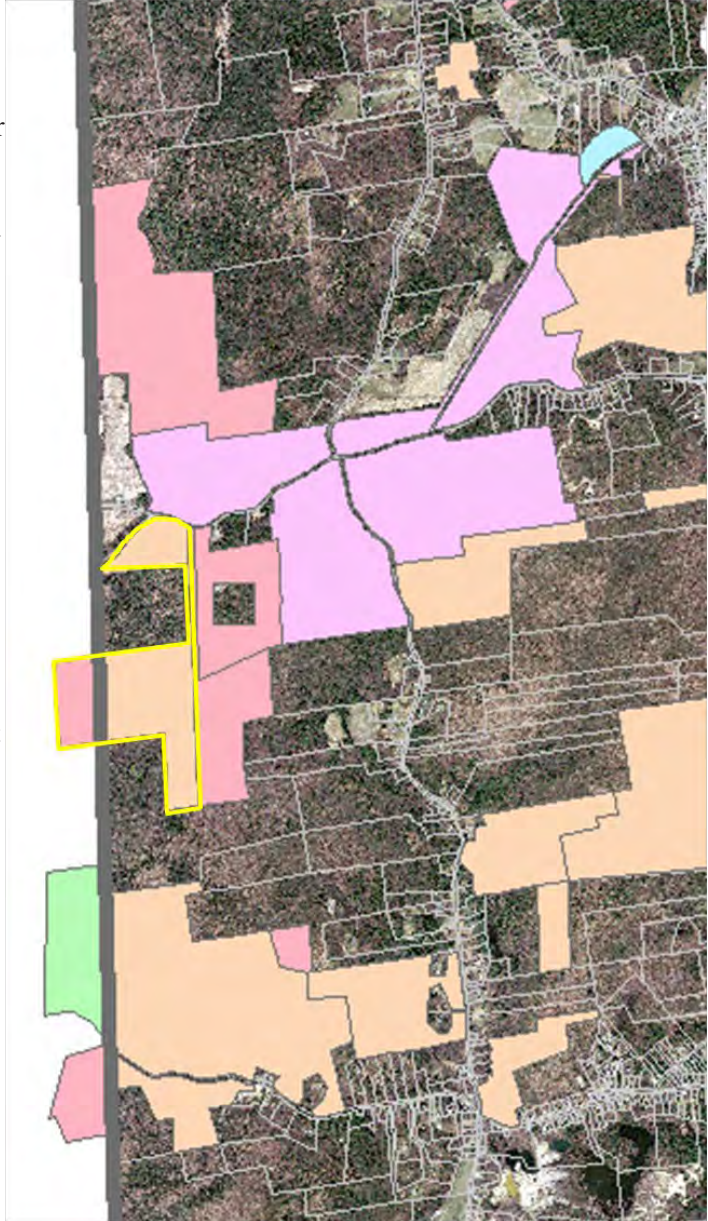
The Bookends Parcel (120 acres) includes 90 acres of conservation land in Northampton (outlined in yellow) and 30 acres in Westhampton (outlined in blue). The land to the north and east is protected through private Conservation Restrictions or owned by the DPW.

Conservation of the Clapp Farm

In 2005, John Clapp asked his cousin/forester Tom Jenkins to mark the timber on his land and after cruising the property. Jenkins asked Clapp if he had ever considered putting his land under a conservation restriction. At the time, Clapp admits, he didn't know much about conservation restrictions, but after learning more about them, he and his wife Dee were on board. The following year they worked out the terms of a conservation restriction with a fledgling conservation group called the Nonotuck Land Fund (now part of Kestrel Trust), sold their development rights and placed twenty acres of hayfield and forest under a permanent Conservation Restriction.

By then, Clapp had also been talking about conservation restrictions to his sisters, encouraging them to take similar steps with their shares of the family farm. The next year, Clapp's sister Miriam put her share—57 acres—under Conservation Restriction and two months later, Clapp and his wife placed another 35 acres under easement. Three years later, two other sisters—Liz

Clapp Anderson and Christine Clapp Guyette--worked with the Nonotuck Land Fund and placed their 168 acres under a conservation restriction. Two years later, in 2012, another relative, Joan Sarafin, protected her 120 acres, selling 90 acres of the family farm to Northampton's Conservation Commission and 25 contiguous acres in Westhampton to the Kestrel Trust. Known as the "Bookends" parcel during the fundraising effort, its protection filled in a key parcel. In less than a decade, nearly 400 acres of the Clapp Farm had been protected in perpetuity.

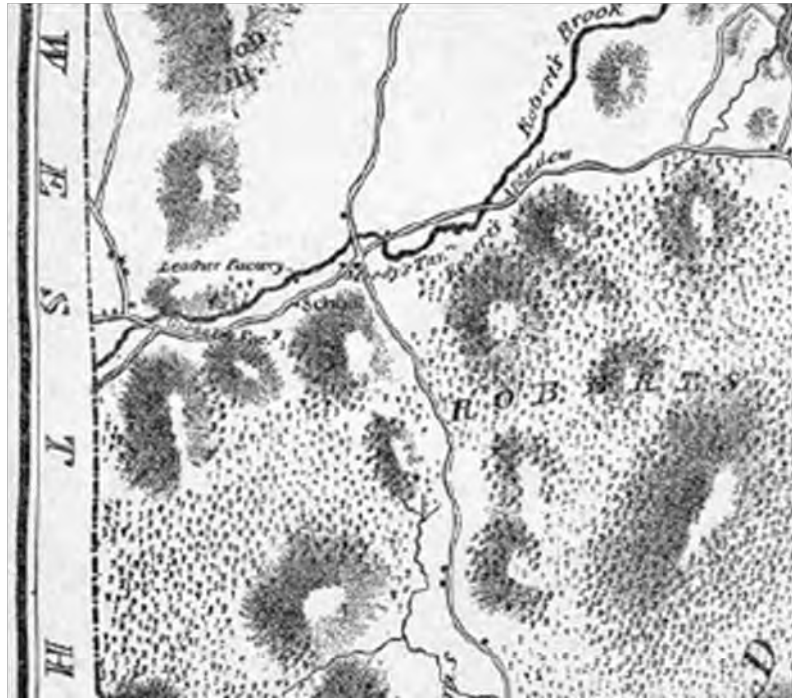


The Bookends Parcel (120 acres) in context, with the other Clapp family farmland (light red) and the City's DPW land (lavender). Its protection helped protect a block of land that now extends all the way to Roberts Hill and helped fill a key piece in the Mineral Hills. The frontage along Montague Road and Chesterfield Road was particularly vulnerable to development.

History

The connection between the Clapp family and this corner of Northampton extends through six generations. In 1826, Henry Clapp (John's great-great-great grandfather) purchased 100 acres from Leander Moody's family. Moody was best known as the owner of the then-famous tavern at the intersection of Chesterfield and Sylvester Roads, but he also operated a sizeable farm. In those early days, this part of Northampton was known as the Roberts Meadow District and although small, it was fairly busy and included a school

house, a tannery, a sawmill and another small factory. Henry Clapp settled in the district largely to work as a blacksmith, but he also farmed and was a co-owner of the local sawmill.



The 1831 map shows about ten houses, two factories a school and Moody's Tavern. Other farms were nearby in Westhampton and to the south in West Farms. The stippling on this map suggests that most of the Sawmill Hills and Mineral Hills were still covered with some kind of forest, but probably none of it was virgin by then and was growing back.

By the time of his arrival, a lot of the forest in this area had been cut and cleared. A sawmill had been built nearby almost 60 years before and the leather factory just down the road had been operating for nearly 40 years. In the early 1800s, the tannery was in its heyday and was considered one of the most important leather factories in the Commonwealth, processing up to 30,000 hides a year and employing up to 20 men. Its operation, however, required enormous quantities of oak and hemlock bark, which were ground up and used in the processing of hides and so the tannery alone had a huge impact on the surrounding forest.

But the tannery wasn't the only source of pressure on the local woodlands. The development of the woolen mills in nearby Leeds (then known as Shepherd's Hollow) in the early 1800s was another. By the time Henry Clapp settled his growing family here, Leeds was bustling and like everywhere else in those days, wood was the only source of fuel for heating and cooking. For the factories and workers in Leeds, some of their firewood almost certainly came from this part of town. In addition, more forest

clearing was done to create pasture for sheep that were being raised by the thousands to supply local textile mills with wool. “Sheep fever,” as it was known, played an important role in land clearing here and elsewhere in southern New England. When Henry Clapp arrived, land clearing was at its peak, with upwards of 80% of the state open.

During his tenure, Henry Clapp and his wife Nancy Root Clapp raised six sons on the farm and during the next three generations, his descen-

dants bought more land, eventually accumulating 1,000 acres in this corner of Westhampton, Northampton and Williamsburg. The Clapp Farm owned dairy cows, grew crops, harvested hay and cut timber off their land.

During the last fifty years, John’s father and Uncle Philip ran the farm. In the 1960s, they sold off several parcels (~300 acres) and in the late 1980s, they sold off the last of their dairy herd. After John Clapp’s father and uncle died, the farm was subdivided among the family’s heirs, which included John and his five sisters and also his uncle’s step daughter, Joan Sarafin and her husband John. The



By 1895, when this map was produced, James Clapp had taken over his grandfather’s farm. During his lifetime, he increased the size of the family’s holdings from 200 acres to 1,000. What this map doesn’t show is the City’s new reservoir, which was built in 1883, just opposite the schoolhouse, on Roberts Meadow Brook.



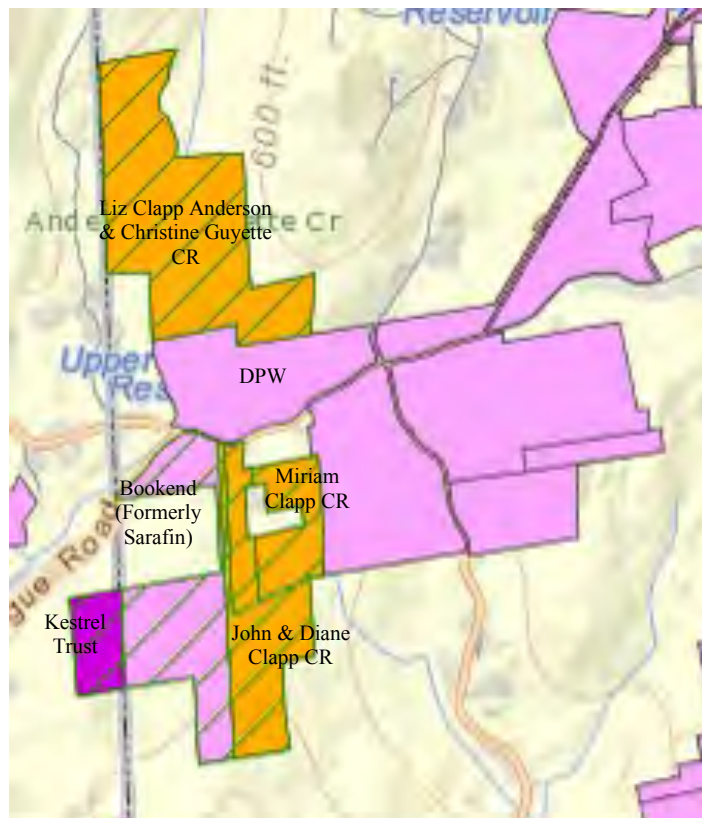
Evidence of the land’s farming history is easy to find. Rough stonewalls mark old field edges and boundaries and although they are now found in the middle of the forest, they tell a story of past land clearing. Most of these walls probably date to the 1820s-1840s. Barbed wire is also easy to find. It was invented after the Civil War, came into widespread usage in the 1870s and is still a popular fencing material.



The pasture at the intersection of Montague and Chesterfield Road in 1952 and 2013. Today this former pasture is seriously invaded by non-native plants, particularly Asiatic bittersweet and multiflora rose. Returning this portion of the property to an open clearing would help reveal the historic stonewalls, control invasive species, improve access, and restore habitat for wood turtles and grassland birds (woodcock, savannah sparrow, bobolink). Once cleared, a portion of this pasture could be leased to a local farmer or it could be maintained as grassland/shrub habitat.

Sarafins received 120 acres (90 in Northampton and 25 in Westhampton) and in 2006, they hired a local logging company to begin harvesting some of the trees. Logging continued, albeit sporadically, until 2011, when a new logging company was hired. During the next year, a fairly heavy cutting job was done (~276,000 board feet), with most of the trees being white pine and oak.

In 2013, forester Mike Mauri completed a stewardship plan for the property, but otherwise no management or stewardship activities have been done since the land's acquisition.





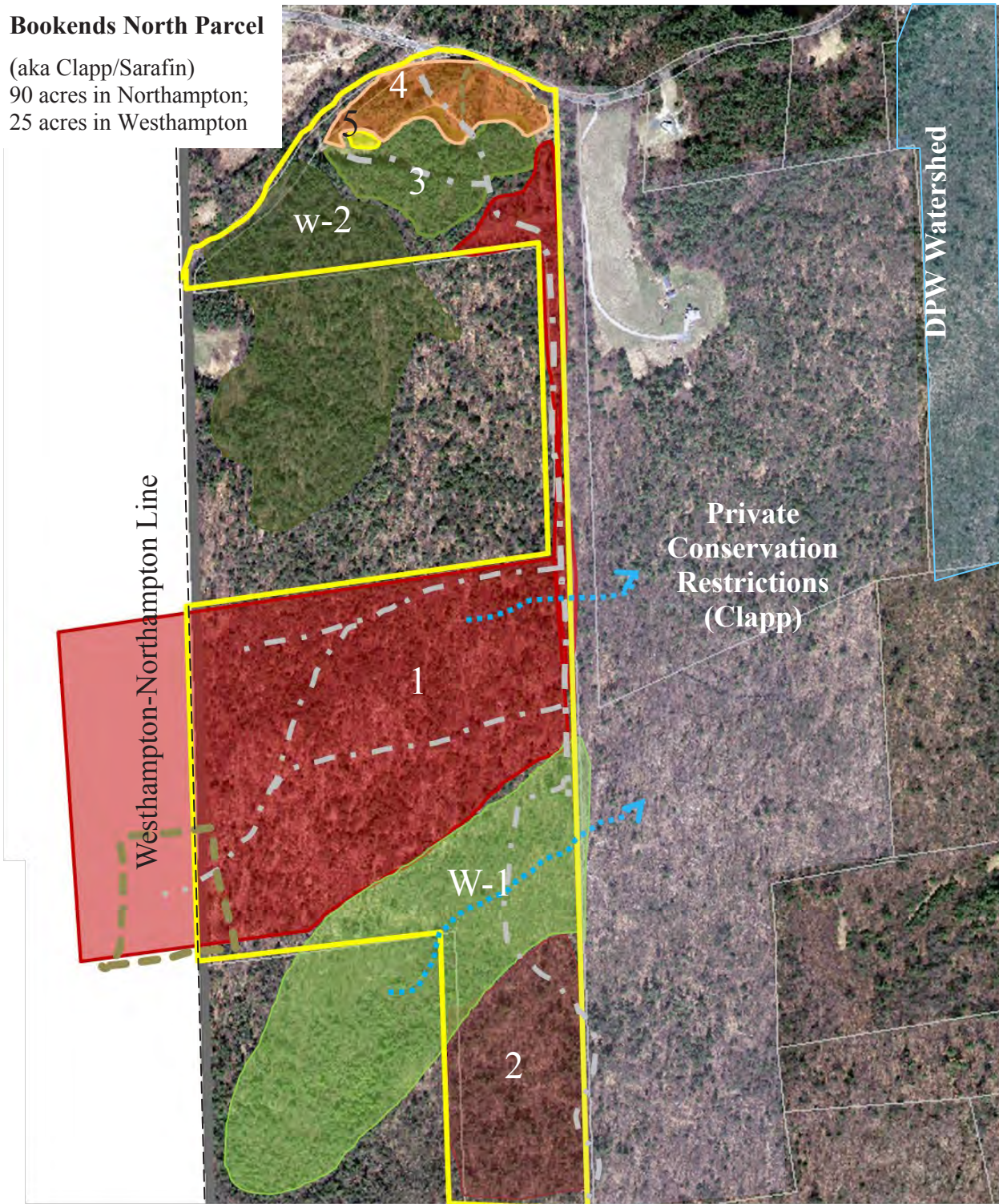
These two aerial views show a bigger view of the Bookend parcel, the Clapp CRs properties and vicinity in 1965 and in 2013.

Bookends North Parcel

(aka Clapp/Sarafin)

90 acres in Northampton;

25 acres in Westhampton

**Vegetation Patterns**

- 1: Hardwood dominated (logged 2006-2012), mostly level w1: Hemlock/yellow birch swamp
 2: Hemlock/hardwood mix (logged 2006-2012), 25-35% slope w2: Hemlock dominated swamp/perched wetland
 3: Successional white pine
 4: Former pasture/brushy field/invasives
 5: Log landing/open grasses & goldenrods

Vegetation Patterns

Except for a steep slope at the south end, most of this 90-acre property is fairly level, with mild slopes and no exposed bedrock. The land is mostly uplands (75 acres), with only two small wooded swamps. Aside from two small clearings that have been kept open by log landings and ATV use, the rest of the property is forested.

In spite of the property's relative uniformity, the composition of the canopy—thanks to the richer, deeper soils—is diverse. Oaks are the most abundant trees (red, black and white oak), but many other hardwoods are common (shagbark and pig-nut hickories, black and paper birch, red maple). The hardwood component of the canopy also includes minor amounts of ash, sugar maple, black cherry and yellow birch. White pine is also common and widely scattered throughout forest, and there is one good-sized stand that has grown up in an abandoned pasture. Hemlock too is found throughout much of the property, but, at least for now, it is most common in the property's two main wetlands—one in the interior of the property and the other along Montague Road. All of the hemlocks are affected by both hemlock woolly adelgid and scale.

What follows are more detailed descriptions of the vegetation patterns. These numbering and descriptions correspond to the vegetation patterns map on page 52.



Most of the property is fairly level, with only the north end of Bald Hill having any significant slope.

Uplands

Mixed Hardwoods—Level & Gently Sloping (1)

This mostly level area was cut repeatedly between 2006-2012 and includes a diverse mix of hardwoods, white pine and hemlock. Oaks are the most common (red oak, white oak, black oak) but hickory, red maple, and black birch are also widespread, and several other hardwood species occur in low numbers (black cherry, ash, sugar maple). Chestnut oak can also be found, especially along the drier ridges within the Westhampton portion, where some small rock outcrops are exposed.

Within this large block, the understory varies widely. In some sections (especially recently logged sites) there is a carpet of hayscented fern, while in many other areas, the ground layer is virtually absent. When herbaceous plants occur, the most frequently encountered are partridgeberry, Canada mayflower, starflower, common woodland aster, wild sarsaparilla, Indian pipe, bracken fern, New York fern and Christmas fern. The shrub layer is also variable. Mountain laurel is the most common, but witch hazel, maple-leaved viburnum, huckleberry and low-bush blueberry are patchy. Blackberry is abundant in the sunnier, logged clearings. In parts of the central section, the forest includes more hemlock (all dying), and dozens of young bittersweet seedlings were found growing below. Whether these plants will survive is unclear, but their establishment in the interior part of the forest was worrisome. Aside from this area, the only other non-native plants found were some Japanese barberry growing in the Westhampton portion and a single Asiatic bittersweet in a seepy spot.





A dying hemlock stand.



Bittersweet seedlings below the dying hemlock.

Hemlock/Red Oak/Mountain Laurel—Steep Slope (2)

The slope at the property's southern end is dominated by hemlock and red oak, but scattered throughout are a mix of other species, including black birch, red maple, hop hornbeam, hickory, American chestnut, white pine and chestnut oak (some good sized). The soils here are drier and more acidic, and the understory vegetation is patchy. Mountain laurel is the most abundant and witch hazel is common. The other shrubs here include huckleberry, lowbush blueberry and maple-leaved viburnum. The herbaceous layer is very thin. Starflower and partridgeberry are some of the only plants. What's "interesting" about this slope is that although it feels like you are deep in the forest and away from civilization. The trees along the boundary, however, have strands of barbed wire, indicating that this area was used as pasture decades ago.

So far, there are no invasive plants found within this patch of forest. There are, however, invasive insects. All of the hemlock here is dying due to the non-native hemlock woolly adelgid and hemlock scale.



Succession White Pine Stand (3)

This old white pine stand was cut fairly hard between 2006-2012 and is now thin and patchy. Red maple is common in the canopy and there is also some red oak. In the wake of logging, the forest understory has grown into a tangled mix of blackberry, witch hazel, hay-scented and lady fern. There is also an abundance of multiflora rose and Asiatic bittersweet, particularly along the stonewall that borders John Clapp's property. Regrettably the last cutting job left lots of slash and the trail is now blocked in many places.



Old pasture/Brushy Tangle & Log Landings (4 & 5)

Used as cow pasture by the Clapp family until the late 1980s, this area along Chesterfield and Montague Road has grown into a brushy mix, with dense stands of young white pine (no understory vegetation below) and deciduous species (staghorn sumac, red maple, black cherry, old apple trees, black birch). This area has the most serious invasive species problem within this 90-acre property. Mike Mauri, in his stewardship plan, estimated that non-native plants currently cover about 10% of this area. The most widespread and abundant are Asiatic bittersweet, multiflora rose and Morrow's honeysuckle, but Japanese barberry is also present. Two small areas in the old pasture are still open and grassy, and also include steplebush, sweetfern, dewberry, goldenrods, blackberry, and yarrow. These clearings have remained open because they were used as log landings or by ATVs.

Wetlands

Swamp Forest (w-1)

Dominated by yellow birch, hemlock and red maple, this seepy swamp forest is a headwater for Parson's Brook. Striped maple and witch hazel are common on the higher hummocks, while wetter places support winterberry, northern arrowwood and spicebush. The understory plants are typical of wooded swamps. Ferns include interrupted fern, New York fern, spinulose wood fern, crested shield fern, and sensitive fern, while the wildflowers include Virginia creeper, swamp dewberry, poison ivy, gold thread, turtlehead, spotted touch-me-not, foamflower, enchanter's nightshade, hog peanut and violets. There are no invasive plants growing here.

Hemlock Hardwood Swamp (w-2)

This small, shady swamp is dominated by hemlock, but also includes white pine, red maple, black birch, and occasionally yellow birch. The shrub layer is mostly absent, but includes sporadic patches of mountain laurel and witch hazel. The forest floor is full of wet, moss-covered rocks and seepy springs. Wildflowers include hellebore, wintergreen, foamflower, partridgeberry, poison ivy, golden ragwort, golden saxifrage and painted trillium. The ferns include spinulose woodfern and



Christmas fern. Ultimately this water coalesces into an intermittent stream, which drains under Montague Road and joins Roberts Meadow Brook. A barbed wire fence runs through this forest and along the trees bordering Montague Road, indicating that cows were allowed to roam through this wet area in the past. The hemlock is infested with woolly adelgid and scale and Japanese barberry, garlic mustard and multiflora rose can be found along the roadside edge.



Recommendations

1. Restore the former pasture/clearing at the intersection of Montague & Chesterfield Roads .

This project would make the management and control of invasive plants much easier and it would also improve the habitat for species in decline (e.g. wood turtle, American woodcock, savannah sparrow, kestrel and possibly bobolink, which nest successfully in the vicinity), reveal the historic stonewalls (now almost entirely hidden by brush), and possibly create an opportunity for a local farmer. The East Quabbin Land Trust, for instance, has a cooperative agreement with a beef farmer that has been a win: win for both parties. The farmer gets use of the land and in return is responsible for maintaining the field edges and controlling invasive plants.

Initially, a brontosaurus mower would be required, followed by annual (or every other year) disc cutting or brush hogging. The abutting owner, John Clapp, expressed interest in collaborating.

2. Control invasive plants in and around the former pasture.
3. Create a small parking area along Montague Road at the edge of the former log landing. (Trash would be a concern, but right now the only parking is along the roadside and suitable for only 1-2 cars.)
4. Work with the Friends of the Mineral Hills, nearby residents, AmeriCorps, Smith Vocational, the County Jail and/or other volunteers to restore the pre-existing trail system, fix erosion issues, and map the trails.

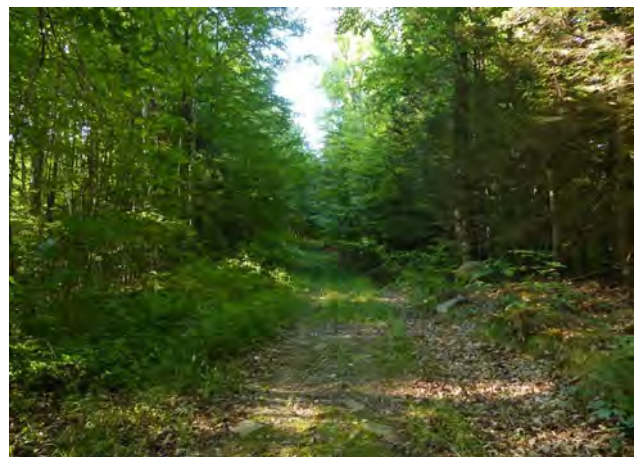
5. Secure permission to cross private land and formally link the trails between the Turkey Hill Road conservation land and this property.
6. Discuss with DPW the possibility of access to the ravine on the other side of Chesterfield Road, which is one of the most beautiful spots in Northampton.
7. Install a kiosk at the trailhead describing the history of the area.
8. Continue acquisition of adjacent parcels.
9. Encourage field walks and research projects in this area.
10. Enroll the land in the Forest Stewardship Program (as per the forest stewardship plan.)



Footpaths and wood roads that used to exist within this conservation area have been obscured by slash left after the last logging job. Unless they are re-opened soon, they will disappear as the vegetation grows in.



This is one of the few places where erosion occurs along the main wood road. It could be improved with a few water bars.



This wood road heads south and connects to the trail system in the conservation land along Turkey Hill Road. Although mostly free of invasive plants, Asiatic bittersweet and multi-flora rose occur in this stretch as the trail enters the forest from the old pasture.



Along the narrowest section of this property is one small area with sweeter soils. Growing here is a mix of sugar maple, Christmas fern, hazelnut, maidenhair fern and spicebush. There is also some Asiatic bittersweet and Japanese barberry near a small intermittent stream (right).



Although these 90 acres have been recently been logged, the cutting was a shelterwood and there are still many good sized trees within the forest. Even bigger trees can be found along the property's borders and its corners, like this old white oak. There are also a few very large red oak, black birch, and bitternut hickory along the wood road near the old pasture.



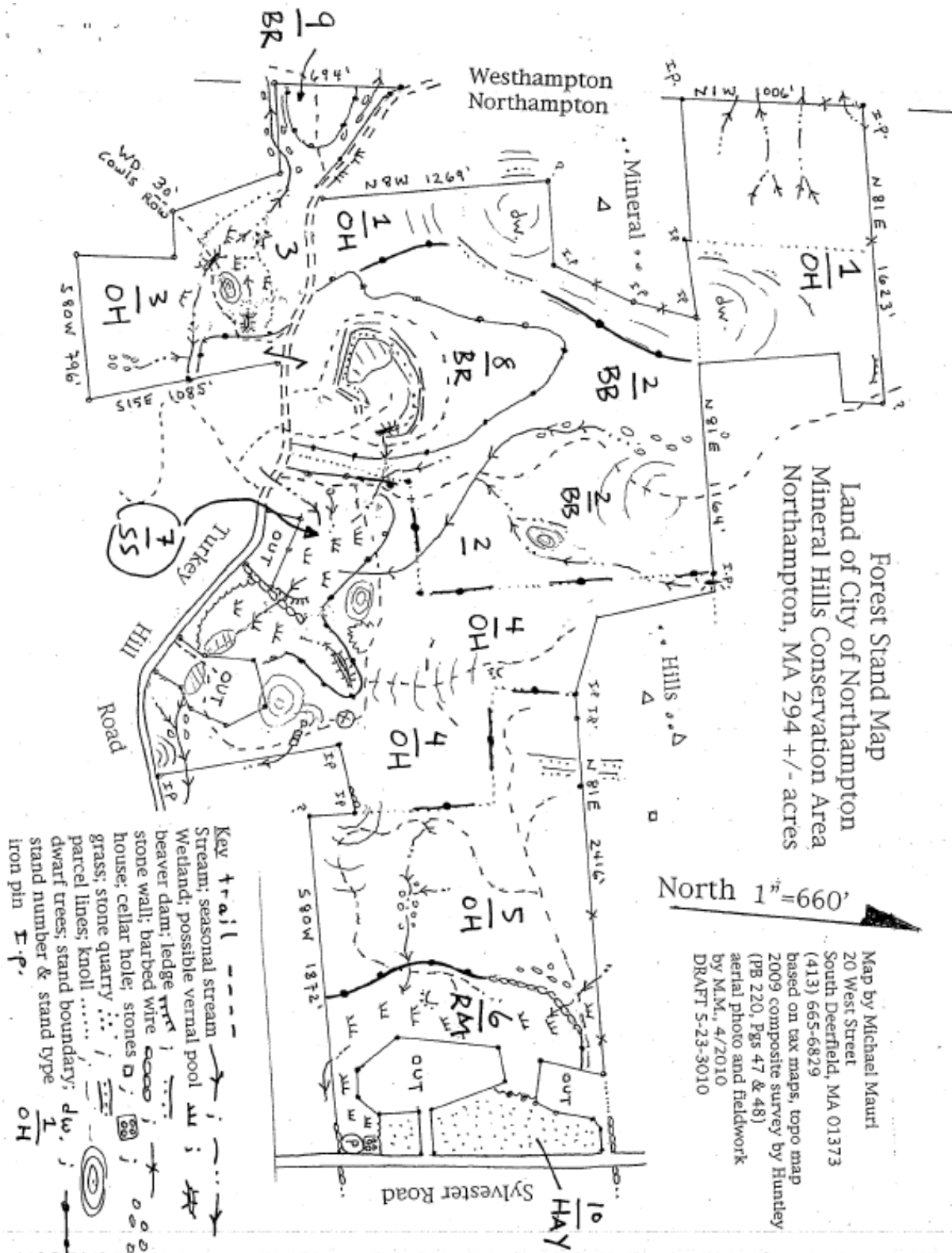


The property in 1952. At the top of the image is the upper reservoir, Chesterfield Road, and the original Clapp family farm house. To the south, the now-abandoned telephone & telegraph right-of-way can be seen cutting east-west across the forest and pasture. In the lower left is a former pasture that is growing in. Bald Hill is further south and outside of this image.

Appendix 1

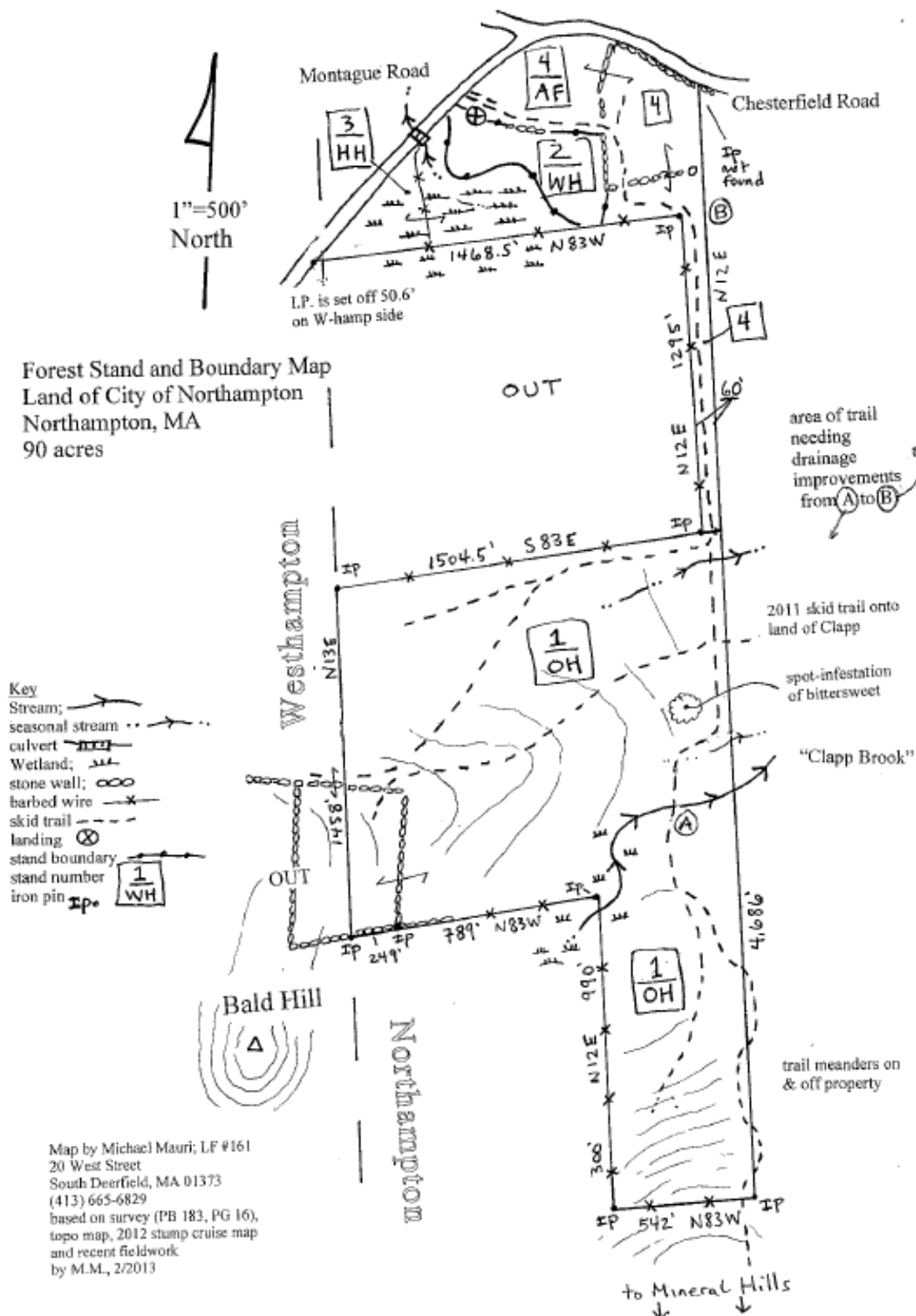
Forest Stand Map—Turkey Hill Road Vicinity

Prepared by Mike Mauri



Appendix 2

Forest Stand Map—The Bookends Parcel (formerly Sarafin) Prepared by Mike Mauri



Part 3: A Natural History of the Ridge Mineral Hills Greenway





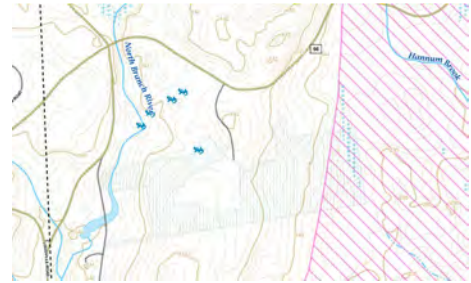
The Ridge

This 36.5 acre property was acquired as conservation land in 2005, not through strategic planning, but as a condition of a cluster subdivision. That's seldom the best way to gain new conservation land, but fortunately this property—although not a heart-stopper—is in good condition and has qualities that make it, from a conservation-perspective, fairly interesting:

- A portion of it lies within a Zone II Aquifer Protection Zone;
- Another section is within Core Aquatic Habitat;
- It contains a vernal pool;
- It includes a short stretch along the Manhan River.

In addition, from a management and stewardship perspective, it has few invasive plant problems and its new trails, although disconnected and oddly laid out, are in good condition.

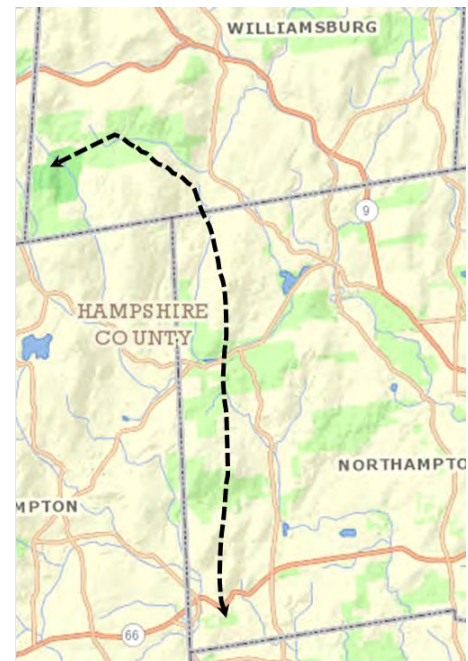
And here's something else that's interesting: it is part of a much larger forested block and from here, you could walk north for more than five miles through the woods and only cross two roads before reaching the Williamsburg line, where you could hike another two miles to the Brewer Brook Wildlife Management Area.



The eastern edge of the conservation area lies within a Zone II Aquifer Protection Area.
Map data from MA GIS.



A small portion on the western boundary along the Manhan River is within MA NHESP's Core Aquatic Habitat.

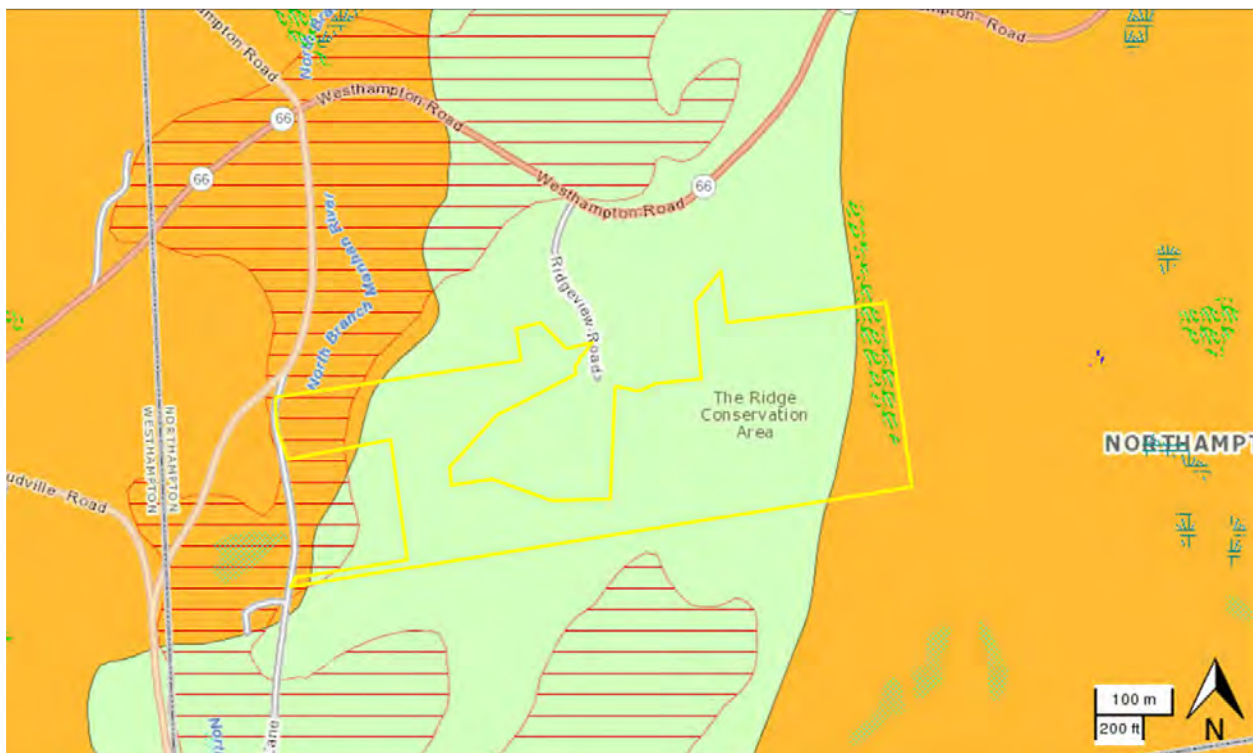


Introduction

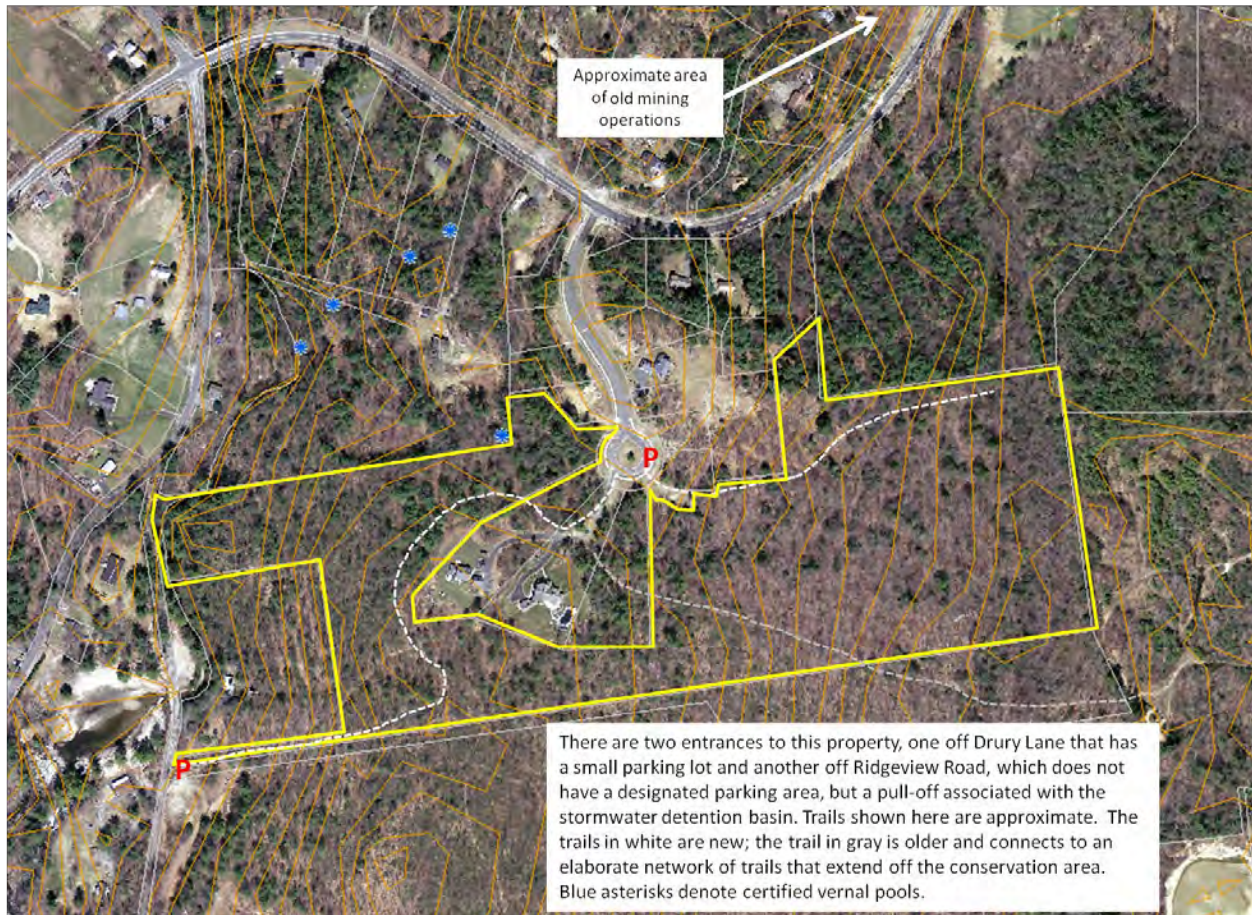
The Ridge, in spite of its current name, it is not located on a ridge, but on the side slopes of one of the southernmost knobs in the Mineral Hills. These hills are the erosional remnants of once-great mountains that formed roughly 450 million years ago and are composed of metamorphic rocks with igneous intrusions. Within the conservation area, bedrock is exposed in only two places—along Ridge View Road where there is a small outcrop and along the Man-han River, where there are more extensive outcrops. All the other bedrock on the property is hidden under glacial till, and on the lowest slopes, the till itself has been covered by coarse, wa-



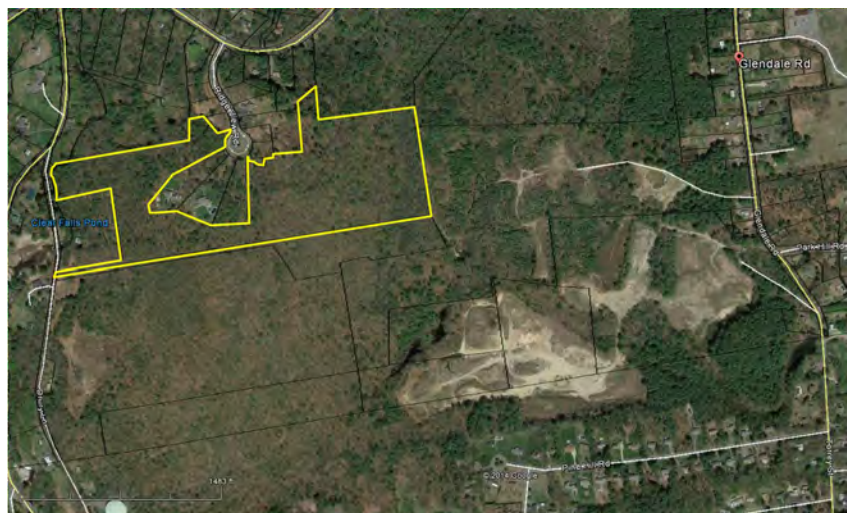
ter-sorted sediments. These sediments were deposited 15,000-12,400 years ago, during the time of glacial Lake Hitchcock, when glacially-charged rivers and streams deposited vast amounts of sand and gravel around this knob and created extensive outwash plains that stretched from here to Florence and into Easthampton.



Red lines show bedrock close to the surface, light green is glacial till, orange is glacial outwash. Data from MA GIS.



During the last 10,000 years, the Manhan River has carried away most of the sandy deposits that lay on the west side of the property. On the east side, the sand has also been “carried away,” but much more recently. Beginning in the 1950s, several sand and gravel pits got underway in Northampton’s southwestern corner. In the 1960s, additional small gravel pits opened on the land just east of the conservation area and during the 1970s and 80s, they were significantly expanded. To-



Extensive gravel pits are located to the east and southeast of the conservation area in the former glacial outwash.

day most of the mining on the adjacent land has ceased, and large portions of the landscape have begun to grow back into wet meadows and brush.

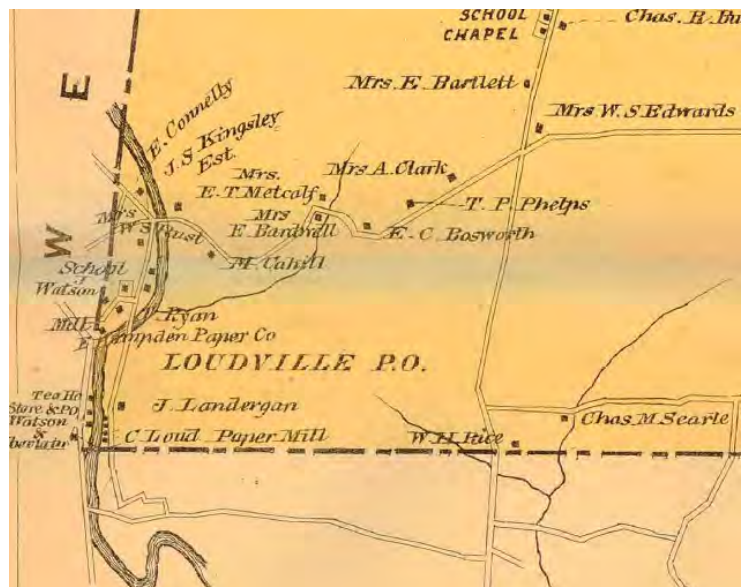
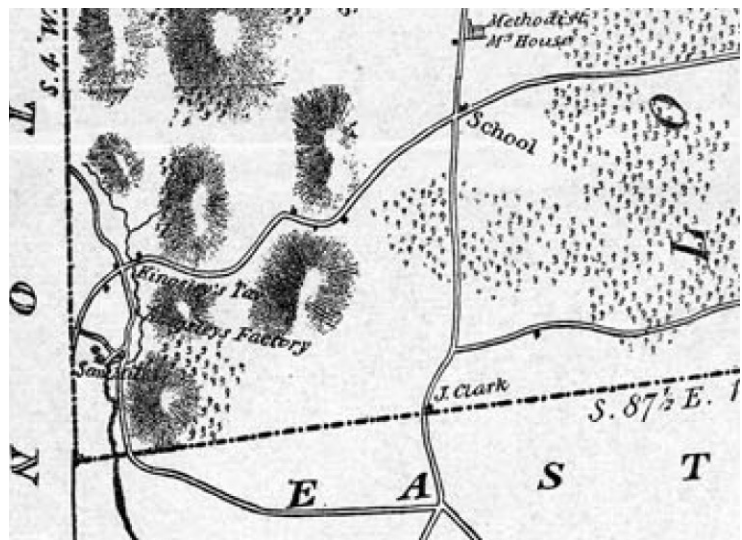
Human History

Even though it lies more than four miles from the center of Northampton, this part of town attracted attention early on in the City's history. In 1685, Robert Lyman of Northampton discovered lead in the form of galena along an outcrop near the Manhan River. The site lay just a few hundred yards downstream from the current conservation area, and for the next two centuries various mining companies worked the claim. Other nearby sites were also explored for minerals, and although none of them were very successful, the region became known as the Mineral Hills.

By the early 19th century, this area was not only a mining district, but also a factory village. The power of the Manhan was tapped and by 1831, the village supported a sawmill, a factory, tenant housing and a tavern. The village eventually became known as Loudville (named for the Loud family) and after the last mining operation failed in 1865, it con-



The beautiful orchid known as rose pogonia grows on the wet soils of the former gravel pits not far from the conservation area.



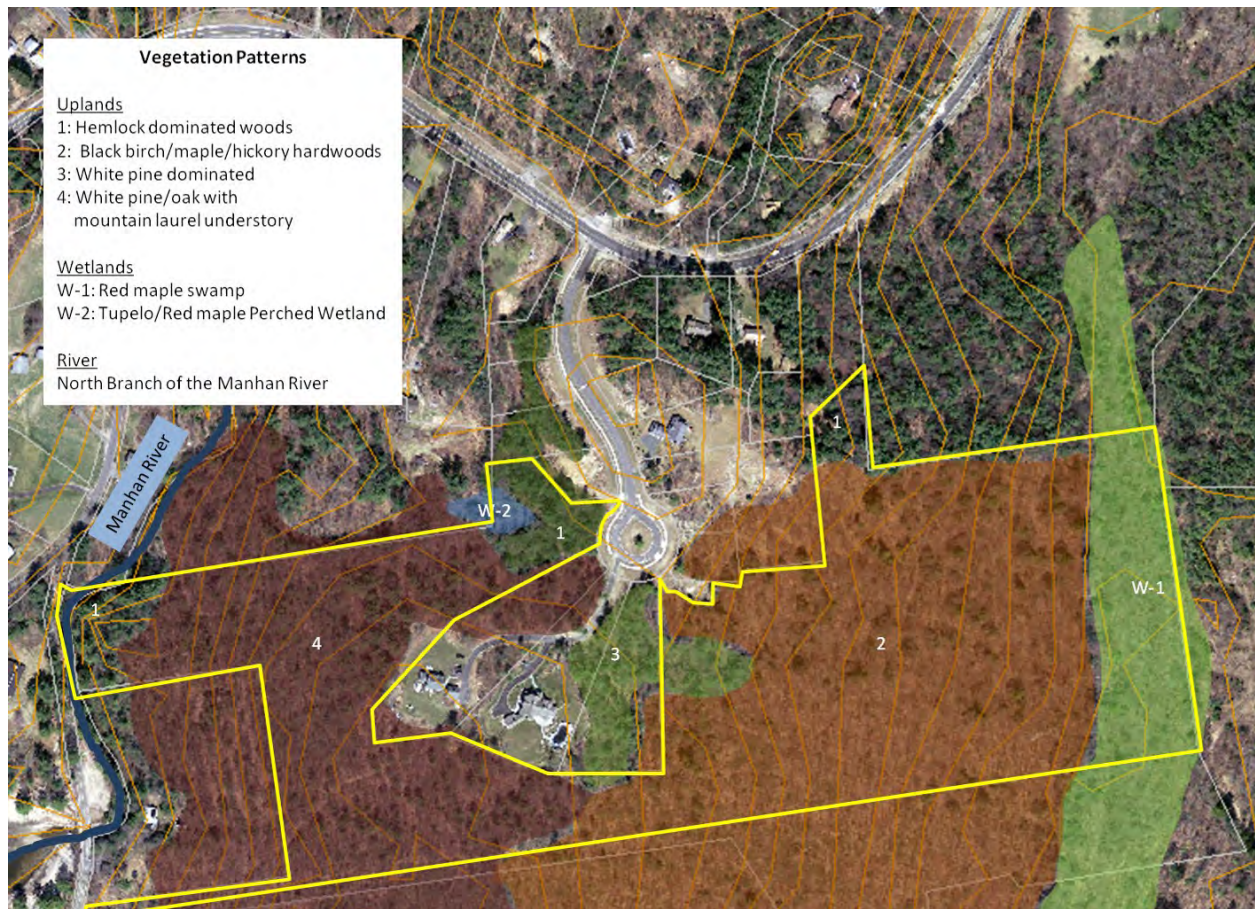
The 1831 map (above) and the 1884 map (below) show big changes in Loudville during the industrial revolution.

tinued to bustle. By 1884, it boasted three mills, two of which were producing paper, plus a school and post office. But, not unlike Leeds and Baystate, its industries folded in the early 1900s when steam and electricity replaced the need for water-power. The village, however, continued to sputter along, finally losing its post office in the 1950s and its local grocery in the 1960s.

Vegetation Patterns

Like most of Northampton and Massachusetts, the land that now forms the conservation area was probably completely cleared by the early 1800s—partly to feed the nearby sawmills, partly to feed the home fires, and partly to create pasture for sheep and cows. Although no stonewalls were found on the property, old strands of wire fencing tell a history of pasture use.

Just when the land began to grow back into forest is unclear, but based on aerial photos from the 1950s and 60s, this block of land has been forested for decades. That said, it is hardly uniform.



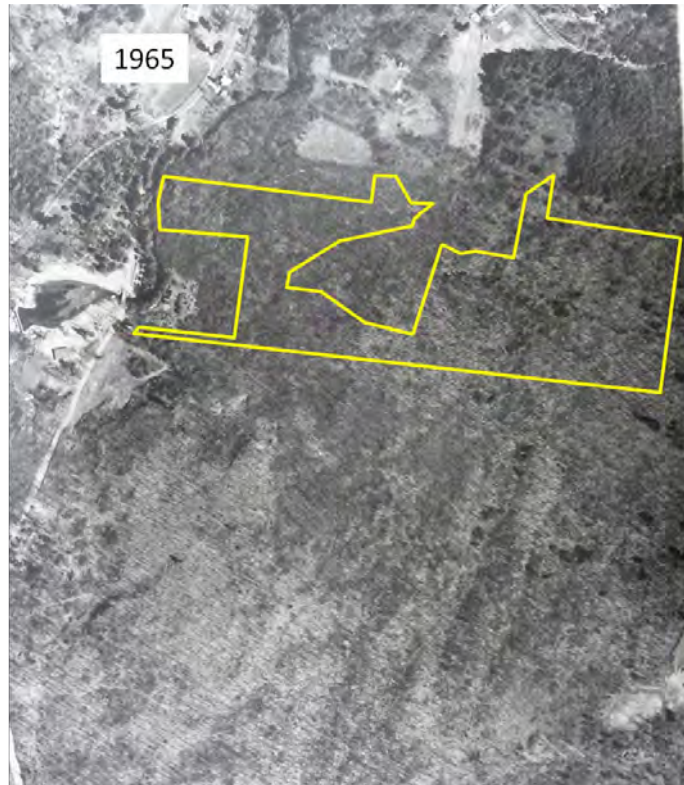
Its drier, steeper western half is covered with oak, hemlock, and dense thickets of mountain laurel. Its wetter, more gently sloping eastern half is dominated by deciduous hardwoods and a few patches of hemlock and white pine.

Looking closer still, the land can be divided into six major plant communities (four upland and two wetland) and the newer trails intercept four of these communities. What follows is a tour of the property's vegetation patterns—from the trails and with a little bushwhacking.

Upland Forests-Wetter Eastern Slope ***(Ridgeview Road entrance)***

From Ridgeview Road, just past the stormwater detention basin, is the entry to one of the property's two new trails. From the top of the hill, it heads east, downslope, through a mixed forest of black birch, oak, hemlock, and red maple, with a scattering of black cherry and hickory. Patches of mountain laurel and maple-leaved viburnum are common in the

shrub layer, and growing along the forest floor are broad carpets of hayscented fern, swaths of New York fern and clusters of Christmas fern. A variety of common woodland wildflowers can also be seen, including Indian cucumber root, star flower, whorled loosestrife, true solomon's seal, Virginia creeper, and false solomon's seal. In a couple places, the trail intercepts seepy



A swath of hayscented ferns covers the ground below a mixed hardwood-hemlock forest.

clearings, and then the vegetation shifts to a mix of wetland specialists, including cinnamon fern, interrupted fern, touch-me-not, soft rush (*Juncus effusus*), grasses and sedges.

The trail itself is one of the few places on the entire property where invasive non-native plants are found. A handful of young Asiatic bittersweet and multiflora rose bushes have established along its sunny border. A few other non-native plants have also seeded in, but none of them are species that invade into natural, undisturbed woods.

As the trail descends, it intercepts richer soils where sugar maple, beech and even a few tulip trees join the dominant mix of black birch and red maple. The variety of wildflowers also shifts to include wild



An old fence post strung with barbed wire reveals the pasture history of this part of property.

oats, dwarf ginseng, red trillium and grape—all of them botanical indicators of sweeter soils.



Top photo: There is little understory beneath the dense stand of hemlock.

Middle Photo: Christmas fern is a common species at the conservation area.

Bottom Photo: Depending on where you are, the canopy is dominated by all hardwoods, a mix of hardwoods, white pine and hemlock, or pure stands of either hemlock or white pine.

At the toe of the slope, near the north-eastern corner of the property, the trail suddenly, unexpectedly and bafflingly ends. To the left (north) is a large stand of dying hemlock (mostly off the property) and to the southeast (on the property's boundary), a red maple swamp. The swamp begins where the heavier till soils intercept the sandier glacial outwash deposits, which overlie a thin layer of glacial Lake Hitchcock clays.

Swamps are almost always interesting places to explore, and this is an attractive one, with mossy hummocks and luxuriant vegetation. In addition to red maple, the canopy includes elm, yellow birch, hemlock, and ash and the shrub layer has tangles of winterberry, small patches of mountain laurel and loads of spicebush. In terms of plants, this wetland is the most diverse habitat on the property, with a variety of ferns and wildflowers (sensitive fern, cinnamon fern, turtlehead, gold thread, marsh marigold, foamflower, hog peanut, halberd-leaved tearthumb, Virginia creeper, false nettle, hellebore, jack-in-the-pulpit, fringed loosestrife, swamp dewberry, poison ivy). The wetland also includes a few non-native plants—



Top Photo: The swamp at the property's eastern edge has small pools. The sphagnum hummocks might provide nesting habitat for four-toed salamanders.

Middle & Bottom Photos: Cut stumps and abundant resprouts document a logging job on the property during the last two decades.



A spicebush swallowtail lays eggs on a sassafras in the forest.



A view of the forest below the cul-de-sac.

multiflora rose, Japanese barberry, one Asiatic bittersweet and surprisingly, some moneywort. These are all, for now, in low numbers and could easily be yanked out.

From the wetland, the remaining section of woods (i.e. the south and east of the cul-de-sac) requires bushwhacking. This forest was logged during the last twenty five years, and in the aftermath of cutting, witch hazel and black birch have rebounded. The herb layer is highly variable; in some places there is al-



Just off the property, a network of trails connect to the gravel ponds to the east and are regularly used—and abused—by ATVs.

most no vegetation, in others, the ground is hidden by ferns. Christmas fern, New York fern and lady fern are the most common in the drier areas, while spinulose wood fern dominates the hillside seeps. Near the cul-de-sac is a stand of white pine and the remnants of a trail. This section of the trail was discontinued once the cul-de-sac was built, but following it downslope, it connects with trails that are actively used by ATVs and lead to the old sandpits off Glendale Road in one direction and to the trail off Drury Lane in the other.

Upland Forests—Drier West Slope (*Drury Lane Entrance*)

Although you can continue bushwhacking over to the forest on the western slope, it is most easily seen and explored by the trail that begins on Drury Lane.

Beginning at the parking area, the vegetation around this spot is different than elsewhere on the property and supports a mix of species that do well in open, sunny, disturbed locations. Most of these are either native (big-toothed aspen, witch hazel, poison ivy, bracken) or non-native species that aren't too invasive (daisy fleabane, black locust.) There is, however, some Asiatic bittersweet growing here, as well as on barberry and one autumn olive.



The trail from Drury Lane leads up a gentle slope, past thick mountain laurel and oak woods.



American chestnut used to be a common component of this forest.

From here, the broad trail climbs up a gradual slope and through a forest of white pine, oaks, red maple and scattered sassafras. The shrub layer is abundant and dominated by mountain laurel. Witch hazel and maple-leaved viburnum are also common. In contrast, the understory vegetation is generally sparse, although a few big patches of wintergreen, whorled loosestrife and low-bush blueberries can be found.

As the land levels off, the trail bears left at the intersection with an old wood road. To the west (on your left), the land is steep and overwhelmingly oak, with scattered pine, red maple and black birch and an understory dominated by mountain laurel.

The trail exits along a shared driveway—and the barking dog that belongs to a nearby home—and then continues a short distance to Ridgeview Road.

From here, it is possible to bushwhack back into the forest to visit the vernal pool, which is located a couple hundred feet in from the road and along the property's boundary. Located in a shallow bedrock depression, the pool is surrounded by tupelo and red maple and an understory of highbush blueberry, sheep laurel, chokeberry, and mountain laurel. Cinnamon fern is abundant and this is one of the few sites in Northampton for catbriar (*Smilax rotundifolia*), which is unusual to find in Northampton. It is a more southern and coastal species.



Poke milkweed occurs occasionally in Northampton and grows along the trailside at this conservation area.



The view from the top of the rock outcrop near the Manhan River reveal a forest dominated by oak with a thick tangle of mountain laurel in the understory.



Views of the North Branch of the Manhan River (A, B, C), including Japanese knotweed along the banks (D). The riverbank also supports a relatively uncommon plant in Northampton called honeysuckle (E), and the rocks and nearby shaded outcrops have polypody fern growing on them (F).

North Branch of the Manhan

The final and most interesting habitat is the short stretch of the Manhan River. Rich in history, it's also ecologically important—its highly-oxygenated waters are classified as a “cold water fishery” and falls within the state’s Biomap Core Aquatic Habitat.

It's also very pretty. The bottom of the river is a mix of sand, gravel and boulders with bedrock outcrops and moss-covered banks bordering the hemlock-lined brook. Unfortunately there are also a few small patches of Japanese knotweed growing on the banks. The population of this invasive is still small enough within the conservation area that it could be controlled, but further downstream, off the conservation area, it has taken over the riparian corridor.

Wildlife

This conservation area provides habitat for a wide range of animals, from common species, like deer to much rarer ones, like box turtles. It also provides important habitat for amphibians and vernal pool specialists. Its single vernal pool is breeding habitat for wood frogs and spotted salamanders and it is more valuable because of its proximity to four other certified pools. The river habitat also enhances the property's value to wildlife, as does its connectivity to other undeveloped land.



A box turtle lays her eggs in the gravels of a nearby property.



A male wood frog in a breeding pool.



American toads live in the conservation area.

Recommendations

As the southern bookend to the jigsaw puzzle of protected land along the Mineral Hills, this parcel adds to the overall diversity of Northampton's protected lands. Its value to wildlife—and people—will increase if more of the adjacent land can be protected, especially the sand barren habitat to the east, Turkey Hill to the north and more land along the North Branch of the Manhan River. In addition, it is recommended to:

1. Control the Japanese knotweed along the Manhan River and the other invasive species along the trails (Asiatic bittersweet) and in the red maple swamp (multiflora rose, Japanese barberry, moneywort)
2. Re-route the trail away from the houses and create a connecting loop and trail to the Manhan River.
3. Organize a field walk to introduce residents to the natural and human history of this seldom visited conservation area.
4. Monitor for Japanese stilt grass, which has been found within $\frac{1}{4}$ mile of the conservation area.



The conservation area in context to other protected land in Westhampton, Easthampton and other parcels in Northampton. The higher knob due north is currently unprotected and one of the most interesting areas ecologically, with impressive outcrops, talus slopes, hickory-hop hornbeam forests, and richer oak woods. At least three state-listed species are known from this unprotected hilltop, which also offers impressive views and an existing network of trails.



Stilt grass, in this case growing along Bassett Brook in Easthampton (2014).

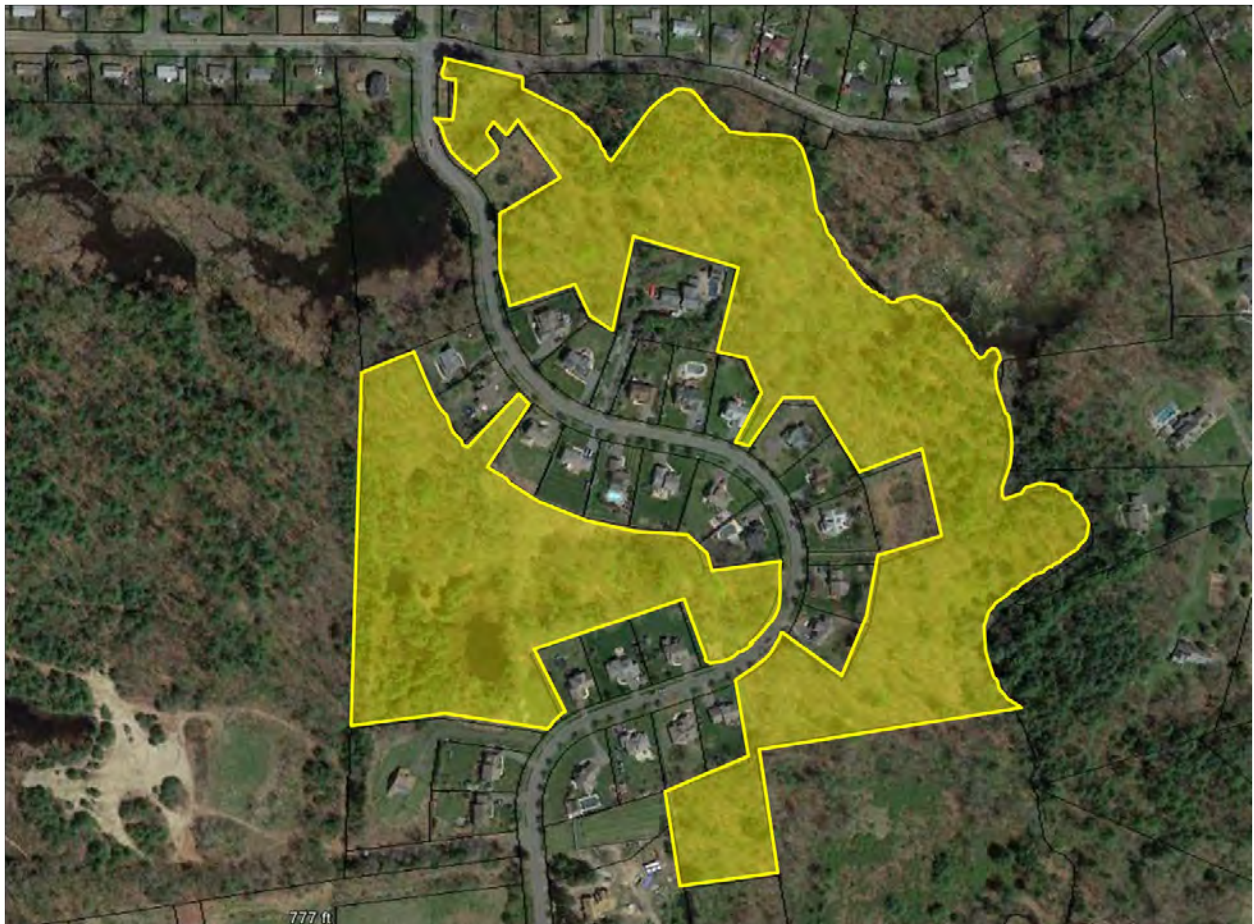
9 A Natural History of the Parson's Brook Greenway





Parson's Brook Greenway

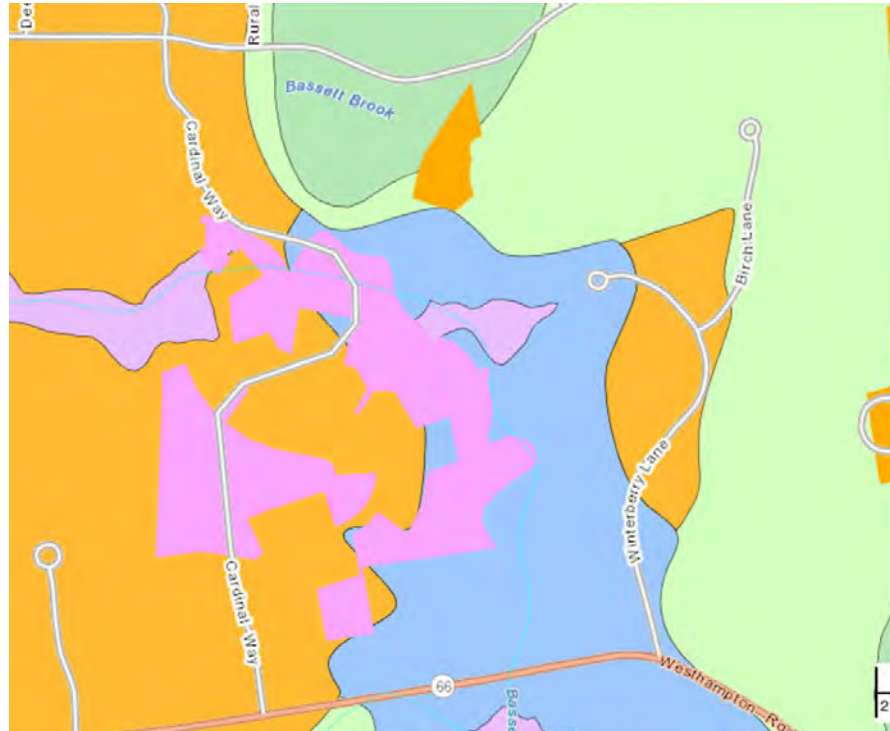
Protected in 2005 as a condition of a cluster subdivision, this 27-acre conservation area is split into two sections, ten acres on one side of the subdivision road and 17 acres on the other. Not only is the conservation area physically divided, but the two sections are very different in character and composition. The ten-acre block contains a mix of habitats that have developed on old gravel pits and clearings, while the other section has a combination of young forest, older forest and Parson's Brook itself. The brook is the highlight of the conservation area. And even though there are roads and homes nearby, walking along this shaded corridor feels like you're in a remote, wild place.



Geology

Fifteen thousand years ago, this site was under about 30 feet of ice-cold, glacial lake water. It was far enough from the shoreline and deep enough to accumulate lots of fine silt that became clay layers, deposited on top of an underlying rocky, glacial till. Eventually the lake level dropped and the glacial clays were overtopped with coarse sands and gravels as this landscape became part of a vast outwash plain that covered most of southwestern Northampton.

In the intervening 12,000 years, Parson's Brook has cut down through both the sands and the underlying glacial lake clays. Today at the bottom of the brook, what you find are the rounded rocks and boulders left behind as glacial till and in one small stretch, one of the few exposures in Northampton of the underlying bedrock—200-million year old red



Surficial geology and the conservation area overlaid. Darkest green= drumlin; lighter green= till; orange=glacial outwash sands; blue= glacial lake Hitchcock clays; light pink—recent alluvium along Parson's Brook; magenta= overlay of conservation area. *From Mass GIS.*

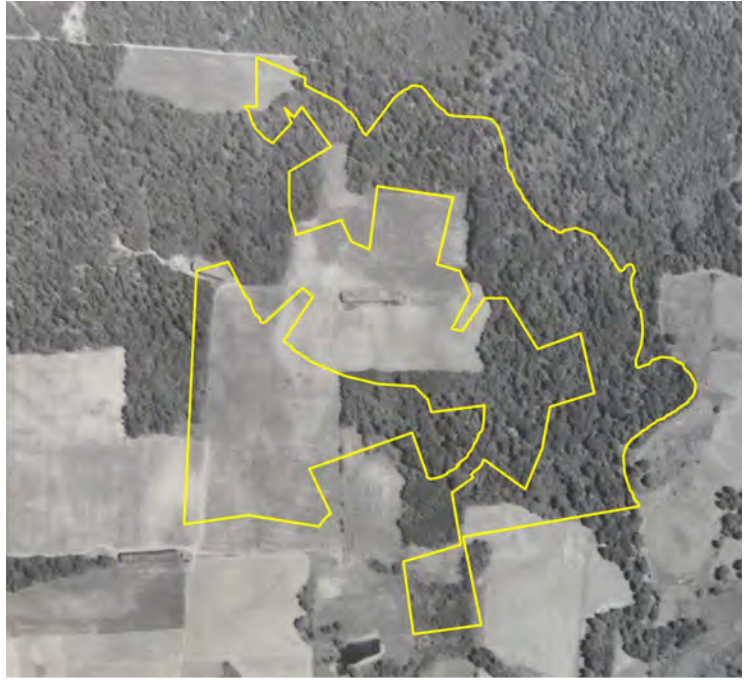


Remnants of an old dam in the distance, with brook flowing in sheets over the exposure of 200-million year old sandstone. A few glacially-rounded cobbles can be seen along the margin of the brook.

Human History

The property's glacial history has profoundly affected how the landscape was used by people and even the vegetation patterns we see today. For instance, in the aftermath of fires set by the local Native Americans, the broad plains of glacial outwash would have developed into sand plains and pine barrens, dominated by fire-adapted species like pitch pine, white pine, oaks, low-bush blueberries and grasses dominating. In contrast, the tighter soils derived from the glacial lake deposits and more recent organics would have supported a much more diverse flora, including sugar maple, ash, Canada yew, and wood horsetail.

Based on the sandy soils and what we know of the Nonotuck's use of fire, it is likely that they burned this landscape every few years. The practice of burning continued even after the English arrived, who, like the Nonotuck before them, wanted to keep down the under-brush, in this case to provide forage for cattle and swine. And although this area was several miles from the original home lots, the pine forests that grew in this part of town would have been familiar to the early residents. Not only were the pine and oak used for timber and firewood, but the resinous branches and knots from the white pine and pitch pine



The outlines of the conservation area on the landscape in 1952, when it was mostly open farms and forest (*above*) and a few years later when gravel operations had begun to the south and west (*below*). *Historic aerial photos courtesy of Northampton DPW.*



it was a precious commodity, with most of the collecting done in the fall. In fact, it was so valuable that as early as 1662, Northampton residents passed a series of orders that restricted the collection of candlewood within seven miles of the meeting house.

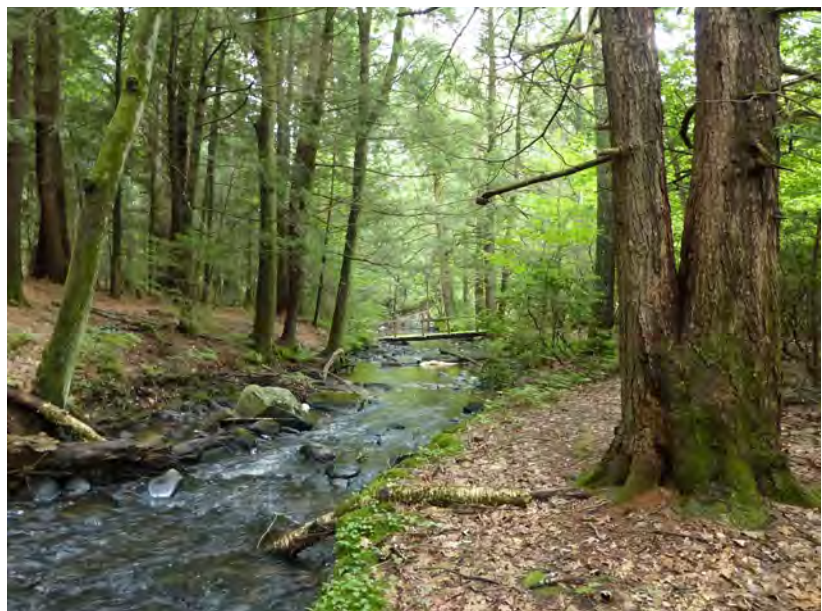
By the 1720s, all of this land, which had once been held in common, had been divvied up and sold to individuals. By the 19th century, all of the good timber in this part of Northampton had been cut, but because the sandy soils made for poor farming, the area remained thinly settled in spite of being cleared. In fact, it wasn't until the 1930s that more people began moving into this part of town.

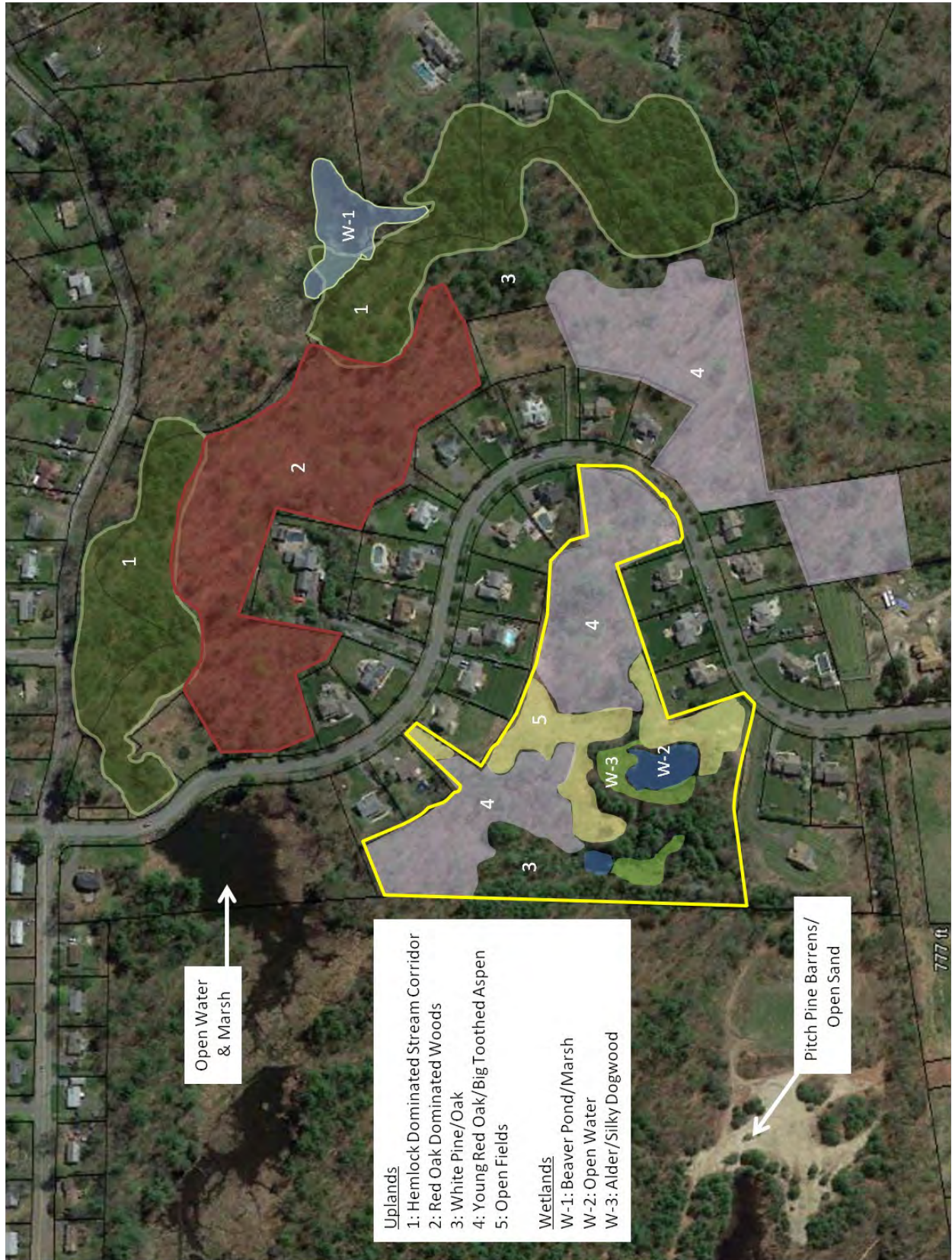
By the end of WWII, this conservation site was part of a farm and a large portion of it had been converted to hayfields. In the 1950s, a number of sand and gravel operations began mining the thick sand deposits in the vicinity and by 1965 a small sand and gravel operation began in this property's southeast corner. This operation gradually expanded west, and by the time the subdivision was proposed, some of the abandoned gravel pits had been regraded and were growing back into grasses and brush, while others were still fresh scars on the landscape. As part of allowing for smaller lots in a cluster subdivision, one of the conditions for approving the development was the donation of land; in this case, seventeen acres on one side of the road and ten acres on the other.

Vegetation Patterns

In the decade since the land was set aside as a conservation area, the property has been unmanaged and now supports a mix of old fields, young forest, older forest, three small ponds, shrubby wetlands, seepy hollows, part of a beaver pond, and Parson's Brook (see *Vegetation Map on next page*).

Due to its history of alteration, it also supports an ever expanding amount of invasive plants, including loads of autumn olive and multiflora rose, as well as an abundance of Morrow's honeysuckle and Asiatic bittersweet. There are also lesser amounts of glossy buckthorn, Japanese barberry, *Phragmites* and purple loosestrife. In 2014, many of the





purple loosestrife plants had been attacked by weevils, their leaves were brown and riddled with holes and their flowering stalks were absent or substantially reduced.

Because the character of the two parcels is so different, their natural histories are described separately.



Parson's Brook Section (17 acres)

Along Cardinal Way, there are three places where the conservation area bumps out and meets the edge of the road, but probably the nicest and easiest way to explore this part of the property is to take the small, unmarked trail that begins at the north end of the property near the intersection with Burt's Pit Road. Not far behind the stormwater detention pond, the trail leads through a slice of the older oak forest and down the bank to the edge of Parson's Brook. From there, the trail follows the brook downstream, running almost half a mile before looping back to Cardinal Way through a section of young forest.



Along this entire stretch, Parson's Brook is beautiful—clear and meandering, with moss-covered banks and a bottom of sand and rock. Over the last ten thousand years, the brook has carved down through the overtopping sands, through the narrow layers of glacial lake clay and into the rocky till below. In one short stretch, you can see the remnants of an old dam (just off the conservation area and on the other side of the brook), which was built here long ago because of an exposure of bedrock, in this case, the tilted

beds of 200 million year old red sandstone. This is one of only five places in Northampton that has an exposure of late Jurassic-aged sandstone, and the only one in a conservation area.

Several hundred feet further, a shaded hemlock border gives way and the brook flows into a beaver pond that was abandoned this year. Although most of the wetland is on the abutting property, it is an excellent place to watch for wildlife, especially from the trail, which after crossing a small, seepy marsh (lousy with multiflora rose), climbs to the top of a hill. This is a perfect place to sit and observe the goings-on in the marsh.

Leaving the beaver pond, the trail continues along the edge of the ridge, through a mix of hemlock and forest. The trail forks and you can take an old bridge across to the homes on Winterberry Lane or loop back to the road. This section crosses the sandier, more acidic soils that were left behind after the gravel operations, and the flora reflects land use history, soil conditions, and hydrology. The forest is younger and dominated by oak and aspen. Old drainage channels cut through the young forest, and Asiatic bittersweet is common here. More detailed descriptions of the plant communities in this portion of the conservation area follow (see Vegetation Map):



1. *Forest Edge Near Stormwater Detention Basin (Near Cardinal Way/ Burt's Pit Road):* This narrow strip includes a mix of black cherry, white pine, oak, red maple, and chestnut, with an understory of staghorn sumac, autumn olive, multiflora rose, Asiatic bittersweet, bracken fern, goldenrod and Queen Anne's lace. Along Burt's Pit is a



A seep, rife with vegetation.

small area with basswood, sugar maple and Canada yew; all species that document the influence of the richer soils that developed on the silts and clay deposits left by Glacial Lake Hitchcock.

2. *Brook at culvert crossing:* Lined with speckled alder, with some multiflora rose and Morrow's honeysuckle creeping in. Coltsfoot along banks. The brook itself contains riprap, as well as *Phragmites*, burreed, cattails.



3. *Sunnier Margins of Brook:* Cinnamon fern, fringed loosestrife, Joe Pye weed, boneset, hayscented fern, alder, enchanter's nightshade, lots of grape and multiflora rose, as well as Asiatic bittersweet, glossy buckthorn, and purple loosestrife.



4. *Forested Margins of Brook:* Hemlock, tupelo, red maple, winterberry, New York fern, hayscented fern, bracken, royal fern, wild azalea, mountain laurel, and many other species (lady fern, wild oats, sensitive fern, and cinnamon fern).



5. *Seeps (multiple) Along Brook:* Red maple, ironwood, witch hazel, sugar maple, elderberry, wild raisin, with a rich herb flora, including false nettle, wood horsetail, marsh marigold, cinnamon fern, sensitive fern, halberd-leaved

tearthumb, fringed loosestrife, dodder, wild geranium, turtlehead, grasses, and a diversity of sedges. Garlic mustard is present in some of the seeps.

6. *Beaver Pond Edge*: Red maple, alder, mountain laurel, LOTS of multiflora rose, ironwood, silky dogwood, winterberry, Japanese barberry, Morrow's honeysuckle, a very rich and diverse herb layer (arrow-leaved tearthumb, several sedges, marsh horsetail, touch-me-not, scouring rush, cinnamon fern, reed canary grass), and occasional sugar maple.



7. *Below beaver dam*: Asiatic bittersweet, purple loosestrife, autumn olive, followed by a hemlock ravine.
8. *Older oak/white pine forest*: A mix of oaks (white, scarlet, red, black), white pine, red maple, gray birch, shagbark hickory, hemlock, black cherry, with witch hazel, maple-leaved viburnum, American hazelnut, mountain laurel, chokecherry, low-bush blueberries (*Vaccinium pallidum*, *V. angustifolium*) and occasional sheep laurel in the shrubby understory. The acidic soils below have few plants. Where present, they support starflower, partridgeberry, pipsissewa, wintergreen, woodland aster, Canada mayflower, fringed polygala, bracken fern, Lycopodium, and Pennsylvania sedge. One small patch along the road supports sugar maple, basswood and some Canada yew.



9. *Young forest behind houses in area of historic alteration and re-claimed old gravel pits*: A mix of big-toothed aspen, black birch, ash, abundant Asiatic bittersweet and Morrow's honeysuckle.

The western 10 acres in 1986, with gravel operations in full swing. Note the beginnings of the ponds. Aerial photo, courtesy of Northampton DPW.

West of Cardinal Way (10 acres)

This area is a mix of early successional habitats (old fields, young forest) with some wetland areas and open water. The ponds were excavated decades ago and are fed by groundwater. During periods of high water, these areas drain into Parson's Brook, passing under Cardinal Way and through an open ditch. All of this area is underlain by glacial outwash and although groundwater is not far below the surface, the soils are acidic, droughty and nutrient poor.

Given its disturbance history, it is no surprise that this part of the conservation area has the greatest amount of invasive plants. Autumn olive forms a border along most of the edges and is widely scattered in this part of the property. Other common invasives include glossy buckthorn, multiflora rose, bittersweet and garlic mustard.

1. *Open water & adjacent wetlands:* This pond is ringed with *Phragmites* and speckled alder, but many other species are also present, including white pine, red maple, gray birch, staghorn sumac, silky dogwood, willow,



and multiflora rose, Asiatic bittersweet). The largest pond had a nesting pair of Canada geese and functions as a vernal pool.

2. *Open Field:* The field is transitioning to scrub, so that although there are lots of grasses and herbs, there are also lots of young cottonwood. Raspberry, black locust, quaking aspen, glossy buckthorn, autumn olive, and multiflora rose are creeping in and around the forested edges.



3. *Young Forest:* This former hayfield was manipulated during the era of gravel operations, but just how it was used is unclear. There are some large earthen berms, which may be the scraped off topsoil from other nearby gravel operations. A small trail cuts through this area and connects to the network of larger ATV trails that extend all the way to Willard's Gravel operation, nearly a mile away. Since it was abandoned, this part of the property has grown into a young forest mostly consisting of white pine, with lesser amounts of gray birch, black locust and cottonwood. Garlic mustard is common in places, while other herbaceous plants include wild strawberry, Christmas fern, dewberry, enchanter's nightshade and many others.



4. *Red Maple Forest:* Adjacent to the large open pond/marsh that lies beyond the conservation area's northern

boundary, this part of the property has developed into a very pretty, mostly open red maple forest. Black cherry is also common in the canopy, while the understory includes winterberry in the shrub layer and an abundance of ferns (royal, sensitive, lady, cinnamon, New York, hayscented, and interrupted.) Canada mayflower is also common, as is dewberry, false solomon's seal, red trillium, and several others. Since the beavers returned and built a dam, the soils here have become wetter than they have been since beavers were hunted out of the area in the 1700s.

Wildlife

This property supports a wide variety of animals, both resident species as well as those that just pass through, like migratory birds. In addition, the area along Parson's Brook falls within MA NHESP's "priority habitat for a rare species." For wildlife, the brook and its forested corridor are the jeweled necklace of the property. During my field visits, I saw crayfish, fish, turtles, frogs, muskrats, evidence of otters, beavers, more than three dozen birds, including pileated woodpeckers, belted kingfishers, red-tailed hawks, and much more.



The other section of the conservation area, although compromised by its history of alteration, also has wildlife value. The ponds function as vernal pools and the upland areas provide supporting habitat for species that depend on sandier, open sites, such as prairie warblers. It is possible that box turtles also use this area. They are a species in decline and have been found in the vicinity. Furthermore, the abutting property to the west has sand blowouts and patches of pitch pine. It probably supports some unusual insects (i.e. native bees, moths).

Recommendations

1. Organize field walks. Although four signs along Cardinal Way read "Parson's Brook Conservation Area," the trails are poorly marked and it appears that most of the conservation area is little used. A series of field walks to



introduce the local neighborhood to the beauty and diversity of this conservation area would be worthwhile.

2. Control invasive plants. The most important place of focus is along Parson's Brook, where multiflora rose is currently the worst problem. Autumn olive should be controlled in the 10-acre portion, and if time and funding permit, other non-native plants should be controlled as well.
3. Monitor for stilt grass. This highly-invasive grass was found in 2014 downriver along the brook, just over the Easthampton line.
4. Improve and/or create trails to promote more use of conservation area.
5. Restore Sand Barren/Pitch Pine: An intriguing possibility to investigate is the possibility of managing the 10-acre portion of the property with a controlled burn and trying to restore it to a sand-plain/pitch pine barren.



Purple loosestrife foliage ravaged by biocontrol beetles. This plant is so stressed that it will not flower.



The land in 1995, showing the ponds and the regraded and revegetated former gravel pits., with the boundaries of the two conservation parcels overlaid on top. *Courtesy Google Earth.*

10 A Natural History of the Robert's Meadow Reservoir





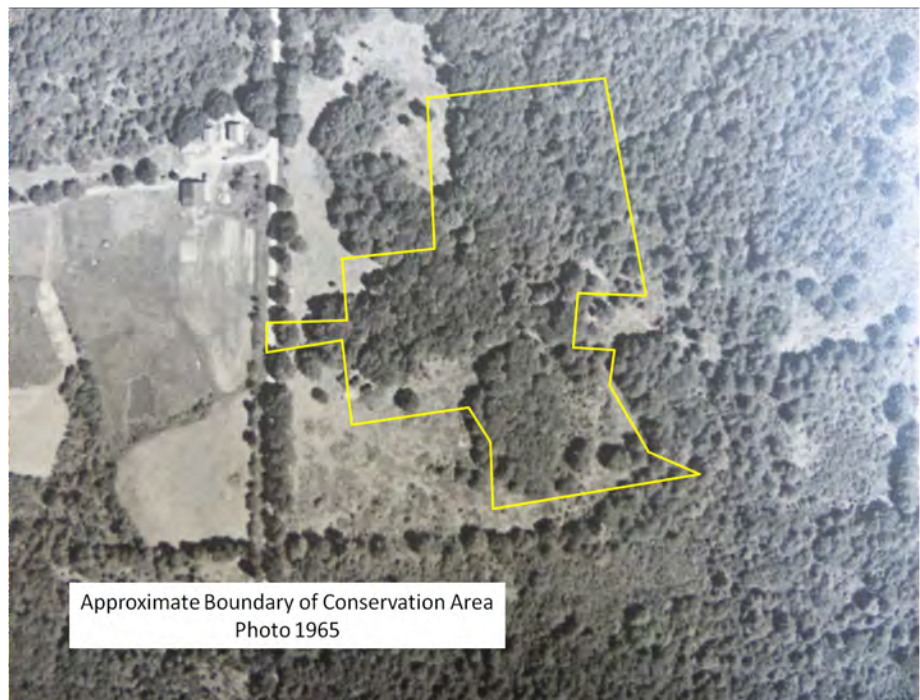
Located in Northampton's northwest corner, this 12.5 acre conservation area was part of a larger parcel and permanently protected in 2004 as a condition of a special permit for new construction. The special permit was required because the proposed development fell within the watershed of Roberts Meadow Reservoir and included a 1,000-foot stretch of Clark Brook, one of the reservoir's important tributaries and designated as an Outstanding Resource Water.

This is a nice place to explore. It is entirely wooded, with a mix of uplands, small seeps, and an intermittent stream that flows into Clark Brook. Most of the land has been forested during the last century, but the remnants of an old dam and barbed wire on an abutting property provide evidence of earlier uses. In the 1830s, the land in this area was owned by Captain Ayres,

A Natural History of the Robert's Meadow Reservoir



The conservation area, outlined in yellow, includes a tributary to the nearby reservoir, which is now an emergency water supply for the city, but in the late 19th century, was part of Northampton's primary drinking water supply.



Like so much of Northampton, fifty years ago this conservation area was a mix of pasture and forest. Today it is entirely forested.

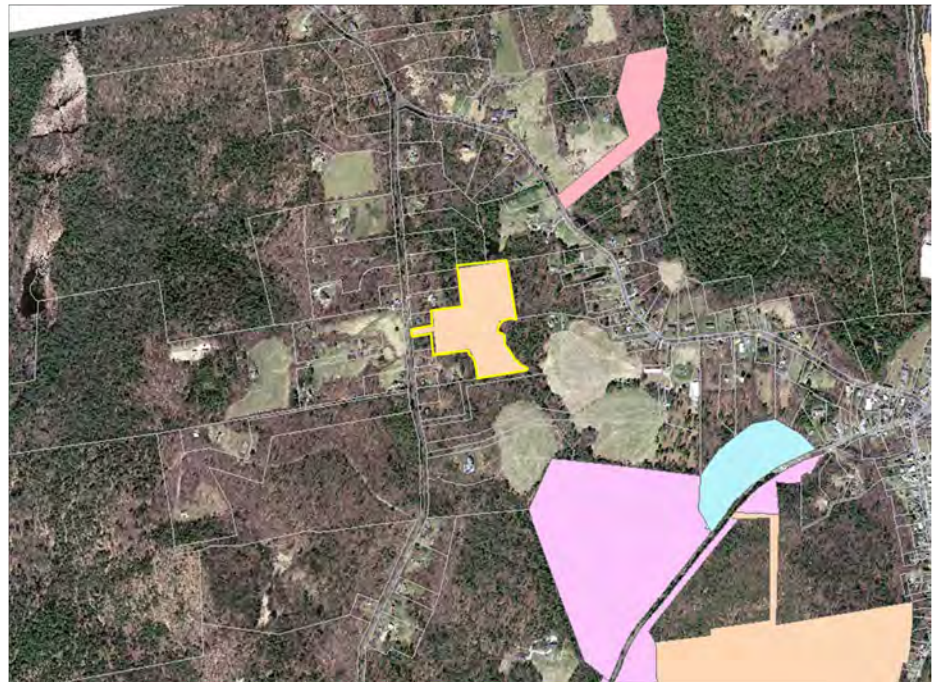
who probably had a mix of sheep, cattle and other livestock, just like his neighbor Clark Dickinson, who owned the farm on Audubon Road. The wetland on the former Dickinson farm is where Clark Brook originates and how it earned its name.



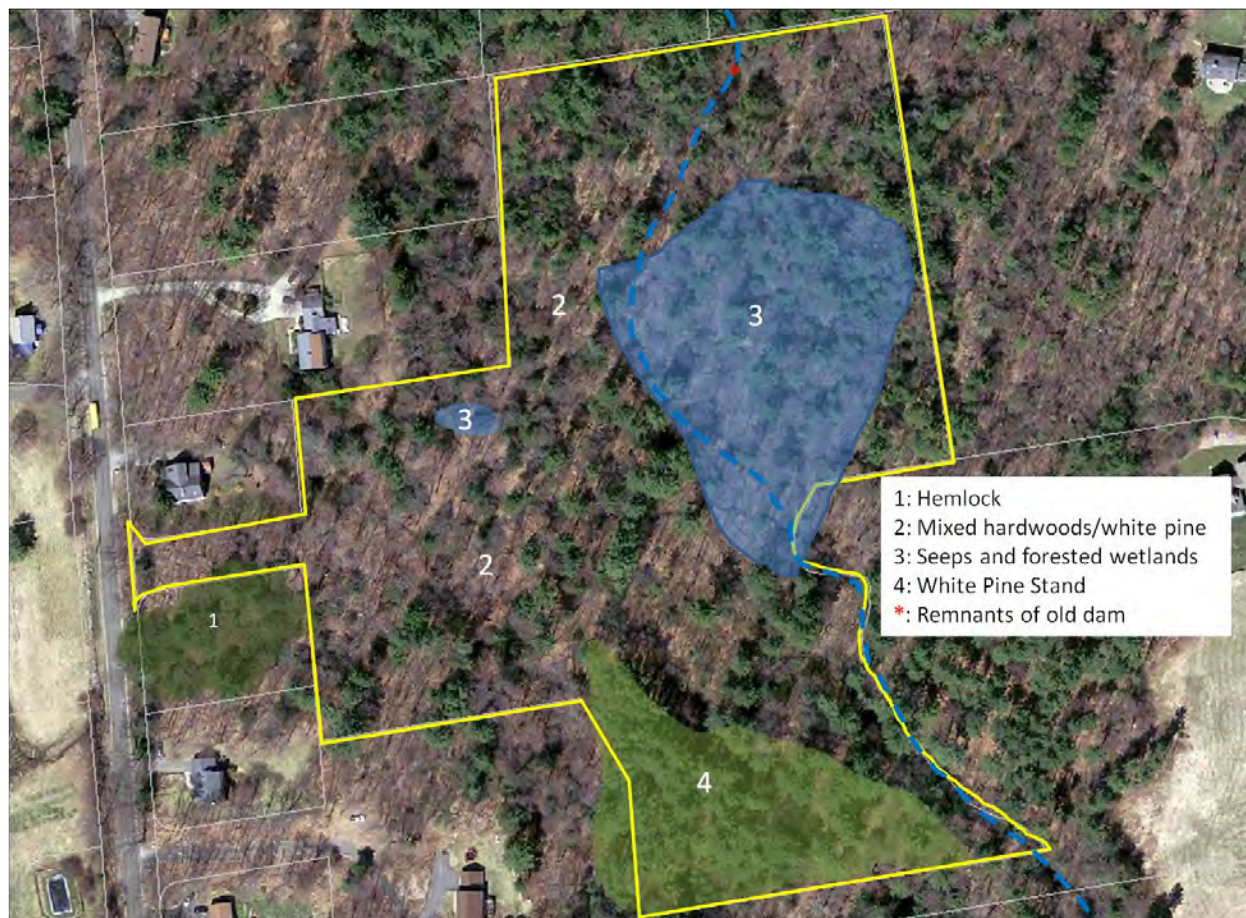
From Kennedy Road, all of the land slopes toward the Clark Brook, and begins to fall away almost as soon as you leave the roadside edge and enter the property. There is no path, but the forest is fairly open and you can easily follow the bank of the intermittent stream. The stream has fairly steep banks, but then flattens out. Along this more level plateau is a broad section of woods, with large pines and good-sized hardwoods. Not much further below is Clark Brook, which in this stretch is a lovely, little meandering stream with mossy banks and a rocky channel. Walking here, it is easy to feel like you're much further away from civilization than you are.

Vegetations Patterns

There is no easy parking at this site, so I parked two houses to the north, where there is a small pull-off. (A new invasion of Japanese knotweed has taken hold here, and the understory is covered with myrtle. Asiatic bittersweet vines are also growing here, curling around the old fence posts with barbed wire.)



Although isolated, this conservation area is not far from a private conservation restriction (northeast) and other city-owned land, including the watershed land (magenta), Roberts Hill (orange), and the Musante Beach Swimming Area (blue). It is also near hundreds of acres of undeveloped land to the west.



Walking back to the conservation area, the access point is an unmarked, 60-foot wide forested strip between two house lots. Along the roadside edge, the forest is a mix of sugar maple, red oak, black cherry, black birch, ash and hickory, while the understory is mostly bracken fern and Virginia creeper. There are also some invasive plants—including a few stems of Asiatic bittersweet, a couple bushes of Morrow's honeysuckle and a tiny patch of myrtle.

The intermittent stream, which begins in the forested hills to the west and flows down through fields, is piped under the road and crosses private land before entering the conservation land. Just after the road, the stream is surrounded by a dense stand of hemlocks (now dying because of woolly adelgid). Below them, the understory is mostly free of ground cover, but the banks of the stream



Not far from the access into the wetland, the steep slope above the intermittent stream has been riprapped.



The conservation slopes gently away from the road. Grape vines grow in the foreground. There is little vegetation below the canopy.



The slopes of the intermittent stream are frequently covered with a variety of ferns.



As the elevation drops, the stream has cut down into the till layers below, exposing the glacially rounded cobbles.



The land flattens out and the forest opens up. It is easy to walk through the forest as there are few shrubs.



Hayscented fern grows in abundance in an area of the forest that was timbered during the last 25 years.



Glacial till covers this entire conservation area.

support a variety of ferns (Christmas fern, New York fern, silvery spleenwort, interrupted fern and spinulose wood fern).

As the conservation area opens up, the forest shifts to predominantly sugar maple. Carpets of hayscented fern, New York fern, and interrupted fern cover the ground. There are also a few winged euonymus growing in this section. Close by, along the border with the abutting property, is a small seep that supports a mix of wetland-loving species (spicebush, foam-flower, violets, various grasses and ferns). Unfortunately, it also has some multiflora rose too.

As the topography flattens out, the channel of the intermittent stream follows a gentler grade and the mix of species in the canopy shifts to one dominated by black birch and white pine, but with smaller amounts of red maple, yellow birch, gray birch, and hemlock. Canada mayflower, partridgeberry and mountain laurel are all abundant, as is New York fern and maple-leaved viburnum. Cut stumps and resprouts document that this portion of the forest was logged in the not-too-distant past. Near the property's southern border is a plateau with a stand of large white pine. Goldthread, with its delicate orange roots, grows here, as does an abundance of Canada mayflower and partridgeberry.



Just below the plateau is Clark Brook. Following the brook to the property's southern boundary, the canopy opens up and unfortunately (but not unexpectedly) multiflora rose, Japanese barberry and Asiatic bittersweet have all gained a foothold. They are not common here yet, but will probably continue to increase and spread unless they're controlled.



Heading upstream, however, most of the non-natives drop out, and plant diversity increases. The rich, wet soils along the stream support several kinds of ferns (lady, cinnamon, sensitive, spinulose wood), wildflowers (enchanter's nightshade, touch-me-not, foamflower, wood anemone, honewort, toothwort, hellebore, wild sarsaparilla, poison ivy, hog peanut, etc), as well as spicebush and leatherwood (uncommon in Northampton). At the other end of the conservation area, on the east side of the brook, the forested wetland is dominated by hemlock.



Beyond the boundary of the conservation area is a large hayfield and pasture.

Aside from its aesthetics and the brook's good water quality, what makes this conservation area interesting is that its stony, till soils are fairly rich (i.e. more fertile and less acidic) than in many parts of Northampton. The soil's fertility makes a big difference in terms of plant diversity, so in addition to leatherwood, there are even a few stems of maidenhair fern and black ash.

Wildlife & Rare Species

Because of the extensive amount of woods nearby and the presence of the Clark Brook, this site is used by a wide variety of wildlife, especially species that depend on forests—from bobcats and bears to scarlet tanagers and wood thrushes. It does not, however, fall within the estimated habitat for rare species.

Recommendations

Like many of the other small conservation areas in Northampton, this one will never become a destination for many people, and given the brook's water quality, it probably shouldn't. A sign should be installed to alert people of its conservation status, and with a small group of volunteers, the invasive plants could be controlled in less than a day's work with simple hand-pulling.

Leaving the site "unimproved" is a good option. Not every piece of conservation land has to have trails and parking; this one could easily be left alone as a place for wildlife and to perform the host of ecological services it naturally provides.



Knee-high (plus!) cinnamon fern grows in the wet soils bordering the brook.



A hemlock dominated swamp forest is found near the property's northeastern edge. What species will replace these hemlocks when they die is uncertain.

11 The Natural History of the Rocky Hill Greenway and the Ice Pond





Rocky Hill Greenway Ice Pond Section

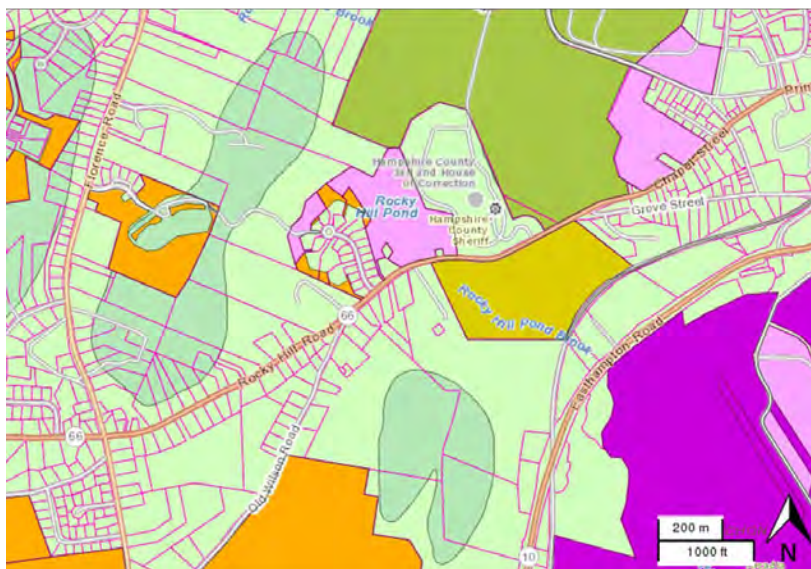
Wrapping around the Ice Pond subdivision, this conservation area is known to few people and appears to be used by even fewer. For the residents of the nearby cluster subdivision, there is no real trail that leads from the subdivision into the property and for the passer-by on Rocky Hill Road, the property looks private (there is no sign or designated parking). It also doesn't look too inviting, with two powerline right-of-ways (ROW) angling across it and a dense forested edge.

But like so many places, once you start rambling around and get to know it, the Ice Pond Conservation Area is actually an interesting place, not only ecologically, but also geologically, historically, and even, aesthetically. The 22-plus acres include a pretty stream, nice woods, a vernal pool, and an unusual mix of plant species. From a management and stewardship perspective, there's more good news: the property has relatively few invasive plants and so far, they occur in low numbers.



Geology & Soils

Located downslope from a drumlin, this property has mostly level terrain, with gentle slopes that gradually trend to the south. Most of the property is underlain by a thin layer of sandy loam, which was deposited on top of much thicker layer of glacial till. The sand was deposited in the shallow waters of Glacial Lake Hitchcock, and if we could have visited this property during that time, we would have been not far the lake's shoreline, in about 50 feet of water.



A map showing surficial geology and protected land., with light green being till and deeper green ellipses are drumlins. Other colors (mustard, olive, magenta, pink, orange) represent other kinds of land protection. The Ice Pond Greenway is in the center, with the jail to the east.

Today the soils here are mostly very stony, fine sandy loams (Woodbridge, Scituate, Gloucester and Ridgebury). A band of Raynham silt loam hems the stream and bordering wetlands.

Past & Current Land Use

During the 1800s (and probably the century before), this property was used for agriculture—mostly as pasture and hay, but possibly for crops as well. During the mid-1800s, a dam was built on Rocky Hill Brook near what is now Route 66 and it created one of several ponds in town that were used for harvesting ice.

Sometime in the early 1900s, a powerline was installed across the property and an-



The 1884 map shows an ice house next to the former 2.5 acre ice pond. From the 1884, *Atlas of Northampton, Massachusetts*, published by Geo. H. Walker.

other line was put in during the 1930s and 40s, this time at a slightly different angle. By then, household refrigerators were becoming commonplace, and the need for ice cut from ponds—a major industry in the 19th century—disappeared. By the 1950s, this ice pond, like the others in town, had been abandoned. The rest of the property had also been let go too, and the former pastures began growing up into brush and young white pine.

As the years passed, the dam fell into further disrepair. The level of the pond dropped, and locals began referring to the former ice pond as “the muckhole.” In those days, before Route 66 was reconstructed, the old pond was easy to see from the road. In the 1980s, the remains of the dam gave way and for the first time in more than a century, the land beneath the “muckhole” was exposed. Today, what’s even more remarkable is that when you’re at the site, it is hard to see where the pond even was! There is no obvious shoreline and what was once the bottom of the pond is now covered with a stand of good-sized red maples.

In 2002, this parcel was sold to Community Builders/TCB Hospital Hill LLC as part of the “surplus lands” associated with the clos-



Changes in the land during the last 50 years, from 1952 to 1999.

ing of the state hospital and the land's redevelopment. The following year, the Ice Pond co-housing project was given a permit for a cluster subdivision, which included 22-acres of conservation land, a right-of-way for a public multi-use trail between the subdivision and the co-housing project on Black Birch Trail, as well as another 3.5 acres that are permanently protected under a private conservation restriction.

The protected land that wraps around the subdivision is a bit like a checkerboard, jumping back and forth between small parcels under CR and conservation land. Public access is permitted throughout the entire property, but the conservation land along the western edge is so narrow and undefined that it feels like you're trespassing in someone's backyard.

In the decade since the conservation area was established, all of the land except for the powerline right-of-ways has been left unmanaged. The right-of-ways are maintained both by mechanical cutting and probably with herbicide. There is also an informal trail that connects the subdivision



Mud and silts cover the ground where the land floods during times of high water. The water backs up because of an undersized culvert and more or less is the same area where the ice pond once was. Today, much of the former pond is covered with red maple.



White pine grows in many of the areas that were once cleared.

(near the stormwater detention basin) with the ROW, but the rest of the land does not have any trails, other than the relatively cleared ROWs.

The simplest access into the conservation area is from the edge of Rocky Hill Road. Parking is limited but is possible near the powerlines, and by walking down either right-of-way, the forests and wetlands can be explored.

Vegetation Communities

Like so many conservation areas in Northampton, the property is a patchwork. In the drier upland sites, there are groves of white pine, blocks of oak-dominated woods, a richer hillside with hickories, oaks, and birch, and the shrubby, laurel-rich scrub along the powerline. In the wetter areas, there is swamp forest dominated by red maple, a small stand of hemlock, and the sand-bottomed brook itself—looping and meandering through the forest. Eventually, Rocky Hill Brook, as it is known on the maps, flows into Arcadia Marsh, skirting the edge of a private transfer station (former burning dump) on Route 10.



The “trail” through the conservation area is via the powerline. Below, a rutted swale along the power line functions like a vernal pool for wood frogs in the spring. This wetland borders Rocky Hill Brook.

Vegetation Communities

1. Upland powerline and cut. Among the most common plants are mountain laurel, sheep laurel, bracken, hayscented fern, ground pine, dewberry, rough-stemmed golden rod, whorled loosestrife, and wintergreen.
2. Wetter powerline, with more grasses, Polytrichum moss, bracken, dewberry, hayscented fern. One of only two sites in Northampton for bunchberry.
3. Open marsh with stream. Lots of sedges. Marsh fern, sensitive fern. Some purple loosestrife, meadowsweet, spice bush. Breeding wood frogs and green frogs. Potentially functioning as a vernal pool.
4. White pine/oak mix, abundant mountain laurel. Canada Mayflower.
5. White pine dominated forest, with oaks, New York fern, Canada mayflower
6. Hemlock dominated woods, steeper slope transitioning to wetland
7. Red maple swamp, with hemlock, spicebush, stream, mossy hummocks, goldthread, sensitive fern, touch-me-not, scattered ironwood. A backwater along the brook may function as a vernal pool.
8. Disturbed area, with Morrow's honeysuckle, Asiatic bittersweet, Winged euonymus, and old fence line along a ditched section of the stream. A sand blowout at the end provides potential habitat for tiger beetles and native bees.
9. Open mixed with with oak, hickory, witch hazel, Canada mayflower, red maple, lots of fern, pinxter flower, maple-leaved viburnum, starflower, American hazelnut
10. Former ice pond, now red maple



Based on land use, soils and hydrology, the conservation area can be separated into ten different vegetation communities (see Vegetation Communities map), but from a purely visual perspective, the most obvious “habitats” are the two linear power lines. Because they are brush-hogged every year or two, they are more open, have more exposed soil, and the vegetation is shrubby. And although most people don’t think of powerlines as “special natural areas,” it turns out that they are. If we look at the entire city of Northampton, most of the land is either forested or open grasslands. These powerlines are one of the few places where shrubby vegetation dominates the landscape.



Polytrichum moss (above) is common along the edges of the powerline ROWs.

Although the management of the two ROWs is similar, they are botanically different. The eastern ROW is shadier, generally wetter and only has about twenty species of plants. In contrast, the western line is twice as wide (so more open), includes both uplands and wetlands, and supports more than 70 plant species.

In addition to broad patches of *Polytrichum* moss, the most common vascular plants along the eastern ROW are hayscented fern, bracken fern, dewberry, ground pine, and Canada mayflower. Along the more diverse western ROW the common species include bracken fern, New York fern, ground pine, wintergreen, whorled loosestrife, rough-stemmed golden-



The powerlines are also good places to look for clubmosses. Two species can be seen in this image, including *Lycopodium tristachyum* (deep root clubmoss), which is only found in open, dry settings and is uncommon in Northampton.

rod, dewberry, as well as impressive clusters of mountain laurel and sheep laurel, which bloom beautifully each June.



The powerline with hayscented fern.



Close up of hayscented fern



Bunchberry in flower.



Mountain laurel in bloom in June.



Close up of sheep laurel.



Cinnamon fern.



Close up of mountain laurel, and northern arrowwood in flower.

The Rest of the Conservation Area

Heading north from the powerlines along the Rocky Hill, the uplands to the west of the western powerline include impressive stands of white pine, scattered hemlocks, as well as tracts of deciduous forest dominated by red oak, black oak, red maple and black birch. In these areas, the understory is sparse, with a few scruffy clumps of mountain laurel. The ground itself is almost free of plants, but instead is covered with fallen oak leaves. Of the plants that do grow here, the most common are ground pine and wintergreen.

Near the northern boundary of the conservation area, the composition of the canopy changes and includes white oak, beech and more hemlock. There is also more mountain laurel. A little further and the land slopes to a swamp forest that borders Rocky Hill Brook. Its vegetation here is much more diverse, and the canopy includes a mix of red maple, yellow birch, hemlock, black ash, and on the higher hummocks, red oak and white oak. The



shrub layer includes witch hazel, spicebush, and mountain laurel, while cinnamon fern, ragwort, marsh marigold, and goldthread grow in abundance in the mossy, seepy soils near the brook. An ATV trail cuts east-west through the wetland and then heads north along the powerline.



Where the wetland is crossed by the powerline, there is a small open marsh dominated by sedges (at least 6 species), ferns (especially marsh and sensitive), wetland wildflowers (wild geranium, Joe Pye weed, blue flag iris, swamp milkweed, goldenrods, grape, Virginia creeper), as well as winterberry, meadowsweet, spicebush and sapling red maples. Two non-native plants, multiflora rose and purple loosestrife, are also present.



Continuing east, the strip of upland forest between the two powerlines is mostly a mix of white pine and oaks. Closer to the former ice pond, however, the pine drops out and the forest is entirely deciduous. It is also more open and park-like, with impressive oaks and because the soils are slightly richer, with shagbark hickory and ironwood as well.



After crossing the second powerline, you pass through a band of woods and can follow the meandering path of Rocky Hill Brook. To the east of the brook, along the property's border is an

old fence line. The land in this area was altered years ago when the wet meadow to the northeast was ditched and routed into Rocky Hill Brook. The original ditching probably took place in the 1800s. Today, this altered area has the biggest patch of invasive plant species on the property, with tangles of Asiatic bitter-sweet and a thicket of Morrow's honeysuckle and winged euonymus.



Wildlife

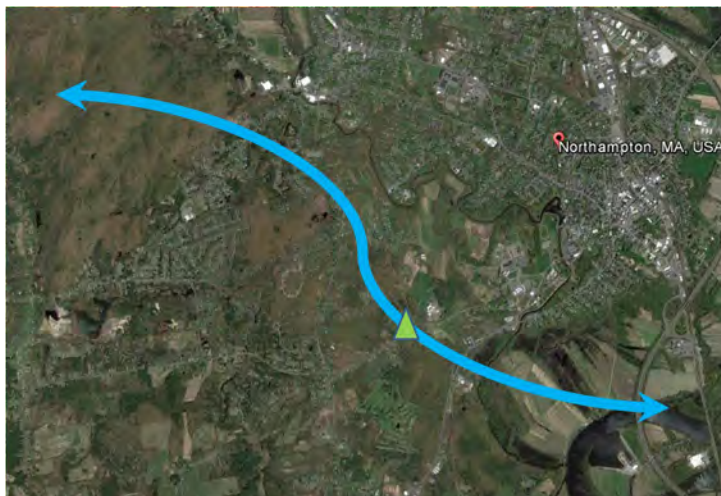
Because of the property's varied habitats—stream, marsh, forested wetlands, and piney woods, a variety of animals use the property—from butterflies taking advantage of the flowers in the sunny ROW to green frogs and wood frogs in the marshy places, to a mix of birds and mammals



This deeper side channel along Rocky Hill Brook may function as a vernal pool.

throughout. Wood thrushes, pileated woodpeckers, cedar waxwings, chickadees and many other

species were heard or seen here. At the northern end of the eastern powerline is a 20' x 30' sand blowout,



The conservation area, marked with a triangle, is part of a mostly unfragmented wildlife corridor that extends from the Connecticut River west to the forested hills. Its wildlife value is also enhanced because of the presence of nearby protected land (former state hospital grounds, other private conservation restrictions.)

which is just the kind of bare ground preferred by some of our native bees for nesting and by certain kinds of tiger beetles.

What's more, this property has real value for wildlife because it is part of a larger block of protected land and although somewhat frag-



The Ice Pond Conservation Area, circled, is in close proximity to many other protected parcels, which increases its value to wildlife.

mented and interrupted, it is also part of an even larger corridor that extends between the Connecticut River and more extensive woodlands to the west.

At present, it does not fall within the estimated habitat for any rare species and is not considered supporting habitat for any rare wildlife.

Management & Stewardship Recommendations

Although this conservation area will always be most valuable to its nearest neighbors, it has some nice areas that other people would enjoy exploring too. To help facilitate this, it is recommended to:

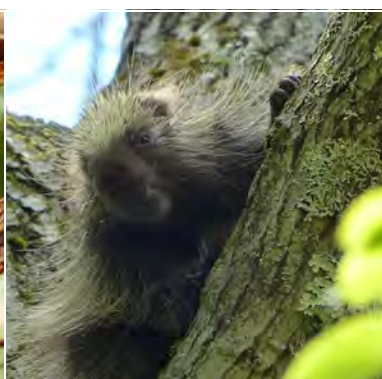
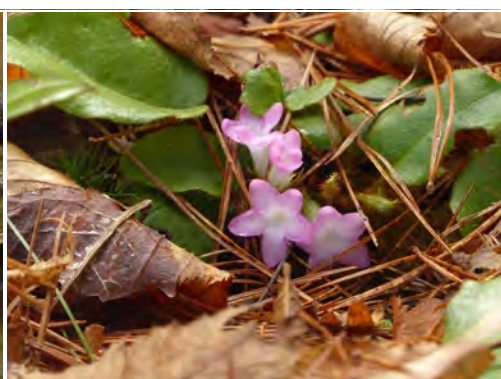
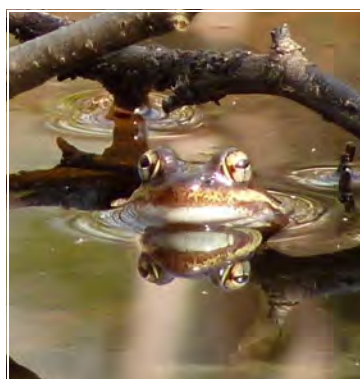
1. Install a sign and create a small parking place along Route 66 (below the power-line).

Most of the invasive plants at the Ice Pond Greenway are found near the disturbed soils and fence line that marks its property boundary with the prison. The leafless shrubs in this photo are Morrow's honeysuckle.



2. Develop a trail that loops through the different habitats (see map) and connects with the DFA lands and multi-use trail.
3. Work with members of the nearby co-housing communities and/or jail to control the limited number of invasives on this property.

12 A Natural History of the Sawmill Hills Greenway



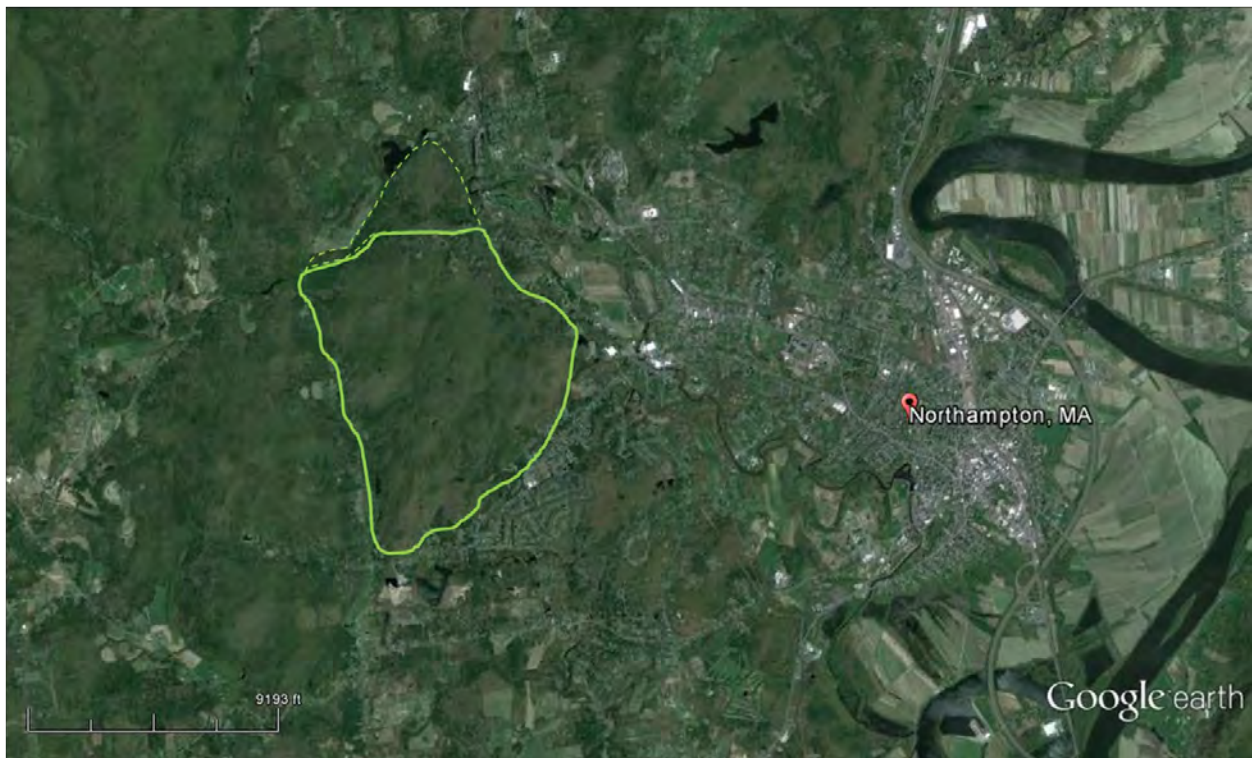
Chapter Table of Contents

	Page
Overview of Sawmill Hills	13- 1
Recreation Value	13- 3
Aesthetic Value	13- 4
Ecological Value	13- 5
Wildlife Value	13- 7
Vernal Pool and Rare Species Habitat	13- 8
UMASS CAPS	13- 9
Coldwater Fisheries	13- 10
Public Water Supplies	13- 10
Glacial & Surficial Geology	13- 11
History	13- 12
Major Vegetation Patterns	13- 18
Conservation Parcel 1: Turkey Hill/Ryan Road/Sylvester Road	13- 21
Conservation Parcel 2: Formerly West & McGowan	13- 28
Conservation Parcel 3: Formerly Symanski	13- 30
Conservation Parcel 4: Formerly Reutener	13- 36
Conservation Parcel 5: Sawmill Hills (multiple acquisitions)	13- 42
Conservation Parcel 6: “Jeep Eater” Trail	13- 54
Conservation Parcel 7: Formerly Spring Meadow Subdivision	13- 59
Conservation Parcel 8: Roberts Hill	13- 68
Sources & Acknowledgments	13- 76



An Overview of the Sawmill Hills Greenway

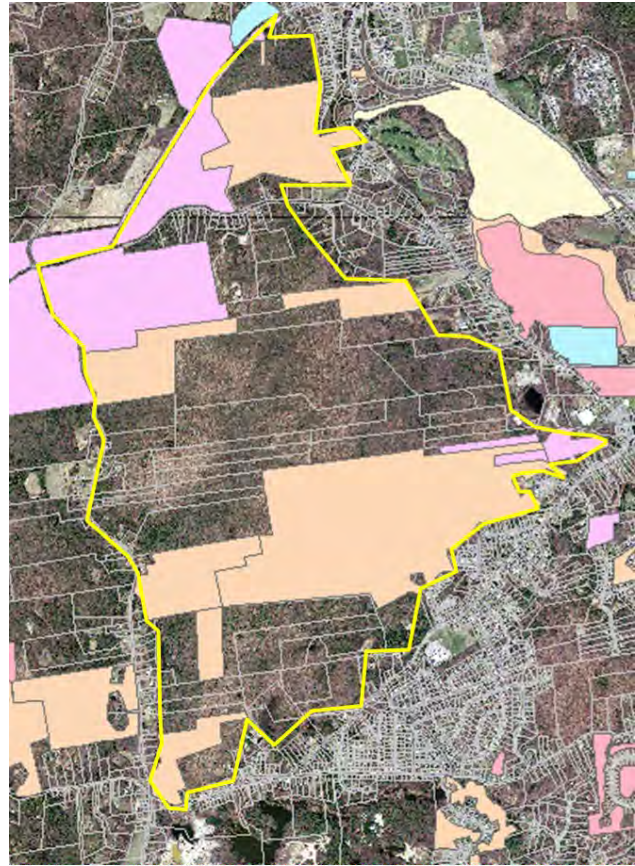
The Sawmill Hills encompasses roughly 2,200 acres and extends north-south from Roberts Hill to Ryan Road and east-west from Spring Street to Sylvester Road. It is one of the City's largest road-less areas, a status due largely to its rough and rugged terrain, which includes cliffs, countless rock outcrops, steep slopes, and thin, acidic soils. These physical conditions have hindered most activities, except, as its local place name reveals, logging. In fact, with the exception of two new homes and the now abandoned telephone and telegraph line, all of the other development that has taken place during the last 360 years is located around the base of the hills where glacial deposits—either thicker tills or sandy outwash sediments—have made it much easier to build homes, dig wells or mine gravel.



When the surrounding homes and a few hundred acres on the north side of Chesterfield Road are excluded (dashed outline), the remaining interior core of the Sawmill Hills forms one of the largest remaining road-less areas in Northampton, spanning 2 ½ miles north to south and 2 miles east to west. And all of it is within a 15-minute drive from downtown Northampton.

In addition to being a large, undeveloped parcel, the Sawmill Hills Greenway stands out for several other reasons. The area boasts an elaborate network of trails, supports nearly twenty different kinds of natural communities, and offers spectacular views. It also plays an important role in providing and safeguarding the City's drinking water supplies, with public wells near Spring Street and watershed land along Chesterfield Road.

What's also extraordinary about this large block of land is that more than 40% has been protected by the City, much of it since 1995. Currently some 235 acres are protected as watershed land (27 acres near the Spring Street wells and 208 acres within the Roberts Meadow Reservoir holdings) and another 696 acres have been set aside for conservation purposes.



The parcels within the Sawmill Hills, which are outlined in yellow, form a 50-piece jigsaw puzzle, a third of which are protected, either as watershed land or for conservation purposes. In this map, the pink is watershed land, the orange is conservation land, and the blue parcels are recreation.

And here's a final category where this property distinguishes itself. From a management and stewardship perspective, these 2,200 acres are in superior condition: the trail network is extensive and mostly in very good shape, trash or dumping problems are virtually non-existent and most notable of all, much of this landscape is entirely free of invasive plant species. The only places where non-native plants do occur are in predictable locations: along the roadside edges, in areas of historic disturbance and within its stream corridors and wetlands.

The remainder of this report provides short summaries of this area's important qualities, its geology and history, followed by more detailed descriptions of the natural history of the properties that have been set aside as conservation land.

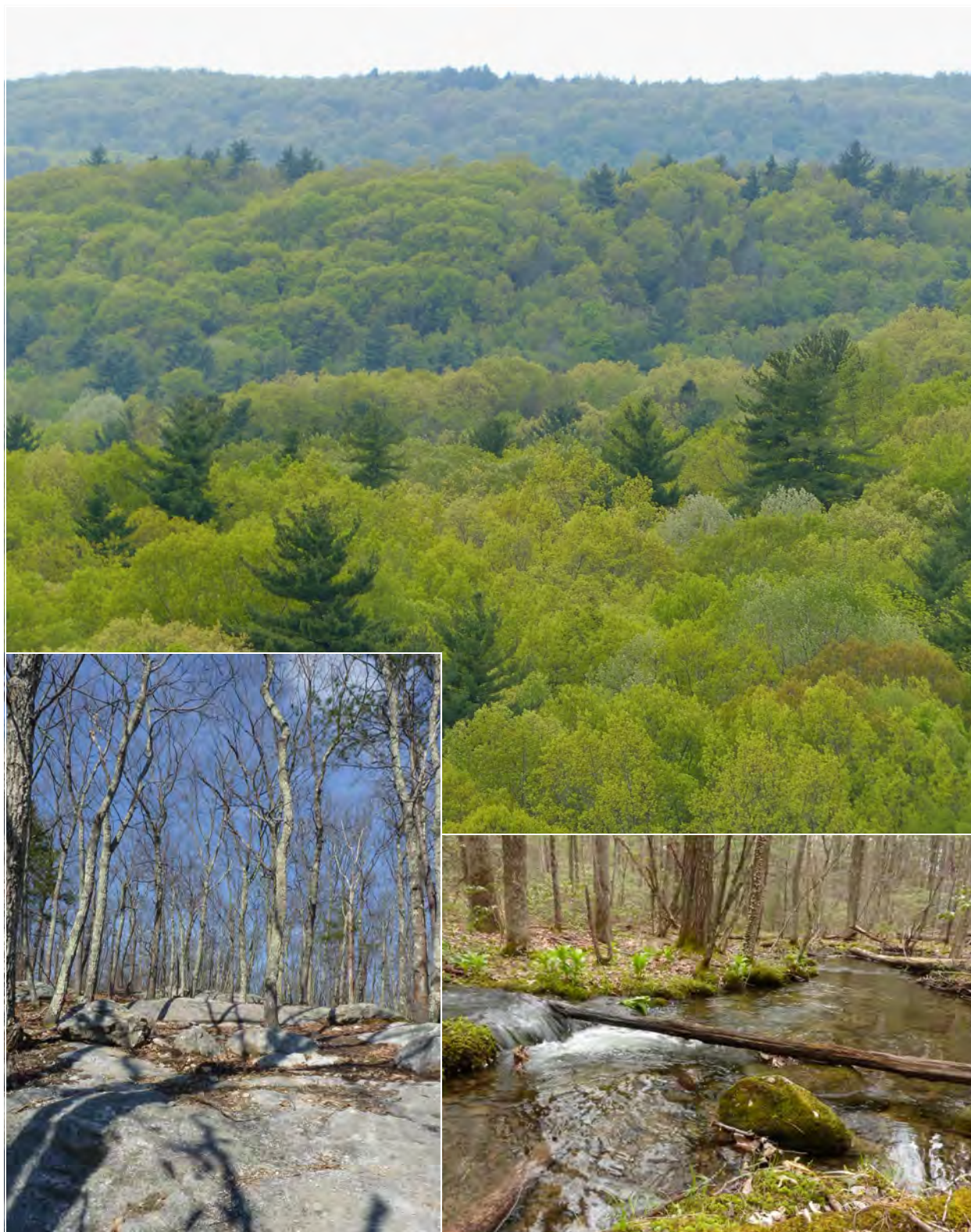


Recreation Value

Although unknown to many Northampton residents, the Saw Mill Hills Greenway includes one of the most elaborate trail networks in all of Northampton. In fact, the trails are so extensive that on a single day you could take more than a seven mile trek: beginning on Spring Street, you could head to Sylvester Road, then cut back to Ryan Road/Avis Circle, then loop north to the “Jeep Eater” Greenway, where via an informal trail through the City’s watershed land, you could reach Chesterfield Road where you could pick up the trails that crisscross Roberts Hill. Eventually you could end up on either Water Street or Dimock Street. You’d be tired, but during your entire outing, you would have crossed only one road and you would have passed by (or through) all of the different habitats found within this large block of land, including rocky cobbles, vernal pools, quiet streams, swamp forests, pine knobs, sheer cliffs, sand plains, and extensive stretches of dry oak woods.

The only potentially troublesome part of this plan is that there is no complete map of the trails. This map shows only a portion of the trails (black squiggles) that are actually there. Another problem is that, at least for now, all of the trails are unmarked, so unless you’ve been there before, you could get turned around. The trails, however, are fairly wide and in mostly good condition, with only a few places with muddy wetland crossings or eroding slopes that are in need of maintenance.

The final hurdle is that parking is limited. There are currently only a few locations and none of them are well-marked either.



Aesthetic Value

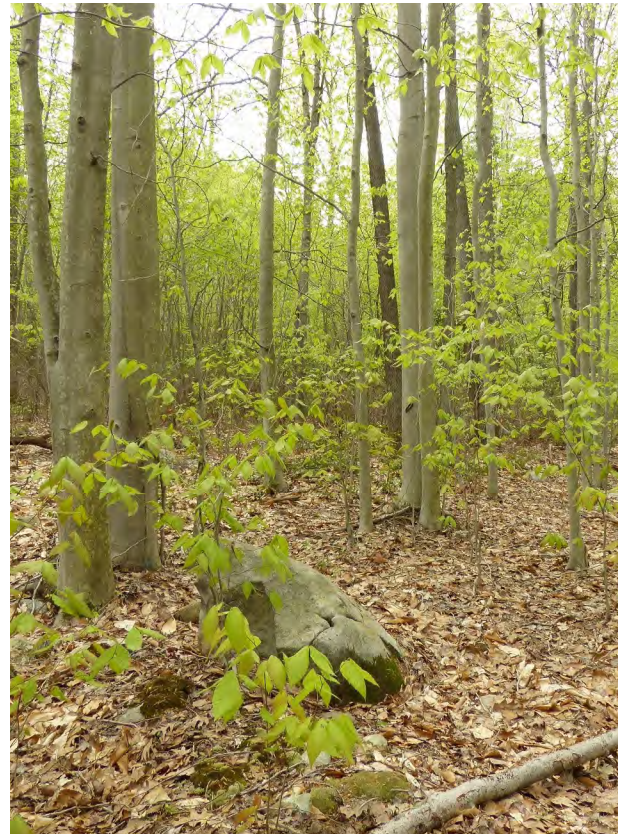
This property is beautiful, with up and down terrain, cascading brooks, bedrock outcrops, fairly open woodlands and impressive views from the higher elevations and cliffs. It is also located in one of the quietest areas in Northampton. Quite often, the only sounds you hear are natural ones.



Ecological Value
Underlain by 400 million year old gneiss, the varied topography of the Sawmill Hills supports a mix of habitat types—a sampling of which are profiled here and on the following page. All told, nearly twenty different natural communities were identified here, and although nearly all of them are common and widespread in our region, what is noteworthy is their high integrity, meaning that they show little to no sign of human disturbance and few invasive species problems.

Natural Communities in the Sawmill Hills*	
1.	Acidic Rocky Summit/Rock Outcrop
2.	Circumneutral Rocky Summit/Rock Outcrop
3.	Acidic Rocky Cliff
4.	Sandplain Grassland (cultural)
5.	Acidic Talus Forest/Woodland
6.	Pitch Pine-Oak Forest
7.	White Pine-Oak Forest
8.	Oak-Hemlock-White Pine
9.	Successional White Pine Forest
10.	Hemlock Ravine
11.	Mixed Oak Forest
12.	Ridgetop Chestnut Oak Forest
13.	Dry, Rich Acidic Oak Forest
14.	Forest Seep Community
15.	Red Maple Swamp
16.	Black Gum Swamp
17.	Shallow Emergent Marsh
18.	Low Energy Riverbank
* Follows MA NHESP Classification of Natural Communities	







Wildlife Value

Because the Sawmill Hills form a large block of unfragmented forest and are adjacent to even larger forested areas to the west and north (*see above*) it provides excellent habitat for those animals that depend on large, uninterrupted tracts of forest. Furthermore, because of the mix of wetland and upland habitats, thousands of different animal species depend on this area, either transitionally or permanently.



Porcupines are common in the rockier areas of the Sawmill Hills, and coyotes, which first arrived in Massachusetts in the 1940s, now breed here too. This litter of six pups was found in May 2014.

Rufous-sided towhees (*right*), a species in decline, are also common in the shrub-brier, upland areas.



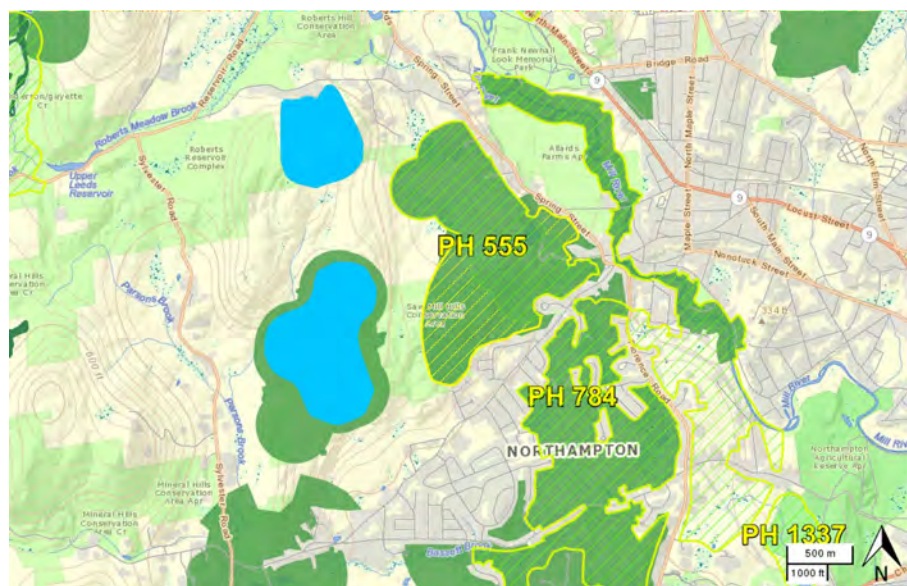


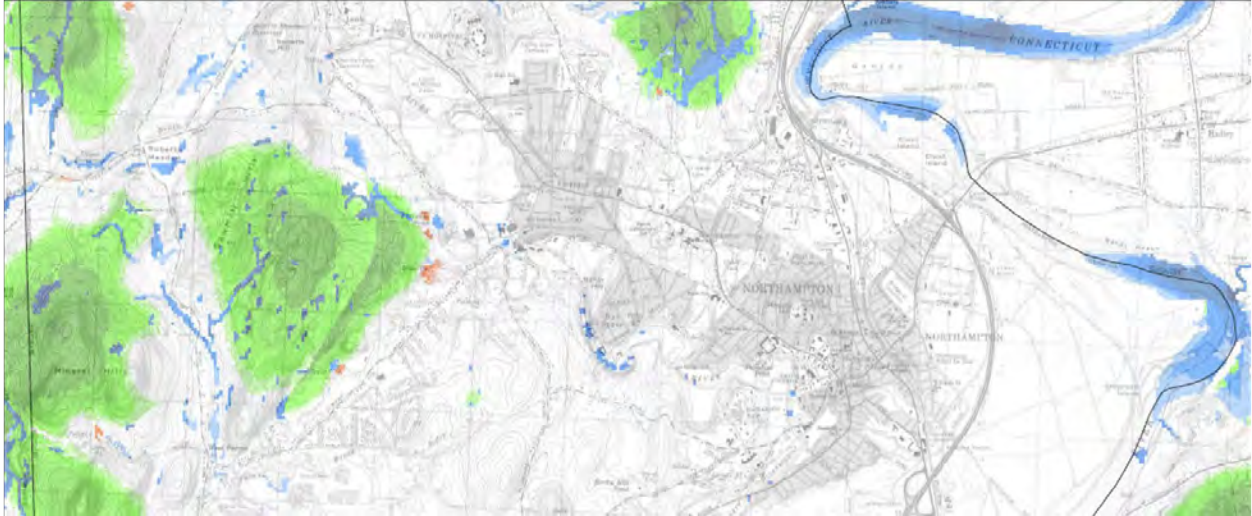
Vernal Pool & Rare Species Habitat

Of the 99 certified vernal pools in Northampton, 17 are found within the Sawmill Hills/Roberts Hill Complex and at least five others—including two that do not appear on this map—are “potential vernal pools.” About half of the certified pools occur in shallow, bedrock depressions, while the rest are located along the margins of the hills. The latter are kettleholes, which formed when blocks of glacial ice were stranded and then buried in water-sorted glacial outwash.

In addition to having an abundance of vernal pools, some of the pools are known to support rare amphibians, including Jefferson’s salamanders and marbled salamanders. The presence of these rare species is one reason why two areas within the Sawmill Hills have been designated by MA NHESP as “vernal pool core habitat” (*bright blue on map below*). The other is because this area includes two concentrated clusters of vernal pools, which from a conservation biology perspective, makes them more valuable than a single, large pool. The nearby pools help ensure the core habitat’s long-term viability and the resiliency of its populations. How? If, for example, a drought caused all of the larval salamanders or tadpoles in one vernal pool to die, this vernal pool would gradually be re-colonized by the offspring and adult creatures (salamanders, frogs, insects, etc.) from the other nearby ponds and would thus continue to function as vernal pool habitat and a breeding site.

The Sawmill Hills also includes priority habitat (PH555) for two other state-listed species—oak hairstreak butterfly and Eastern box turtle, both of which are listed as Special Concern. The area also is recognized as BioMap Core Habitat (*dark green*). These ecologically valuable areas occur on city-owned land as well as on private property.





UMASS Conservation Assessment Prioritization System (CAPS)

Researchers at UMASS have developed computer software (CAPS) that analyzes the landscape and prioritizes land based on its ecological integrity and long term sustainability. Based on this analysis, the Sawmill Hills are one of the few areas within Northampton that rank high in terms of its ability to sustain ecosystem processes and maintain biodiversity over the long-term. CAPS is another way of measuring this area's value and provides support for the continued acquisition and protection of properties within this area. In this image, the colored areas are better than average based on CAPS analysis, with blue representing aquatic habitats, red is shrub and grassland, and green shading is forest. White areas are below average based on CAPS.



(A) Marbled salamanders, listed as threatened species in Massachusetts, are known to inhabit the Sawmill Hills.

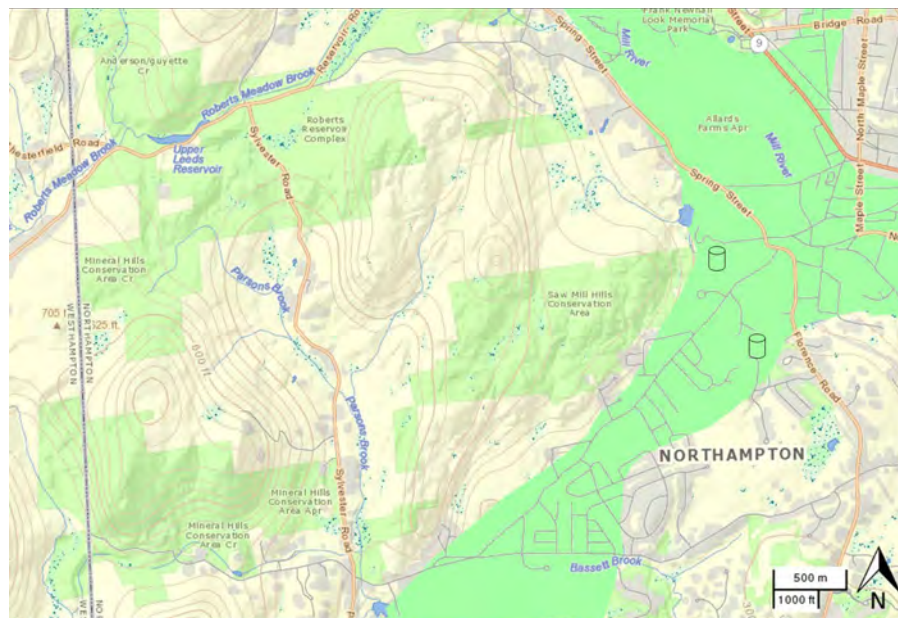
(B) A remnant of a grassland/pitch pine barren, a habitat that is estimated to have covered about 10% of the Northampton landscape when the English first arrived. It now accounts for less than 1% of the City. It is a rare habitat in the entire Connecticut River Watershed.

(C) Large Whorled Pogonia, a watch-listed orchid in Massachusetts, occurs in low numbers on the Sawmill Hills. This individual has a fruiting pod.



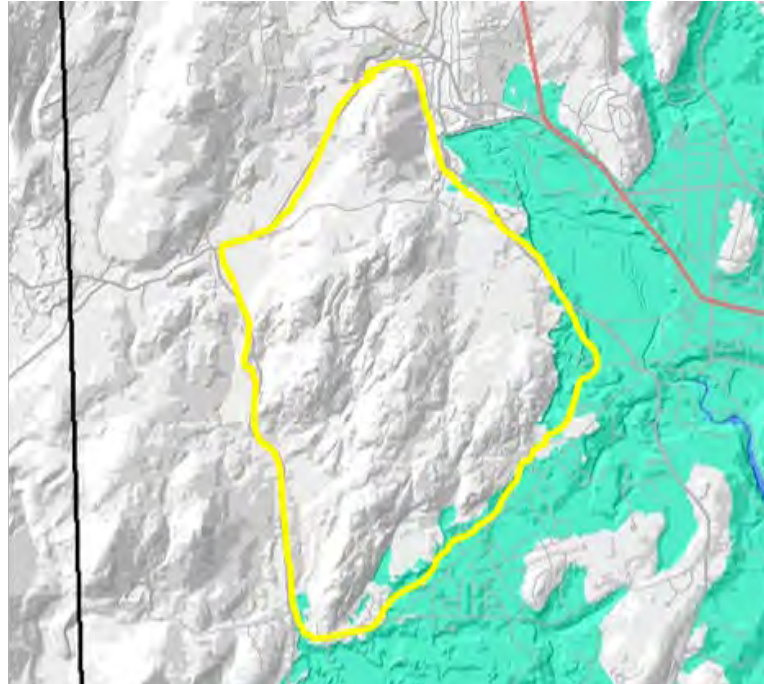
Cold Water Fishery

The wetlands and small streams in the Sawmill Hills/Roberts Hill Complex drain into two different waterways, the Mill River and Parson's Brook, both of which are designated as Coldwater Fisheries. About 80% of the Sawmill Hills/Roberts Hill complex feeds the Mill River, with the remainder (~475 acres) feeding Parson's Brook (and ultimately the Manhan River). By protecting upland and wetland areas in the Sawmill Hills, these fisheries interests are supported. Protecting places like this will be increasingly important as our local climate warms and annual precipitation patterns change. Those changes will affect ground-water supplies, as well as impact wildlife, plants and the City's public drinking water supplies.



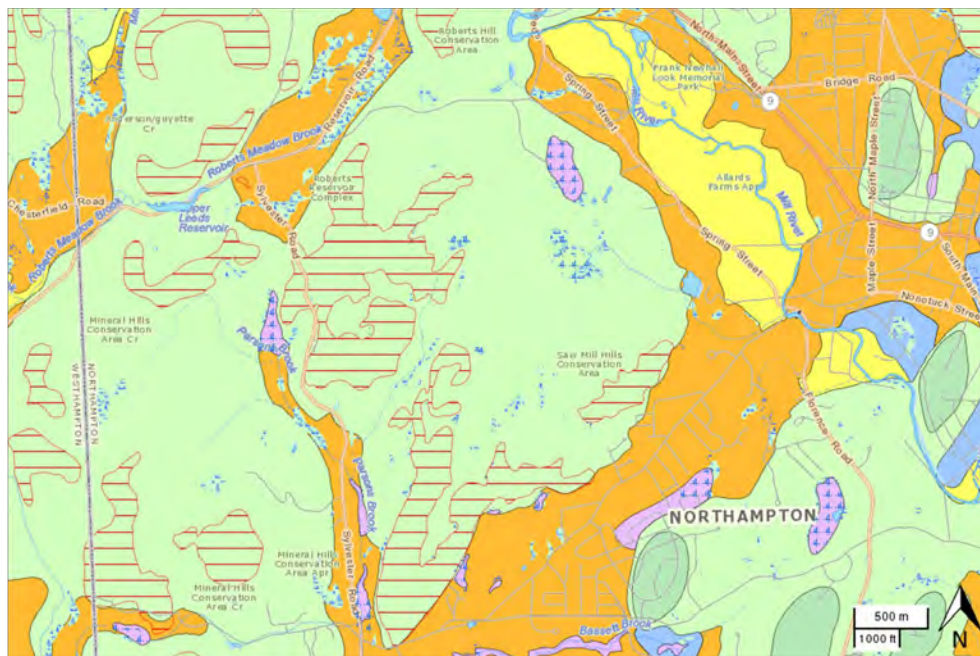
Medium Yield Aquifer, Zone II, Water Supply Protection and Wells

The Sawmill Hills are important to the City's water supplies. In the north, watershed lands help buffer and protect the quality of the Roberts Meadow Reservoir, which now functions as a back-up emergency water supply. In the east, city wells (○), which were installed in the early 1950s, provide drinking water to supplement Northampton's main surface water supplies in Whately, MA. In addition, the band of sand and gravel along Ryan Road (glacial outwash plain) and Spring Street (glacial delta) is designated as a medium yield aquifer by MA DEP; the aquifer is shown in lime green. The area along Ryan Road plus the land bordering Parson's Brook is part of a Zone II.



Glacial Lake Hitchcock

For about 3,000 years (from 15,000-12,000 years ago) the waters of Glacial Lake Hitchcock lapped up against the eastern edge of the Sawmill Hills, outlined in yellow. Had we been where Spring Street or Ryan Road are now located, we would have been standing on the beach. It was lake shore property! White areas are above the lake level and are either islands or uplands; roads are shown to help for orientation.



Surficial Geology

Underlain by ancient metamorphic rocks, the core of the Sawmill Hills is characterized by abundant rock outcrops (*red hatching*) and a thin layer of glacial till (*light green*). Surrounding nearly all of this unit are outwash sands and deltaic sediments (*orange*), which were deposited 15,000-12,000 years ago during the era of Glacial Lake Hitchcock. Post-glacial swamp deposits are shown in pink and more recent alluvium along the Mill River appears in yellow. Other colors in this map represent drumlins (*olive green*) and glacial lake silts and clays (*light blue*). The small streams and wetlands in the Sawmill Hills are also shown in light blue.

History

The Sawmill Hills/Roberts Hill Complex now includes more than fifty parcels, but in spite of all that different ownership, its history is remarkably unified. Quite simply, most of this land, as its place name indicates, was logged—and other than logging, not much else happened. In fact, the rugged topography and shallow soils made for such poor pasture that when the land was divvied up in the late 1600s, it was divided into long, narrow lots that were laid out specifically because their intended use was as woodlots to meet the firewood and timber needs of individual families.



When the English first settled Northampton, the Sawmill Hills Greenway was located within the “Long Division,” shown on this map by a north-south running line. Initially, the land to the west of the line was held in common. But by the 1670s, the Long Division lands were sold to individual buyers. Within the Sawmill Hills, the new lots were long and skinny, as this 1754 map from Sheffield’s *History of Florence* shows (above). The properties were used for woodlots and although many of the lots have been consolidated into single parcels, some of the original lot lines are still valid, as the current parcel data shows.

More commercial style logging began by the 1830s (and probably earlier), and by 1831, there were two sawmills also harvesting trees in the Sawmill Hills, one on the west side, which was owned by the Bartletts, and another on the east side near Pine Street/Spring Street. According to a Gazette article (9/21/1880), Bartlett’s Sawmill gave this range of ridges its place name.



Workers at Bartlett’s Sawmill in the 1880s. Photo copied from *Images of Northampton* by James M. Parsons.

As the 19th century wore on, logging (and possibly fires) in the Sawmill Hills continued intensively so that by 1880, “a large fraction of it [was] young growth” (*Daily Hampshire Gazette*). But by then, the need for firewood had diminished. Coal had begun replacing wood in Northampton since the 1850s (*Northampton Courier*, 1/5/1858) and as the 20th century began, oil and electricity were other alternatives. As the demand for firewood waned, the slopes in the Sawmill Hills began to grow back.

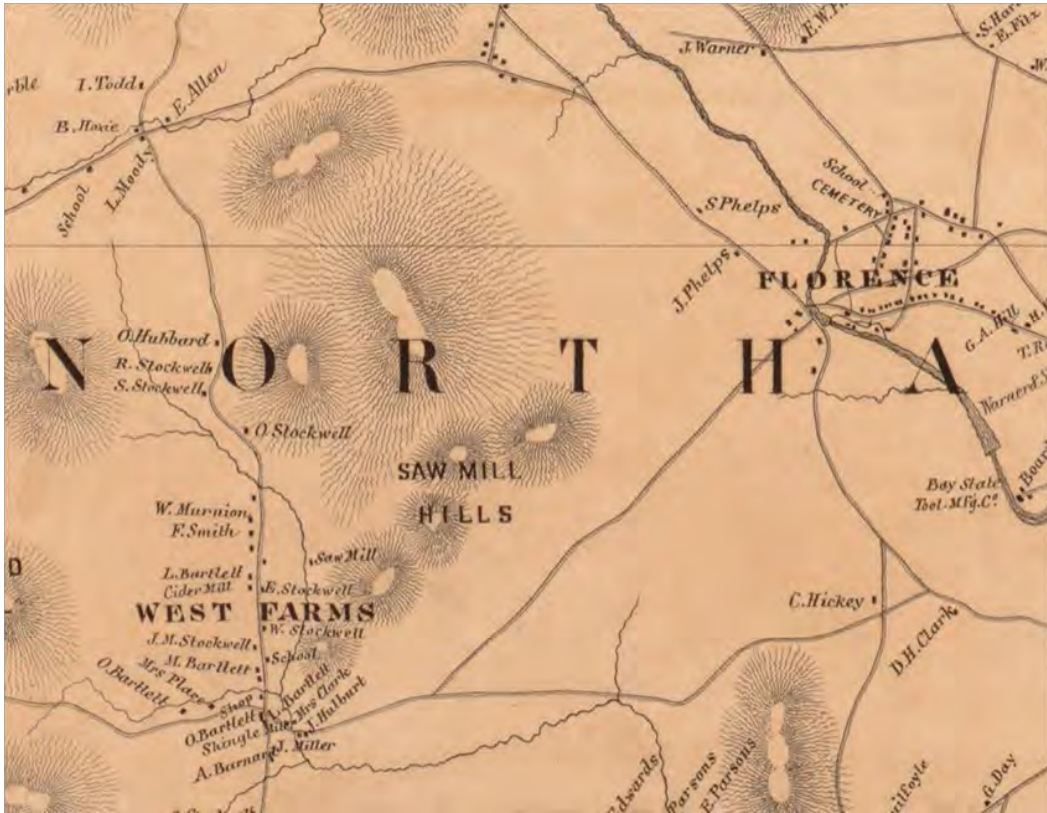


Over the last century, some of the lower slopes were logged again, but most of the upland areas were not. The lack of logging in the rocky uplands is partly a function of access, but even more relevant is the size of the trees. Because the soils in the upland areas are thin and acidic, the trees grow very slowly. Plus, in 1911, a massive fire burned 400-600 acres, destroying the new growth. In fact, even today, most of the trees on the ridges are so small that they would only be used for firewood.

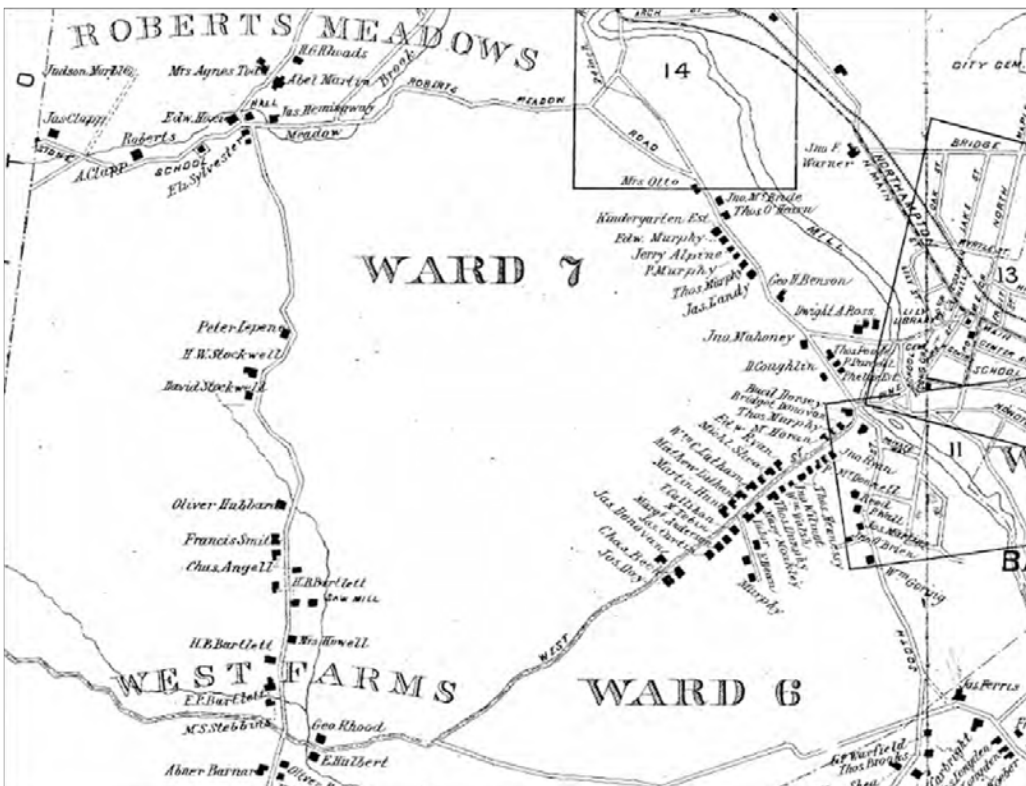
Aside from logging, the flanks of the Sawmill Hills have supported a handful of farms and there were also a few small rock quarries here and there. In 1895 (or so), the New England Telephone and Telegraph Company built many more lines in western Massachusetts, including a new line to Westhampton across the north end of the Sawmill Hills.

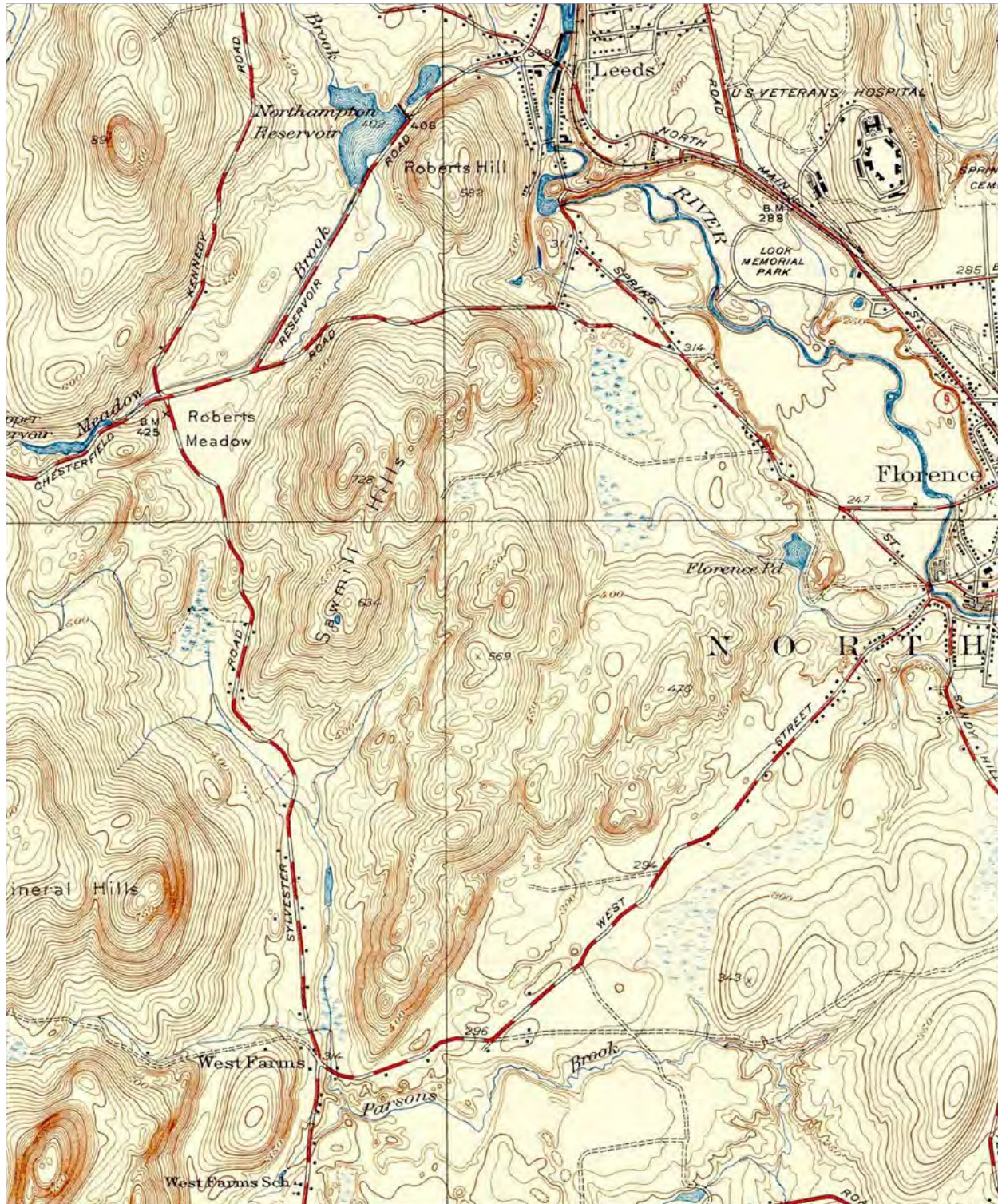


This image, taken in 1895 from the top of the original Florence Grammar School, shows a northwest view, with Ryan Road (then known as West Street) on the other side of the Mill River and its mill pond. The hillsides of the Sawmill Hills are mostly cleared, with only a scattering of pine. Based on the patches of snow, the photo was probably taken in March or late April. *Photo copied from Images of Northampton by James M. Parsons.*



Maps from 1856 (*above*) and 1895 (*below*) show that there were no significant changes in the interior of Sawmill Hills during the 19th century. Rather, all of the new activity occurred around the edges, including more than two dozen new homes along Spring Street and Ryan Road (then West Street). In 1895, Bartlett's Sawmill still appears on the map.





By the time this topographic map was made in 1939, Bartlett's Sawmill no longer appears on the map, but a new road that leads to (and past) what is now the National Guard building had been built. In addition, the road to the ice pond/sand and gravel operations and another dirt road off West Street show up. Other than those roads, however, the interior of the Sawmill Hills and Roberts Hill still remained completely unoccupied.

Aerial Views from the 1950s & 1960s



(A) This view shows the intersection of Reservoir Road and Chesterfield Road, with the linear telephone and telegraph line cutting east-west through the forest of the Sawmill Hills and another telephone line angling northwest through what is now conservation land near the National Guard and within the Roberts Hill Greenway. Note how uniform in age the upland oak forest is versus a patchwork of cutting history. Sylvester Road is visible along the western boundary.

(B) The intersection of Ryan Road and Spring Street, with the ice pond near the top of the image. Sand and gravel mining operations have begun in and around the ice pond, and so has the first subdivision. A.T. Lilly's productive field (now a parking lot) at the intersection of Pine and Spring Street is still under cultivation.

(C) A slightly broader view of the Spring Street/Ryan Road area, but now a decade later. The ice pond is visible near the top of the image, and the sand and gravel operations off Ryan Road are now much larger and another new subdivision (west of the first) is being laid out.





The lack of change in the Sawmill Hills is clearly shown in this map that documents land use changes in purple between 1971 and 1999. Aside from the development of new homes along the periphery, not much has changed during the last forty-five years.



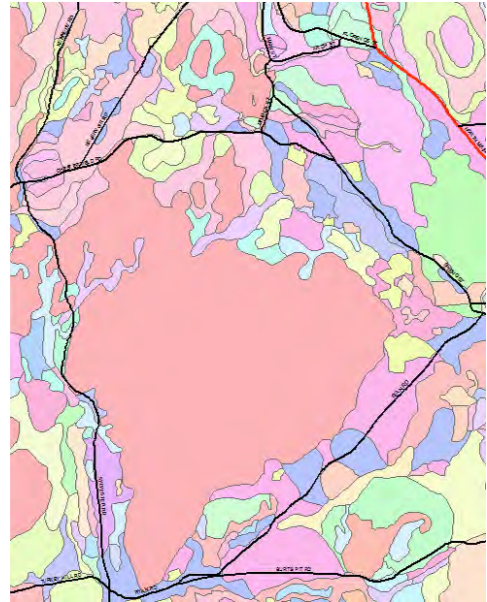
During the last decade, two new homes with long driveways have been built that extend into the Sawmill Hills. Without further land acquisition, more development of this kind can be expected.

During the last century, a powerline was installed along the eastern margin (~ late 1930s) and beginning in the 1940s and 50s, several sand and gravel mining operations began along Ryan Road and Spring Street. Aside from these activities and the construction of dozens of new homes (many of them on the former sand and gravel operations), little else has happened in the Sawmill Hills.

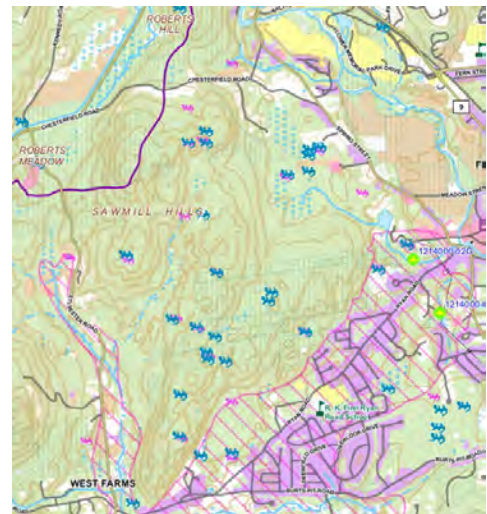
Major Vegetation Patterns

The Sawmill Hills Area is overwhelmingly dominated by dry, rocky uplands and thin, acidic soils. These are tough conditions for most plants and the flora in these areas is limited and predictable. On the drier hilltops, chestnut oak grows above thickets of low-bush blueberries and huckleberries. On the moister slopes, a wider mix of oaks occur, including red oak, white oak and black oak. Mountain laurel, witch hazel and maple-leaved viburnum are widespread in areas with thicker soils. White pine is widespread throughout the property, black birch is common in previously logged areas and hemlock is scattered. Wildflowers and grasses are generally sparse.

The greatest diversity of plant life in the Sawmill Hills is found in its wetlands and streams. Although these habitats make up a tiny percentage of the landscape—less than 10%—their contribution to the overall diversity of the Sawmill Hills is significant. In fact, forested wetlands, vernal ponds and stream corridors support many more plant and animal species than all of the upland areas, demonstrating that, like wetlands everywhere, these areas play a disproportionately large role in terms of biodiversity.



This soils map of the Sawmill Hills reveals how uniform the interior core is. This extensive area is covered with thin, acidic soils and innumerable rock outcrops, which are dominated by oak forests. The variation in the vegetation, as this map shows, occurs along the edges where changes in slope, soil type, hydrology and/or past land use.



This map shows wetlands (blue), vernal pools (salamander profile), homes (lavender) and the boundaries of the Zone II (pink hatching). City-owned land is shown with green hatch-

Six of the most common vegetation patterns in the Sawmill Hills are:



Red, black and white oak forests, with chestnut oak on the highest, driest ridges. Where chestnut oak dominates, the understory vegetation is sparse to absent.



Mixed hardwoods, with an abundance of red oak, in terrain with deeper, richer soils and abundant outcrops. Mountain laurel, witch hazel and maple-leaved viburnum is abundant.



There are hundreds of acres where mountain laurel thickets dominate the shrub layer below the slow-growing oaks.



White pine dominates areas that were once cleared for pastures or because of past logging operations.



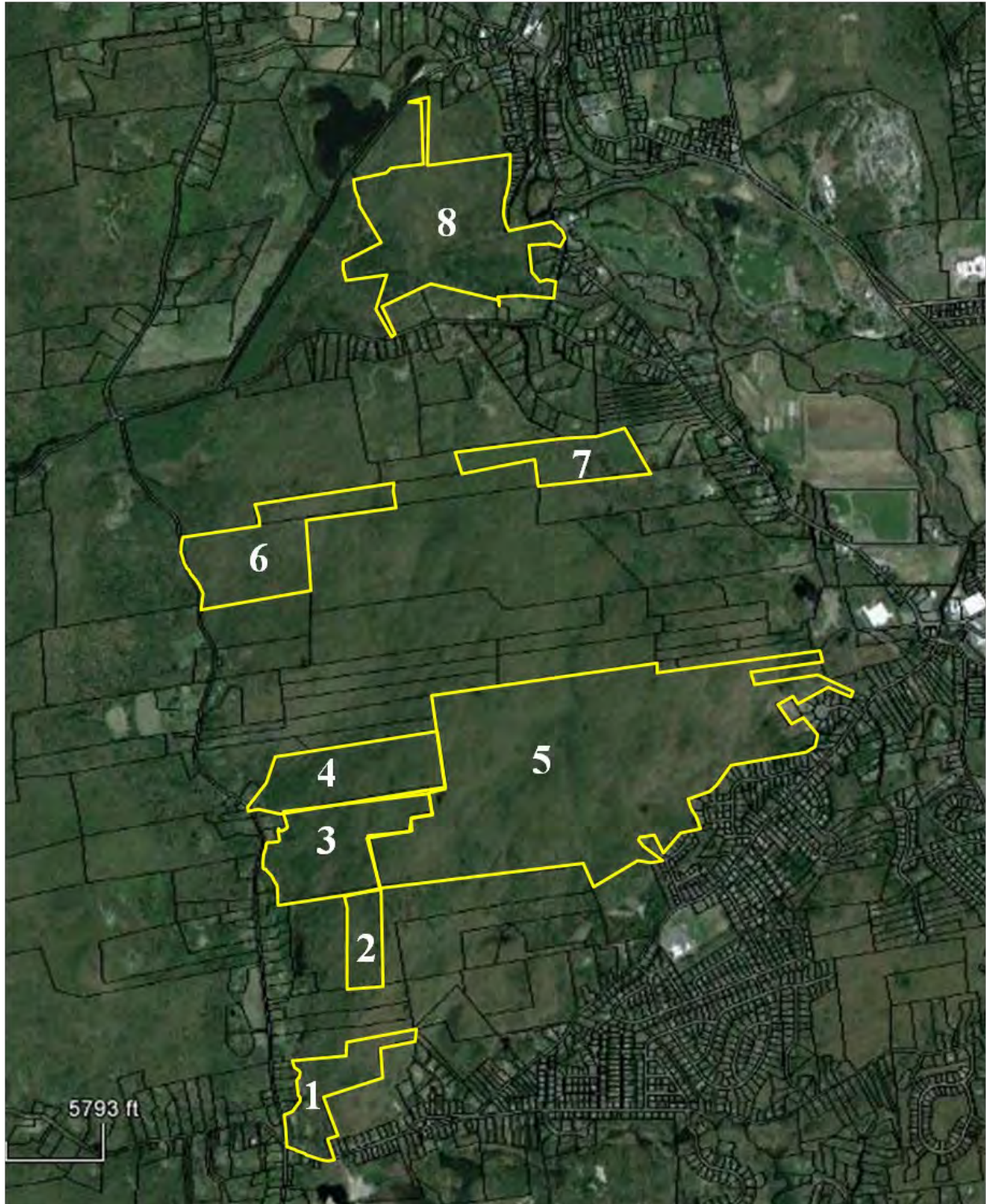
Except for the Mill River, all of the other streams in the Sawmill Hills are smaller than Parson's Brook (above) and most are intermittent. Plant diversity spikes along its borders.

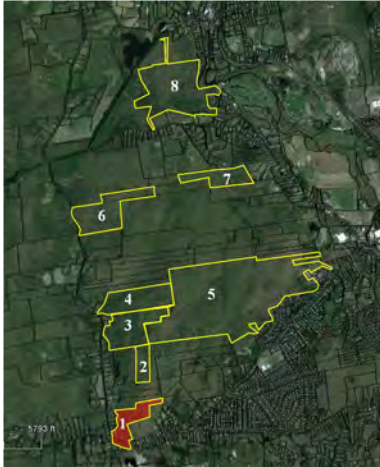


Wetlands, both small pockets as well as more extensive swamps, occur with some frequency in the Sawmill Hills. Some of them also function as vernal pools.

The remainder of this report will provide more detailed descriptions of the city’s conservation areas, from south to north.

#





Conservation Parcel 1: Turkey Hill / Ryan Road/ Sylvester Road

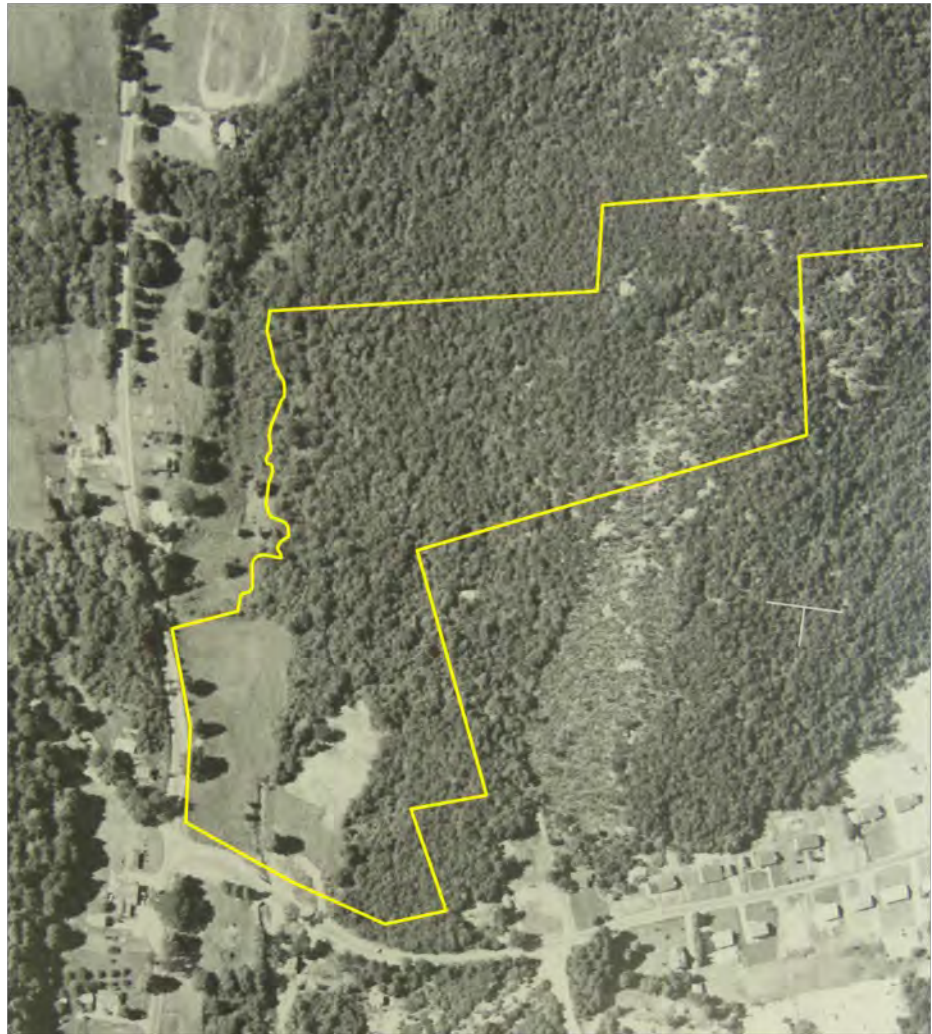
This 32-acre property supports eleven different plant communities, including an interesting beaver pond, a good-sized vernal pool, 1500 feet along Parson's Brook, small grassy clearings, oak-pine forest and impressive rock summits. It is also within easy walking distance of dozens of homes and with some modest improvements, it has the potential to become a much more popular conservation area—not only for picnicking and nature observation, but also, if a trail were created,

a place to hike and connect to the elaborate trail network in the Sawmill Hills.

History

For many years, the level land along Parson's Brook was cleared and open (*see 1965 photo right*). There was also a small house not far from what is now the beaver pond, but prior to the City's purchase of the land, the house was torn down and where the foundation was located, there is now a good-sized and slightly dangerous hole.

The vegetation in the vicinity of the former house is surprisingly natural, with only a



This 1965 aerial shows the mix of open and forested land, along with the property's approximate boundaries.



As the old fields have grown in, the property, seen here in 2013, has become more forested. Meanwhile, the amount of open water, courtesy of the activity of beavers, is also much more extensive than it was fifty years ago.

small amount of myrtle and no lawn. The former owners, however, did keep a small flower garden, the remnants of which can still be found on the other side of Parson's Brook and along the edge of the old field. From the house, the little garden area was reached by a wooden footbridge, which is now gone. To mow the field, the owners used what is now a small wood road off Ryan Road.

Invasive Plants

Like much of the Sawmill Hills, invasive plants are not yet a serious problem at this property. They do occur, however, and without any control efforts, they will continue to increase and spread. Most are found along the roadside edges, in and around the old fields, and a few (multiflora rose especially) are scattered in the wetlands. As elsewhere in the Sawmill Hills, the forested uplands and rocky summits are—at least for now-- entirely free of invasive plants.

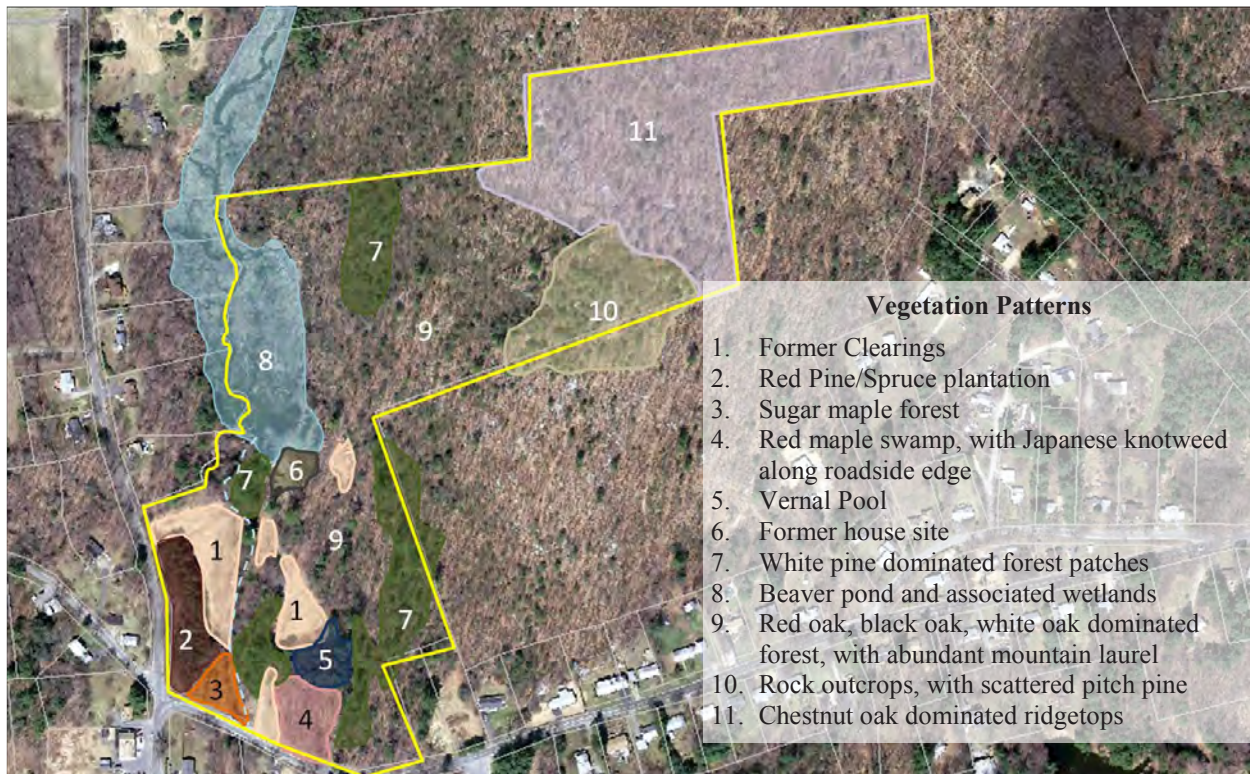


Japanese knotweed forms a border along one of the field edges. Without control, it will further spread into the field and forest.

The most problematic invasive plants at this site are, in order of importance:

- Japanese knotweed, which is found along the edge of Ryan Road and on the borders of the old fields;
- Asiatic bittersweet, which is scattered in and around the field edges, in particular, in the red pine/spruce plantation and along the old stonewall boundary;
- Multiflora rose, which is scattered along the edges of the wetland and Parson's Brook;
- Morrow's honeysuckle and some good-sized winged euonymus, which are also found in and around the old clearings, especially on the west side of the brook in the area where sugar maple is common. Garlic mustard is also present here, especially along the edge of the road.

A small patch of lesser celandine was found along the brook (not far from the old flower garden) and a single autumn olive was found growing on the margin of the beaver pond wetland.



This map shows rough boundaries of the major plant communities, as well as Parson's Brook (dashed line) which flows south out of the property. A large glacial kettlehole is located off the property and in the northeastern corner of the image; it is bordered by steep cliffs on the western edge. High-bush blueberries and false loosestrife (*Decodon verticillata*), a native species, dominate this shrub swamp/wetland pocket.

This conservation area falls within MA NHESP's BioMap Core Habitat.



(A) The field on the western side of Parson's Brook is mostly goldenrod, but also includes an abundance of sensitive fern, touch-me-not and many young saplings. Meadowsweet, meadow rue, grape and blackberries are also common. Non-native plants include scattered multiflora rose, Morrow's honeysuckle, bittersweet and a single autumn olive. At the far end of this field is the former flower bed (iris, daffodils, flowering quince, hyacinth). The clearings near the access road (east side) are drier and support more grasses, such as little bluestem. These clearings are underlain by sandier soils. (B) A meander along Parson's Brook and the remnants of an old beaver dam.



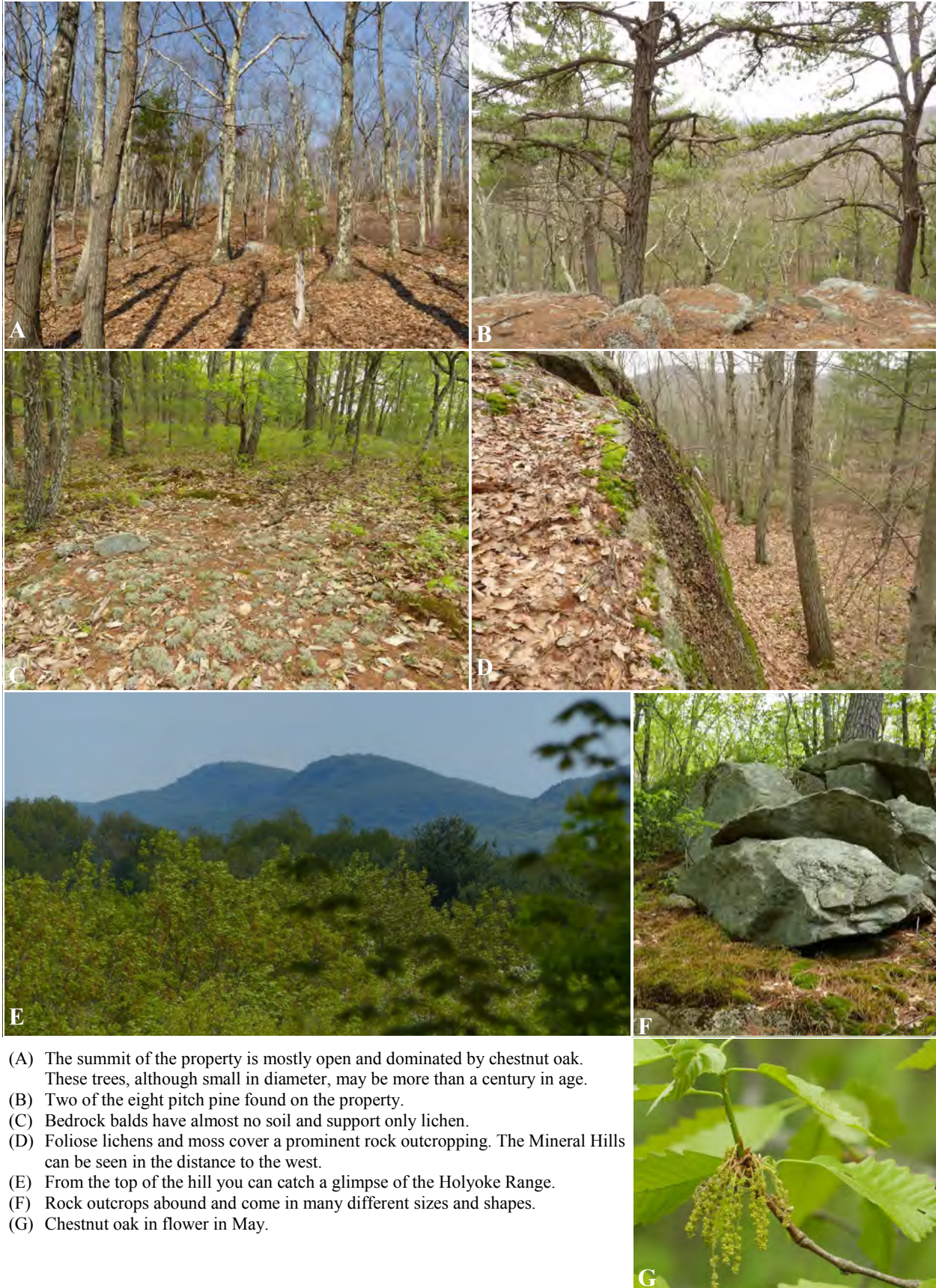
(C & D) During the last twenty (or so) years, beavers have reinvaded and dammed Parson's Brook just above the former house site. Here are two views at different times of year. The beaver pond is a hotspot for wildlife.



(E) The view from the edge of the beaver pond, looking back to the clearing where the cabin/house once stood. (F) A layer of ice covers the certified vernal pool, which is dominated by highbush blueberry and red maple. Buttonbush and meadowsweet are also common here.



(A) Red pine stand in the southwestern corner of the property; (B) Spruce and white pine plantation in the southwestern corner with abundant hayscented fern in the understory. Sugar maple is abundant here, as is bittersweet, Virginia creeper, a variety of young saplings, plus many other herbaceous plants (star flower, Canada mayflower, bracken, touch-me-not). (C & D) Shallow wetlands along the flooded margins of the beaver pond provide breeding habitat for spotted salamanders. (E) Along the slopes, red oak dominates the canopy, while mountain laurel is abundant in the shrub layer. (F) Closer to the summit there is a mix of bare rock, white pine, chestnut oak and occasionally pitch pine. Polytrichum moss, lichen, cow-wheat, huckleberries and lowbush blueberries grow in the understory.



- (A) The summit of the property is mostly open and dominated by chestnut oak. These trees, although small in diameter, may be more than a century in age.
- (B) Two of the eight pitch pine found on the property.
- (C) Bedrock balds have almost no soil and support only lichen.
- (D) Foliose lichens and moss cover a prominent rock outcropping. The Mineral Hills can be seen in the distance to the west.
- (E) From the top of the hill you can catch a glimpse of the Holyoke Range.
- (F) Rock outcrops abound and come in many different sizes and shapes.
- (G) Chestnut oak in flower in May.

Recommendations

- Although a sign to indicate the property's conservation status was recently installed along Ryan Road, it would also be helpful to create a small parking lot next to it (~3-5 cars). A kiosk could also be installed here that shows a map of the property's boundaries.
- The area of the former house clearing would make an attractive picnic area, but the scattered junk should be cleaned up and the hole of the former house site should be filled in and leveled.
- Working with the abutter to the east, it would be great to create a trail that leads to the summit and to another trail, which is connected to the elaborate network of trails in the Sawmill Hills.
- Place a bench and/or small blind discreetly along the edge of the beaver pond to encourage wildlife viewing
- Control Japanese knotweed and other non-native plants using volunteers and a licensed applicator.
- Mow the fields and clearings to maintain wildlife openings; work with neighbors to mow a path through the western clearing and build a foot-bridge to connect the two areas that are divided by the brook.
- Offer a natural history walk here and foster neighborhood involvement in the property's maintenance and stewardship.



Deer ticks were fairly common at this site, so that existing trails should be maintained and future paths should be wide enough for people to avoid brushing against the vegetation.

Conservation Parcel 2: Formerly West & McGowan

Acquired by the City in 2009 from Justin West and Eileen

McGowan, this 18-acre conservation area includes a mix of swamp forest, oak slopes and steep, rocky cliffs with a jumble of rocks below. A trail passes through the property and joins another trail at the top of the hill. The wetland is full of hummocks and shallow to knee-deep pools, which drain to Parson's Brook.

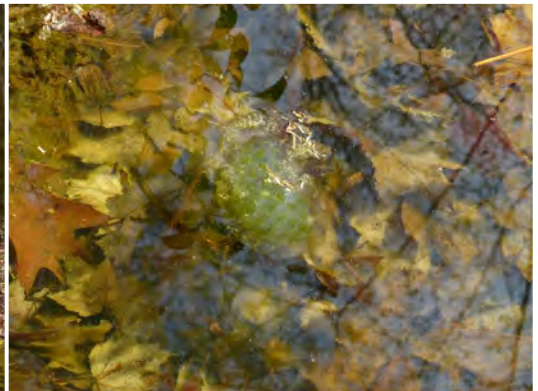


In May 2014, I found a few spotted salamander and wood frog egg masses in the deeper water areas, and the sphagnum-covered hummocks look like potential nesting habitat for four-toed salamanders, an uncommon species in Massachusetts and so far, unknown from the Sawmill Hills. The wetland hummocks supported a mix of species, with the most common shrubs being winterberry, high-bush blueberry, and mountain laurel and the most common

herbaceous plants being cinnamon fern, royal fern, gold-thread and Canada



Located not far from the original Bartlett Sawmill, this 18-acre property has been wooded for years and includes a mix of uplands and wetlands. The topographic lines on this image reveal just how steep the eastern slope is. The swamp forest is located in the northeast corner of the property. It is fed by groundwater and acts as a vernal pool (*images below*).





(A & B) The perched wetland sits in a bedrock basin. Sloshing through the water, with the steep rocky cliffs to the east, it feels like you are in a wild, remote place and yet you're just 15 minutes from downtown Northampton.

(C & D) Large rock cliffs and outcrops form the property's eastern boundary.

(E) At the summit is a well-used trail, which connects to more than 5 miles of other trails.

(F) From the summit, you can occasionally catch a glimpse of the Mineral Hills to the west. A few judicious tree removals would create a year-round vista.

mayflower. The wetland overstory was almost entirely red maple, with a few scattered white pine and hemlock.

The slopes to the east include a rocky jumble and cliffs. The forest here is dominated by oaks, principally red oak and chestnut oak, but red maple was also abundant. Mountain laurel is thick and forms almost impenetrable thickets.

And here's some cause for celebration: no invasive plant species were found in this area!

Recommendations

- Map all the trails and gain permission to access this area from Sylvester Road.
- Cut a few trees at the summit trail, which is just off the property, to create a view to the west.
- Return to check for Jefferson's salamanders and four-toed salamanders.

Conservation Parcel 3: Formerly Symanski

Acquired in 2013, this 58.22 acre parcel is a key piece in the jigsaw puzzle of protected land and in-



cludes several different habitats, including a beautiful stretch of Parson's Brook, three swamp forest areas, two intermittent streams, a dense grove of hemlock, impressive white pine stands, a richer shag-bark hickory forest, as well as a small portion of a vernal pool, oak-pine woods and dry, rocky uplands. Although a portion of the property near Sylvester Road was logged during the last decade, even in this area, the forest is, generally speaking, not too difficult to walk through and the obstacles are more likely to be mountain laurel thickets than slash and logging debris.

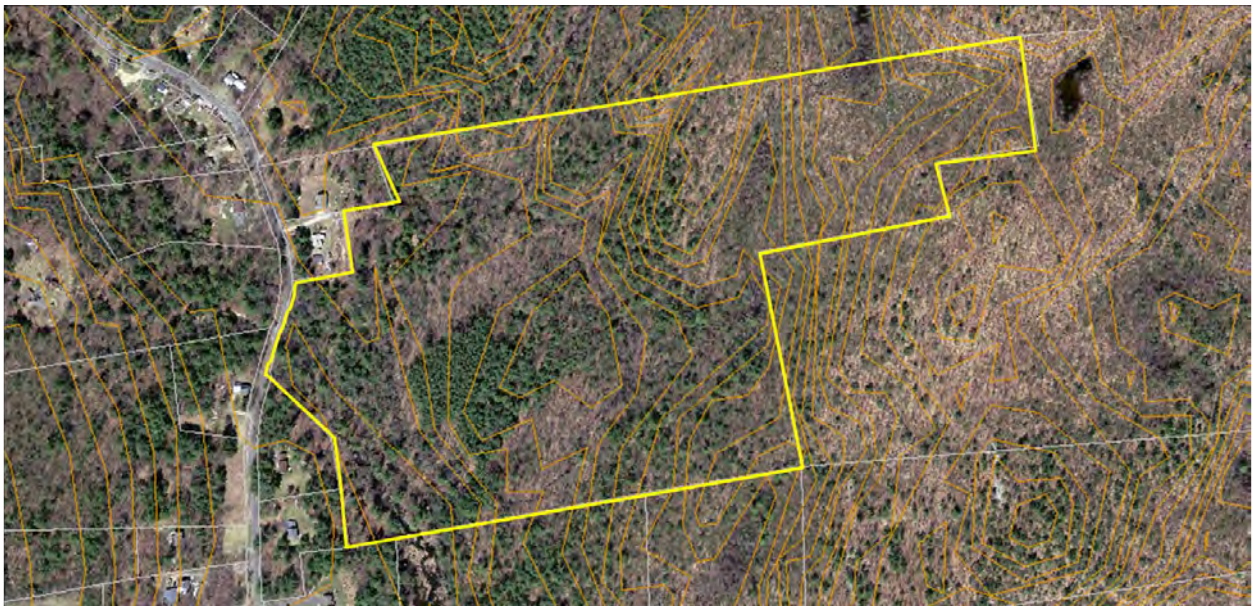
In addition to its varied habitats, what also makes this property noteworthy is that nearly all of it is free of invasive plants. Those non-native plants that do occur are found along the tributaries that are closer to Sylvester Road and along the banks of Parson's Brook. The most abundant and widespread is Japanese barberry, but these areas also include some multiflora rose, Asiatic bittersweet and Morrow's honeysuckle. In a single day in the spring, a crew could treat nearly all of these invasive plants which, without control, will spread and increase in quantity and area.

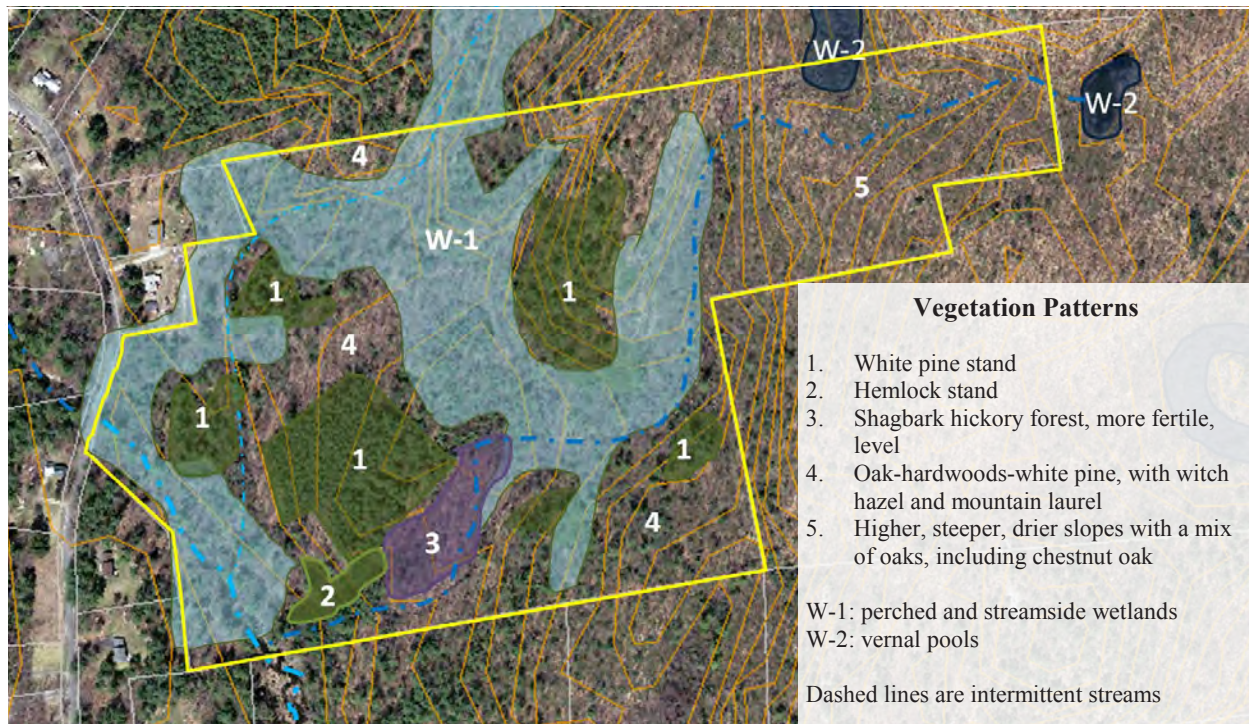
Recommendations

- Control invasive plants along Parson's Brook
- Develop additional trails



The property in 1965 (*above*) and in 2013 (*below*), with elevation contours. It is possible that Bartlett's Sawmill was located on this property. Based on the 1856 and 1895 maps, however, it appears to have been a little further downstream.





(A) The largest white pine stand (#1) on the property, with young birch and white pine saplings in the understory. (B) The hemlock grove (#2) with no vegetation below, but scattered red maple and pine. (C) The richer, more open shagbark hickory and ironwood forest with a small stream. (D) An old stone wall, not too far from Sylvester Road, in the woods. Note the pileated woodpecker hole in the dead tree in front.





- (A) The swamp forest near Sylvester Road.
 (B) The stream that flows from the former Reutener property (now conservation land) and enters this conservation area.
 (C) The same brook a little further downstream and now significantly rockier.
 (D) Parson's Brook, three times as wide and much more open than its smaller, shadier tributary.
 (E & F) Parson's Brook, heading toward Sylvester Road and rockier still. This may be in the vicinity of Bartlett's Sawmill, which was initially powered by this brook and later by steam. Note the patches of barberry on the banks in Photo E.



(A) Beaver activity along Parson's Brook downstream from the conservation area has caused the water to slow down and spread out, creating marshier habitat. (B) The beginning of the true beaver pond lies just off the property. It is a place that feels remote and wild in spite of being within earshot of Sylvester Road.



(C) Cut stumps are hard proof of a logging job done sometime during the last two decades. Above them grows a shrub layer dominated by witch hazel. (D) An old wood road and bridge over a tributary stream leads into the forest.



(E) Signs of human activity are few and far between. Here are the remains of an old camp in the midst of the largest grove of white pine. (F) Above the largest white pine stand is a perched wetland, dominated by red maple in the overstory and a mix of ferns and wildflowers below. No non-native plants were found here.



(A) The property's perched wetlands vary in their vegetation and this one, located near the eastern edge of the property, includes a braided stream below a canopy of yellow birch, red maple, and ash. The hummocks are covered with mosses as well as cinnamon fern, violets, gold thread, golden alexanders, sensitive fern, golden ragwort, and partridgeberry. (B) A vernal pool occurs above this wet seep. Curiously, in addition to oaks and other hardwoods, there are several tulip trees in this area.



(C and D) Beyond the wetlands the forest change is swift and dramatic, transitioning to woods that are dominated by hardwoods, especially oaks. The thin, acidic soils support relatively few species of understory plants, giving the forest and open park-like quality.



Although the dry uplands do not support as many species as the wetlands, you can still find a variety of animals here, including common garter snakes.



Conservation Parcel 4: Formerly Reutener

Acquired in 2014, the 52-acre Reutener property connects with 435-acres of conservation land (Parcels 2, 3, & 5) and from the perspective of conservation planning, it was one of the most exceptional acquisitions within the Sawmill Hills. In addition to its size and location, it is recreationally, aesthetically and ecologically one of the most important properties within the Sawmill Hills region. The following information is drawn from an ecological inventory that I prepared for the City in May 2014.

Recreational Value

The Reutener property includes its own network of well-maintained trails, which begin near the parking area and the family's Sugar House on Sylvester Road. These trails pass through or near most of the property's different habitats and just as significantly, they connect to a much larger, interconnecting trail system that spans the Sawmill Hills.

Aesthetics

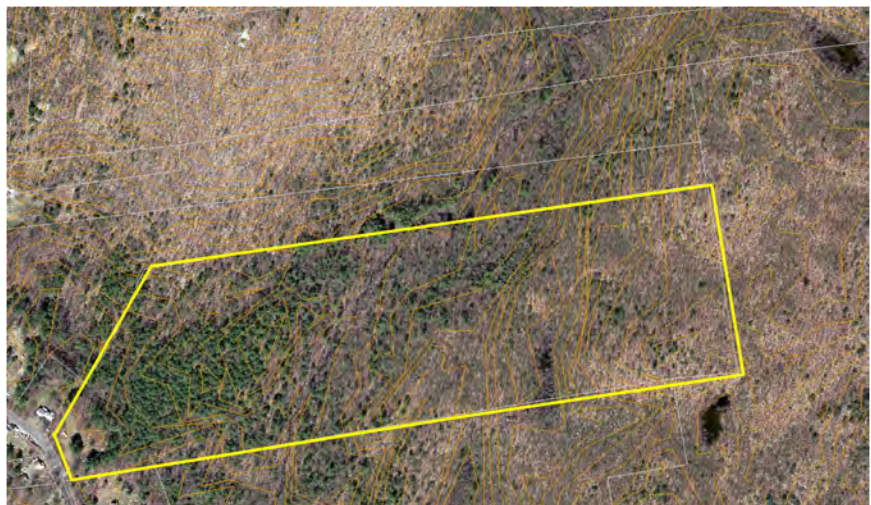
Like many areas in the Sawmill Hills, the property is beautiful, with up and down terrain, a cascading brook, bedrock outcrops, fairly open woodlands and impressive views from the higher elevations and cliffs.

Ecological Diversity

Underlain by 400 million year old gneiss and a relatively thin veneer of glacial till, the Reutener property is topographically varied and supports ten different kinds of natural communities. Although nearly all of them are common and wide-



The trail that begins near the sugar house is wide and mostly level, making it accessible to many people.



spread in our region, they are of high quality and show little to no sign of human disturbance and none have invasive species problems.

The habitats are unevenly divided between uplands and wetlands, with uplands comprising almost 90% of the property. Given the acidic, shallow soils, the flora in these areas is relatively narrow and predictable. White pine dominates a large portion of the land, while further up the slope, the composition of the woods shifts to red oak and at the highest and driest elevations, it transitions to chestnut oak. Broad swaths of mountain laurel grow below the red oak-dominated canopy, and witch hazel and maple-leaved viburnum are also extremely common in this forest type. In the chestnut oak dominated woods, these species drop out and are replaced by drought and fire tolerant species like low-bush blueberries and huckleberries.



The wetland portions of the property make up only about 5 acres, but their contribution to the site's overall diversity is significant. In fact, the stream corridor, vernal pond and small drainages actually support more plant and animal species than all of the upland areas on the property.





Natural Communities and Trail Map

Wetland Natural Communities

W1: Low energy streamside forest
W2: Red maple swamp
W3: Vernal Pool



Upland Natural Communities

- 1: Succession White Pine, transitioning to White Pine-Oak
- 2: Red Oak-Sugar Maple Forest
- 3: Acidic Rocky Summit/Rock Outcrop & Acidic Rock Talus
- 3B: Acidic Rock Cliff
- 4: White Pine-Oak Forest
- 4B: Mixed Oak Forest with Mountain Laurel
- 5: Ridgetop Chestnut Oak

White Pine Successional (1) grows on a large part of the property. In some areas, it has grown up in places that were once former fields, but in others, the historical reason for its presence is unclear. In the latter areas, the land may have been opened up by logging, fire, or hurricane damage.

Although white pine is the dominant canopy tree, a few scattered hardwoods are also typically mixed in with these stands, including white oak, red maple, big-toothed aspen, and hemlock. Usually, the vegetation in the understory is scant, with occasional small patches of mountain laurel, or if bedrock is close to the surface or exposed, there are swaths of *Polypodium* moss and a mix of low bush blueberries and huckleberry. When present, the herb layer includes Canada mayflower, wintergreen, partridgeberry, starflower, and in drier, more open sites, cow-wheat, bracken fern and Pennsylvania sedge. Patches of running clubmoss and ground pine are also fairly common.

Red Oak-Sugar Maple Forest (2) is very limited on the property and occurs near the sugar house and also in its southwest corner. Ironwood, big-toothed aspen, shagbark hickory, red maple and occasional hemlock are also present in this forest type, and while the understory is largely free of vegetation, Canada mayflower, trout lily, and true solomon's seal are common near the Sugar House.



Acidic Rocky Summits and Rock Outcrops (3) are found throughout much of the property, and two of the larger ridges are highlighted on the Natural Communities map. In moister settings, marginal shield fern, Christmas fern and polypody fern and mosses are common, while at drier sites, lichens dominate. Pine, black birch, red oak and chestnut oak are all commonly associated with these barren knobs, and huckleberry and low-bush blueberries are also widespread.



Acid Rock Talus (3b) is found below the larger outcrops and ridges and includes a mix of red oak, black birch and infrequently, sugar maple, hop hornbeam and basswood. False honeysuckle and common sarsaparilla are common in the understory, but in general, these areas are very tough places for plants to grow. Porcupines regularly den in these jumbled rock piles, and in May 2014, a litter of six young pups (p. 38) were found at the base of the talus slope in this photo.



Acidic Rock Cliff (3B) is festooned with large liverworts and mosses, but few vascular plants.



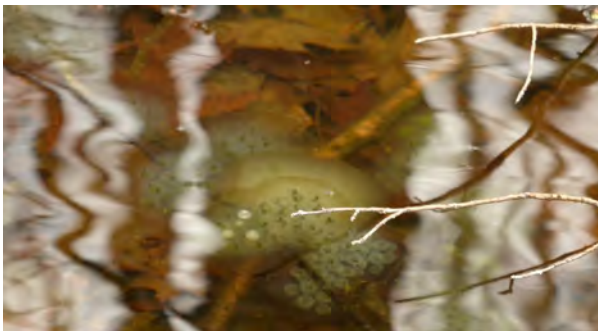
White Pine/Oak and Mixed Oak with Mountain Laurel (4 and 4B) cover nearly 50% of the upland areas. As the soils get drier, the species shift from white-pine and red oak to an increasing amount of red oak and mountain laurel. White oak, red maple, black birch and hemlock are scattered throughout this mix. Witch hazel is also extremely common in the understory and maple-leaved viburnum is common. The herb layer is scant.



Ridgetop Chestnut Oak (5) is found in the driest, rockiest areas and mostly at the highest elevations. The forest here is open and almost entirely dominated by chestnut oak. Black oak, red oak, and white oak are also present, and black birch and red maple are occasional. The understory vegetation is thin, with huckleberries, low-bush and early blueberries in the shrub layer. The herb layer is almost entirely absent, but cow-wheat, sedges, and bracken fern occur.



Low-energy Streamside Wetlands and the Stream (w1) on the property are one its most beautiful features. This cascading stream meanders through the central part of the conservation area and is narrowly bordered by rich wetland vegetation. The bordering rocks are covered with mosses and liverworts and in the spring, the wetland edges are defined by the bright green leaves of false hellebore. Other common wildflowers include golden ragwort, Canada mayflower and less frequently dwarf ginseng, wood anemone, goldthread, marsh marigold, violets and turtle head. Ferns include cinnamon fern, hayscented fern, New York fern. The shrub layer is mostly absent, but witch hazel and mountain laurel inhabit the drier margins, while winterberry and spicebush can be found in the wetter areas. The nearby trees include red maple, big-toothed aspen, shagbark hickory, yellow birch, black cherry, ironwood and ash.



A small **Red Maple Swamp (w2)** fed by groundwater, overland runoff and precipitation is perched in the eastern half of the property. In spite of its small size, it provides a disproportionately large contribution in terms of plant diversity. Common species here include marsh marigold, skunk cabbage, watercress, golden saxifrage, cinnamon fern, sensitive fern and hummocks covered with sphagnum. In addition to red maple, the overstory also includes black ash and yellow birch, while winterberry, high-bush blueberry, young pine and mountain laurel are common in the shrub layer.



A single **Vernal Pool (w3)** is located on the property and is one of its most ecologically important habitats. Located in a shallow, bedrock depression in the bedrock, it is fed by groundwater, overland runoff and precipitation, it measures about half an acre in size. About 2/3 of the pool is shallow and characterized by mossy hummocks with high bush blueberry and winterberry, while the remainder is deeper and supports a small patch of buttonbush. Red maple rims the margins.

Recommendations

1. Organize a volunteer day to cut or handpull multiflora rose within the wetland corridor and monitor for Asiatic bittersweet and Morrow's honeysuckle throughout the property. Aggressively control the patches of swallowwort, which are located on Sylvester Road in the vicinity of the parking area.
2. Install a small kiosk (at the entrance to the woods and beyond the sugar house) and sign for parking along the roadside edge.
3. Install bridges across the wetland and stream crossings
4. Organize a field walk to showcase this new acquisition.



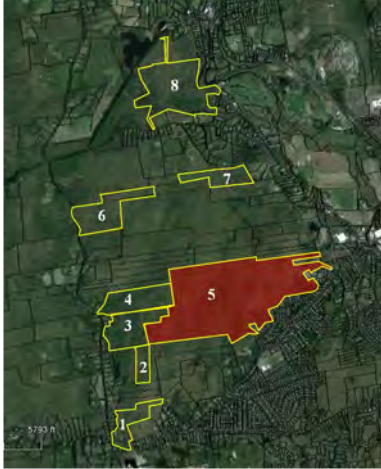
The vernal pool on this property is more valuable, ecologically speaking, because of its proximity to other vernal pools. All of these have been certified and are shown as blue asterisks. The yellow asterisks to the north are potential vernal pools.



My daughter, with binoculars, watching coyote pups in the mountain laurel thicket in May 2014. Now that this land is publicly-owned, more people should be exposed to this area.

5. Monitor the erosion along the trail (steep slope) near the eastern edge of the property.
6. Remove old barrels and other rusty junk along the trail.





Conservation Parcel 5: Sawmills Hills Core Area (multiple acquisitions)

Composed of several adjoining parcels, this 331-acre block of conservation land forms the core of the Sawmill Hills Greenway and includes some of the most ecologically significant areas within the Sawmill Hills/Roberts Hill Complex. What's more, given the focus of this

report, nearly 90% of this giant area is free of invasive plants.

Vegetation Patterns

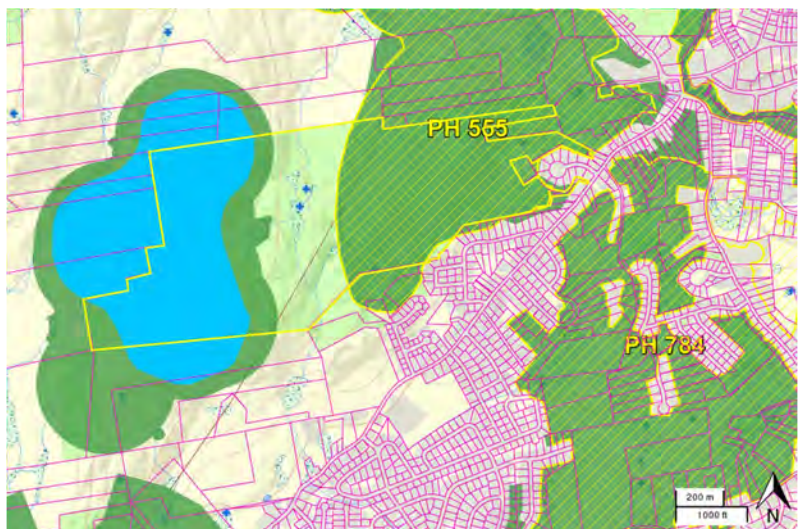
Like most of the Sawmill Hills, this area is dominated by rugged, rocky uplands. Wetlands and streams account for only 3% of the total—a mere ten acres! Nevertheless, in terms of their contribution to the property's overall biodiversity, wetlands play a large role. In fact, because of the property's vernal pools, swamp forests and streams, most of this land has been mapped by MA NHESP as BioMap Core Habitat, BioMap Vernal Pool Core Habitat, and Priority Habitat for Rare Wildlife.



A common scene in the Sawmill hills—rocks at the surface, a thick leaf litter and a surrounding overstory dominated by oaks.

Uplands

Of the 97% of this property that is upland, the majority is up and down terrain, with an impressive and confusing number of bedrock



This image shows rare species habitat (yellow hatching), vernal pool core (blue) and BioMap Core habitat (green). The configuration of this large chunk of conservation land is outlined in yellow.



The impressive cliffs, talus slopes and bedrock balds found in the Sawmill Hills are numerous and fascinating places. Aside from their aesthetic appeal, they provide important denning sites for raccoons, porcupines, coyotes, and other mammals. Not many plants grow in these areas, but on top of the rocky balds you can regularly find low-bush blueberry (right) and American chestnut saplings are common. A century ago, chestnut would have been a major component in the canopy and an important source of food for wildlife.





outcrops. As the Gazette’s editor wrote in 1880, the Sawmill Hills “is a lonesome, desolate region, broken up into a multitude of steep inclines, bluffs and precipices, and whoever ventures to attempt its explorations of [sic] a cloud day is very like to mix up the points of the compass and get lost.”

Getting lost may be even easier today. In the 1880s the landscape was almost entirely cleared, so at least then you had the chance of occasionally catching a clear view and perhaps spotting the church steeple in Florence or a nearby farm to help orient you and regain your bearings .

Today, these hills are entirely forested and there are almost no views—east, north, south, or west. Still, although it is hard to see from the property’s hilltops, these areas generally have fairly open understories, which makes them easy to walk through. Based on MA NHESP’s natural communities classification system, these drier plateaus and summits can be categorized as “ridgetop

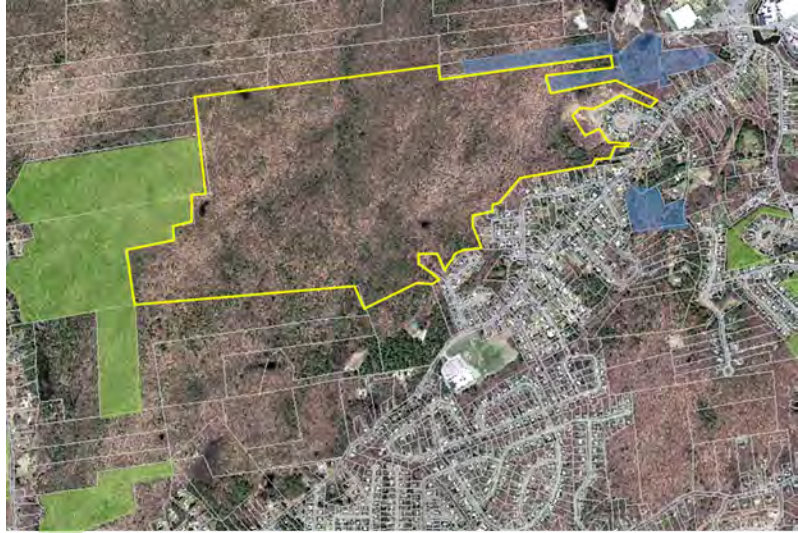


In addition to hardwoods, white pine is common in these woods and hemlock is also common along the edges of the swamp forests. This image also shows one of the many trails that pass through the Sawmill Hills and go for miles.

chestnut oak forests,” with chestnut oak dominating the canopy, a mix of huckleberries, chokeberries and low-bush blueberries in the shrub layer and a few herbs (wintergreen, partridgeberry, Pennsylvania sedge and poverty grass) growing below. Downslope from these ridges, on the side slopes and wherever the soils are slightly deeper and moister, chestnut oak is replaced by “mixed oak forest,” which includes several kinds of oak (mostly red, but also white , black and even some scarlet) as well as white pine, red maple, and a mix of other hardwoods (hickories, sassafras, big-toothed aspen and black birch). In these

settings, the shrub layer is often thick with witch hazel and/or acres and acres of almost impenetrable thickets of mountain laurel. Wildflowers and grasses, however are uncommon. Instead, most of the ground is covered with a brittle layer of oak leaves.

Regardless of where you are in these uplands, what's truly remarkable is that there are almost no invasive plants. None. Zero. Even along most of the trails! Rather than an absence of seeds, it probably has more to do with the acidic, dry conditions and carpet of leaves.

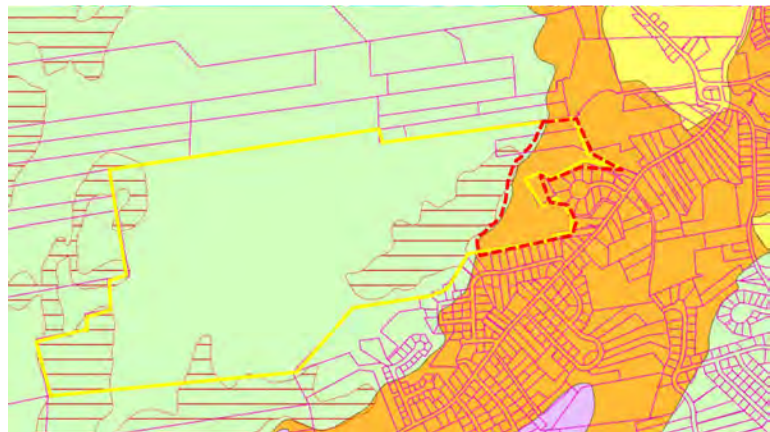


Beginning in 1992 with an acquisition of less than 2 1/2 acres, the City has been able to acquire more and more land in the Sawmill Hills, particularly in this area. Although none of acquisitions has been larger than 80 acres, this jigsaw-puzzle of protected conservation land (outlined in yellow) now encompasses 330 acres. The areas in blue are city-owned watershed land, while the parcels in green are more recently acquired conservation holdings, which were previously discussed.

Sand Barrens

In contrast to the essentially invasive-free rocky uplands, the remaining non-wetland acreage has been highly compromised by invasive plants and its future as one of the City's few remnant grasslands is threatened by their continued spread.

Located along the flanks of the Sawmill Hills, this area encompasses about 25 acres and is underlain by water-sorted, glacial outwash, laid down during the era of Glacial Lake Hitchcock. For thousands of years, generations of Nonotuck burned this nearly-level outwash plain, which kept these sandy barrens open and park-like. When the first English settled here, this landscape was probably dominated by pitch pine,



This surficial geology map shows the different kinds of deposits in and around the conservation area. Glacial till (*light green*) covers most of the property, while bedrock outcrops (*red lined units*) are also abundant. On the southern and eastern margin a tongue of glacial outwash (*orange*) underlies most of the Ryan Road neighborhood. The area outlined with red dashes is the 25 acres within the conservation area that includes old gravel pits, white pine woods and a remnant patch of pitch pine/sand plains.

blueberries, scrub oak, lupine, little bluestems and other species tolerant of fire and the site's tough growing conditions.

Beginning in the 1950s, the same droughty, nutrient poor sands that had long discouraged people from growing crops here became a valuable commodity. Over the next three decades, this area became the focus of several large sand and gravel operations. After the sands were exhausted, most of the former gravel pits were converted into house lots or subdivisions, the most recent of which was Avis Circle.



The remnant grassland, with an abundance of little bluestem and some young pitch pine seeding in behind.

Today, surrounding Avis Circle is one of the few undeveloped patches of glacial outwash sands in this area of Ryan Road. Although all of it was altered in the past (some areas much more than others) there is an acre and a half of open grassland/pitch pine barren and another similarly-sized patch of pitch pine/white pine and oak forest nearby that is relatively untouched (probably just scraped of its topsoil). The rest of the area is much more altered and it is awash in invasives, including big patches of Japanese knotweed, thickets of Morrow's honeysuckle, swaths of knapweed, tangles of bittersweet, carpets of garlic mustard and increasingly, more and more glossy buckthorn. In some places (like the old borrow



Above, the former gravel pit areas and stormwater detention basin (with Japanese knotweed in the basin) in early spring. Below, the former borrow pit, now with Norway maple, rocks from construction jobs, tangles of bittersweet and increasingly glossy buckthorn. Ecologically, this place is a real mess.

pit), the number of invasive plants is so high that any kind of control effort is doomed to fail. Not only expensive and time consuming, in these areas the benefits are questionable. The only hope in these highly degraded areas is that a series of effective biocontrol agents are discovered.

That said, invasive plants should be controlled



(A) Japanese knotweed is widespread and encroaching in the former gravel pit area. (B) In this same area, you can also see an expanding thicket of Morrow's honeysuckle, which is growing beneath black locust, pin cherry and other early colonizers. (C) Knapweed, a pretty but an aggressive invader, has established in and around the remnant grassland/pine barren.

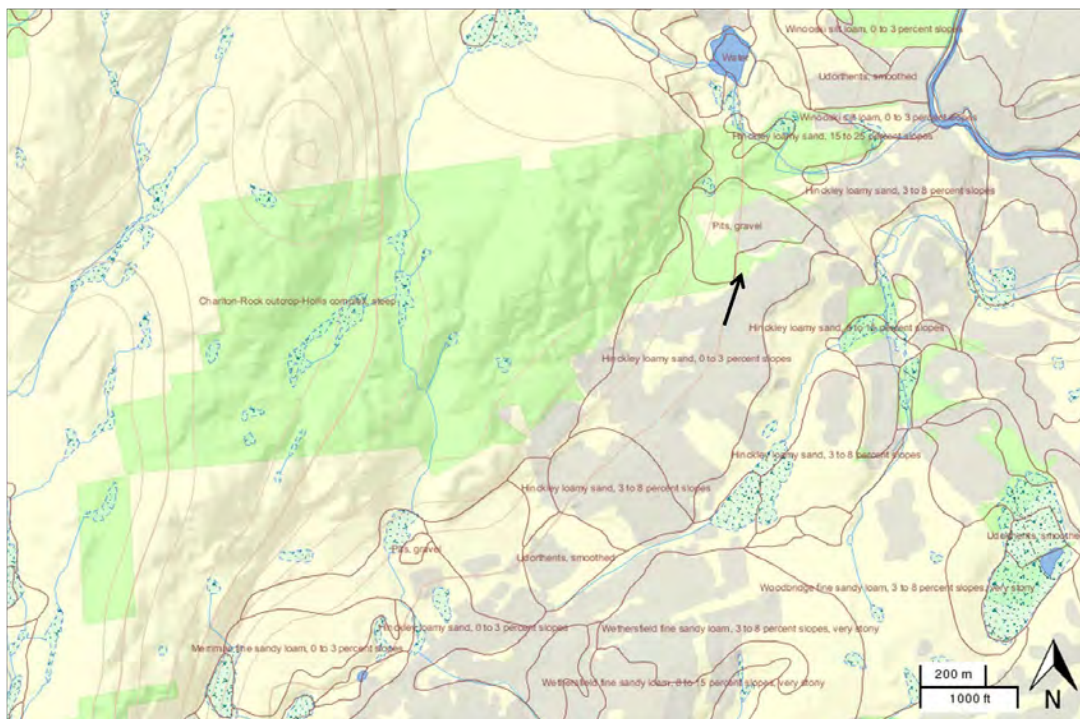
within the three acres that support the remnant grassland/pitch pine barren. Why? Because grassland/pitch pine barrens are one of the rarest habitats in Northampton and also one of the rarest habitat types within Massachusetts and the Connecticut River watershed. In Northampton, this habitat type once covered about 10% of the landscape, but due to development (gravel mining, landfills, cemeteries, and housing, this unusual habitat now covers less than 1% of Northampton.



A number of rare animals depend on grasslands and pine barrens for their survival. Whip-poor-wills, for instance, used to nest in this area as well as in the surrounding uplands. They have not been heard here for several years (Tom Gagnon, pers. comm.). These sand barrens are also important for groundwater recharge. They abut the City's public wellfields and are within a Zone II aquifer.



This image from the 1960s shows multiple gravel operations and subdivisions along Ryan Road.



This map from MA GIS shows the outline of the different soil units. Along the flanks of the Sawmill Hills, the outwash plain has developed into Hinckley sandy loams. Gravel pits are also shown. Interestingly, the remnant piece of grassland/sand barren is shown (arrow) just beyond the outline of a gravel pit.

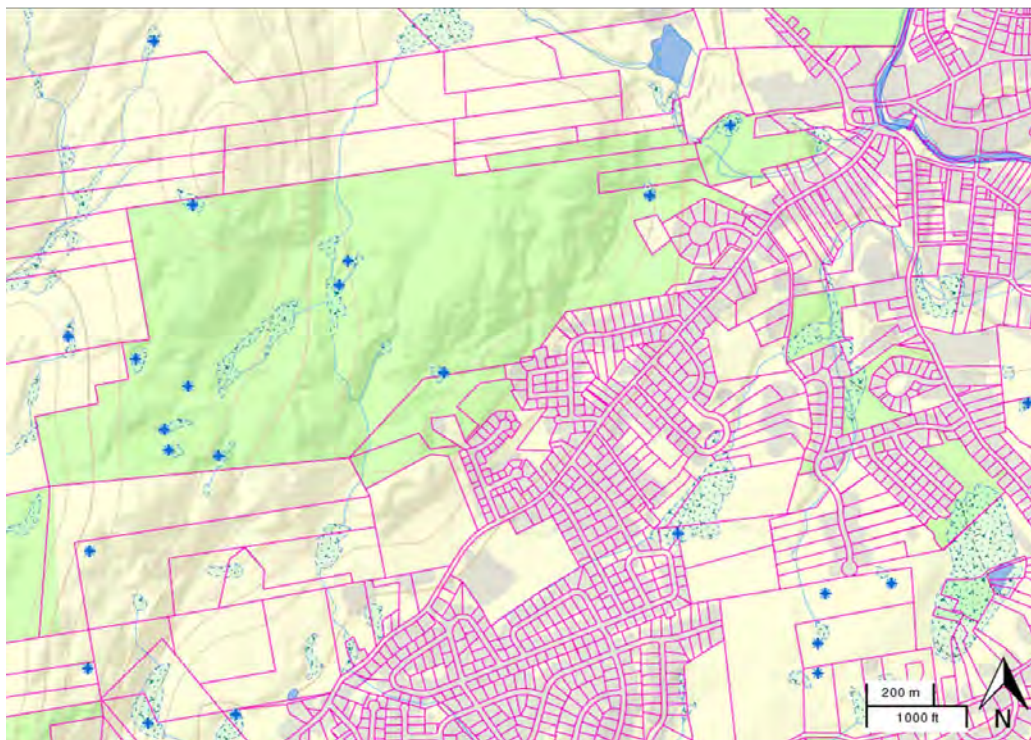
Wetlands

The final component of this conservation area is its wetlands and waterways. As mentioned earlier, although swamp forests, vernal pools and streams account for barely 3% of this 330-acre property, they hold most of the property's biodiversity—both for plants and animals. And here's the other good news about the wetlands: they support almost no invasive plants. There are a few multiflora rose and a few strands of Asiatic bittersweet, but

otherwise, they are free of invasive plants. There are some problems with invasives in the wetlands near Spring Street owned by the City's water department and some additional invasions on private land, but on both properties, the adjacent area was disturbed historically, which appears to have made these areas more vulnerable.



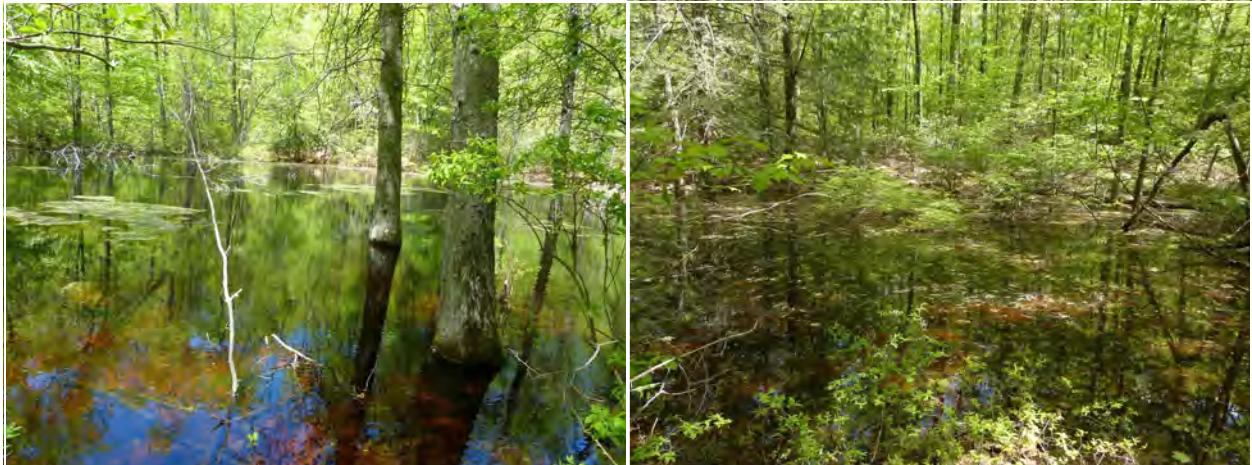
A vernal pool in the uplands that is dominated by tupelo, some of which have old growth characteristics. Tupelo, or black gum, is the oldest living tree in the eastern United States.



The location of wetlands, streams and vernal pools within this portion of the Sawmill Hills.



This is the largest vernal pool on the property and measures half an acre when it is full of water. By mid-summer, it is completely dry. It is located in a bedrock depression in the uplands. Note the pin oak, with its craggy branches, in the first image.



Ten vernal pools are found in this 330-acre property, ranging in size from 1/8-1/2 an acre in size. They have all been certified, many by Molly Hale. Each spring students from the RFK Finn school visit some of the pools as part of a unit on ecology.



About 200 acres in the Sawmill Hills drain to Parson's Brook, while the remainder flows into the Mill River.



Many of the vernal pools in this part of the Sawmill Hills are found within the property's swamp forest habitat, which, compared to the surrounding uplands, feels lush and diverse. Many animals, including this red eft and green frog, depend on these areas to survive. Several species of plants, including this uncommon spring coralroot orchid and an unidentified orchid (probably purple fringed) occur in these special habitats as well. The largest swamp forest within this property is only four acres in size.





Vegetation Patterns

Uplands

- 1: Ridgetop Chestnut Oak Forest and Mixed Oak Forest. Darker background is mountain laurel
- 2: White pine/pitch pine stand
- 2a: White pine grove
- 3: Hemlock-dominated stand
- 4: Former gravel pits, highly altered and highly compromised by invasive plants
- 5: Remnant sand grassland/pitch pine barren

Wetlands

- w1: Perched swamp forest, with vernal pools, draining to the Mill River
- w2: Perched swamp forest, with vernal pools, draining to Parson's Brook
- vp: isolated vernal pools



Although most of the soils in this section of the Sawmill Hills are dry and acidic, there are a few small areas with richer, more fertile soils. Where these conditions exist, you can find leatherwood, perfoliate bellwort, wild columbine and a handful of other plant species that only grow in these settings.

Recommendations

- Control invasive plants within the sandplains/pitch pine barrens and consider a very small, controlled burn in the former grassland area, mechanical mowing...or goats?
- More clearly identify trailheads and parking areas and develop a map/ brochure that shows access points
- Repair the few places where the trails are muddy or require bridges for stream crossings
- Work with neighboring groups and abutters to promote passive use of this area and prevent the dumping of yard waste
- Acquire additional land in and around this area



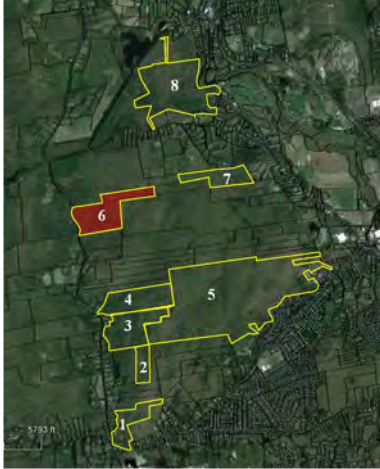
One of the few places where ATVs have muddied the trail.



Yard waste, courtesy of a neighbor.



An impressive kettlehole to the west on private land and bordered on one side by impressive cliffs and boulders.

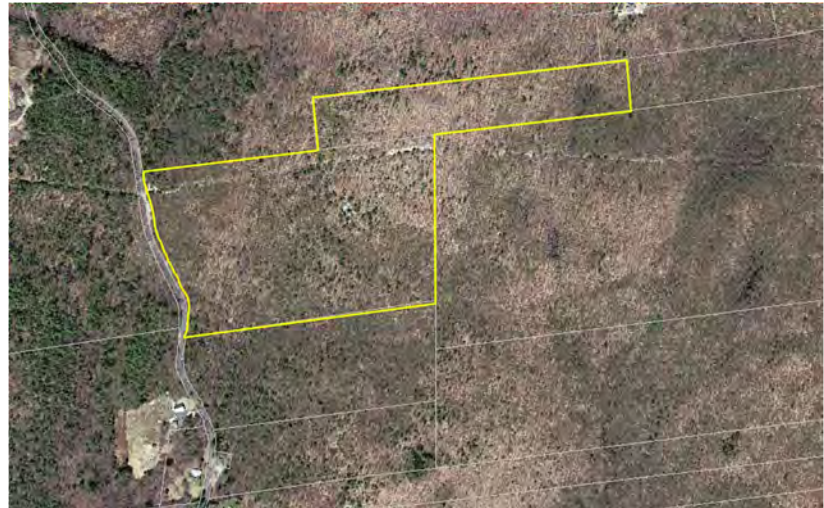


Conservation Parcel 6: “Jeep Eater Trail”

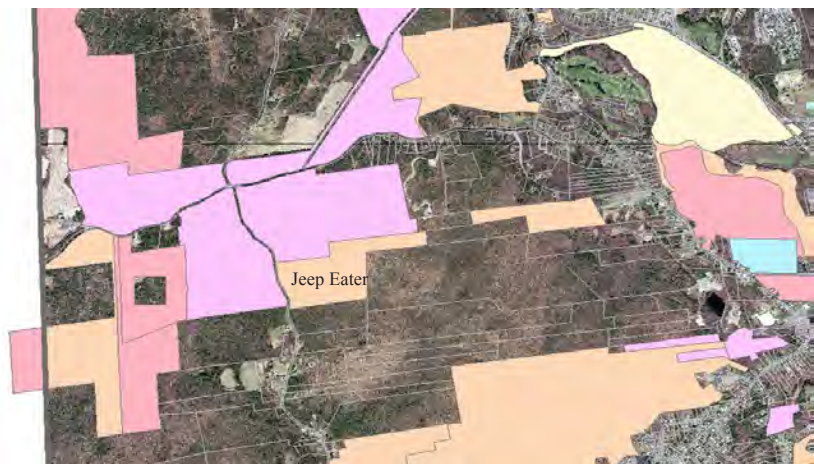
The majority of this 61-acre parcel is dominated by steep, forested slopes and rocky uplands. Mountain laurel, oaks, and bare rock are the norm, but the property also includes two small wetland areas, one of which is an uncertified vernal pool and the other is the headwaters and tributary to Parson’s Brook. As a conservation property, it is a pretty place and from the highest ridge, the views to the west, especially at sunset, are impressive. But most people who visit this con-

servation area aren’t interested in hiking or the views or nature. For them, the main attraction is the steep, rocky right-of-way that once held telephone and telegraph wires. Why? Because that rigorous route is now one of the most popular places for off-road, 4 x 4 enthusiasts to crawl up (or down).

The popularity of the former telephone and telegraph line as an assault challenge for off-road enthusiasts began more than twenty years ago. In fact, the trail’s use was so much a part of this property’s reputation that when the trail and land were proposed for conservation land in 2007, a stipulating provision was that off-road vehicles would be allowed to use the old ROW.



The Jeep Eater Trail, popular with off-road vehicle enthusiasts, can be seen in this photo as a thin thread running east-west through the parcel, outlined in yellow.



The Jeep Eater parcel connects to watershed land (pink) to the north and west, which connects to additional protected land, either under conservation restriction (light red) or owned outright and held as conservation land (light orange).

For many of us, off-road use may seem incompatible with conservation land, but the 4 x 4 community has taken remarkably good care of the R.O.W. and property ever since. Trash, for instance, is rarely left behind, either in the parking area on Sylvester Road or anywhere in the conservation area, and broken car parts are typically retrieved. What's more, the drivers have by and large stuck to the existing right of way and not created alternate routes through the adjacent natural area. True, some additional alteration has occurred at the summit, but this appears to be the result of accommodating multiple vehicles rather than intentionally damaging the landscape. Erosion, which you might imagine would be a serious problem, is not such a big deal—at least not any longer. With the exception of one large puddle, most of the route has been so heavily used over the years that most of it is now bare rock or gravel.



A small trail, used by walkers and mountain bikers, leads to the top of the conservation area.

If off-roading isn't your thing, this piece of conservation land offers other opportunities. For walkers and mountain bikers, there are a few other trails besides the main ROW. Of the footpaths, one begins partway along the former telephone and telegraph line, and more-or-less parallels the ROW and leads to the summit, where two other trails can be found. One leads north and is an informal and hard-to-spot path that was made and maintained by mountain bikers; it extends into City-owned watershed land and ultimately emerges at the intersection of Chesterfield Road and Reservoir Road. The other trail heads to the south, is better defined and links up with the much more extensive network of trails that thread throughout much of the Sawmill Hills.



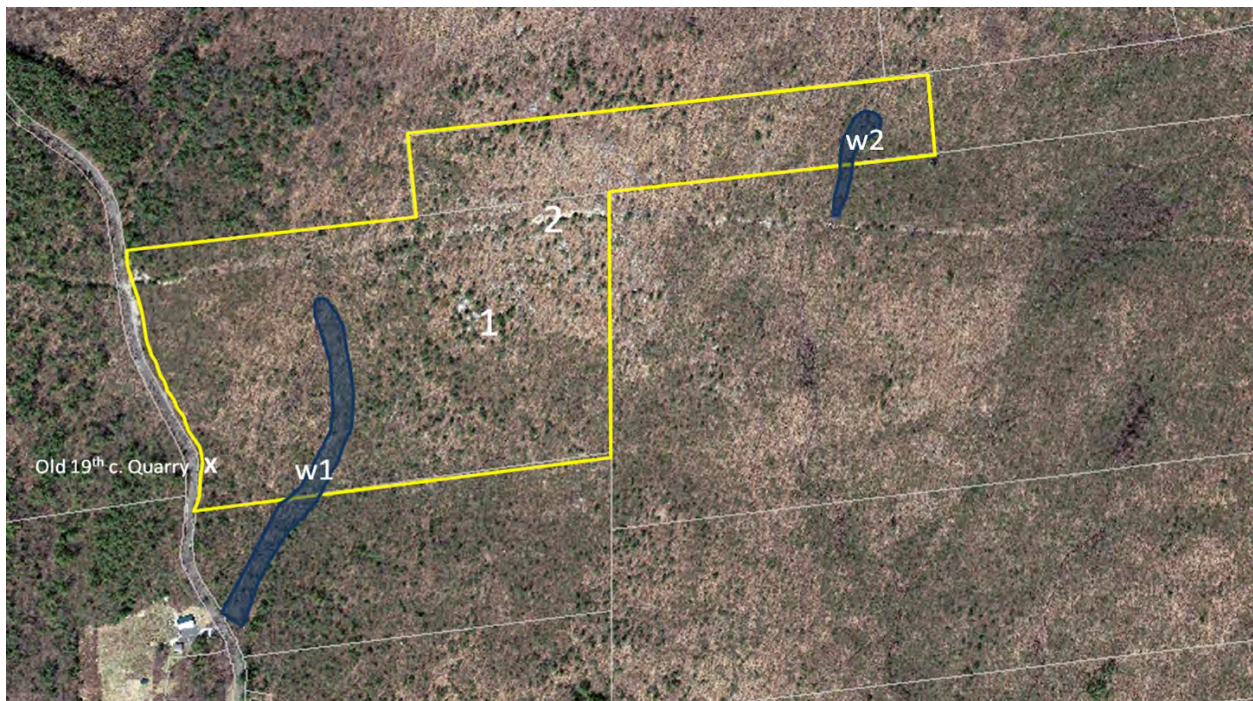
A large puddle in the ROW. It is sometimes used by spotted salamanders and wood frogs as a breeding pond, and for them, it is a black hole. No offspring will emerge as it dries up too quickly.

Aside from trail maintenance and upkeep, there are almost no other stewardship and maintenance issues at this site. Roadside dumping of yard waste and landscape clippings is a concern on the adjacent proper-

ties, both to the north and south along Sylvester Road. But invasive plants, which are such a problem in so many areas of Northampton are almost entirely absent. A few multiflora rose were found in the wetland swale closest to Sylvester Road, but aside from those, no other non-native, invasive plants were found within the property.



Although most of the old telephone line is now bare rock, there are areas along the margin where bare soil is exposed. This image reveals just how thin the till layer is in many areas of the Sawmill Hills.



Vegetation Patterns

1: Oak-hardwood dominated forests, with chestnut oak on the highest ridges and red oak dominating the lower slopes. The bluish of gray-green that can be seen on the slopes is mountain laurel. The brighter green vegetation is white pine.

2: The old telephone/telegraph right of way. Only the portion within the conservation area is used by off-road vehicles. To the east, the grade is too steep and dangerous.

W1: A forested, headwater wetland between two higher ridges. This is the only place where a few small multiflora rose were found.

W2: A vernal pool, with breeding spotted salamanders and wood frogs.



(A) A glacial erratic perched on the edge of a rock outcrop, looking west toward Westhampton. (B) Exposures of metamorphic rock are abundant in the higher elevations. (C) Just below the summit the slopes are covered with huckleberry, low blueberry, grasses and lichens. White pine and chestnut oak dominate the canopy. (D) Where there is slightly more moisture, many of the rocks are covered with mosses. (E) This rock makes for tough living conditions for this black birch, which may be more than 100 years old. (F) Bare rock characterizes the summit. (G) An abundance of gray birch on the adjacent watershed land reveals that it had been heavily logged or burned forty (or so) years ago when these seeds of these birches were able to germinate.



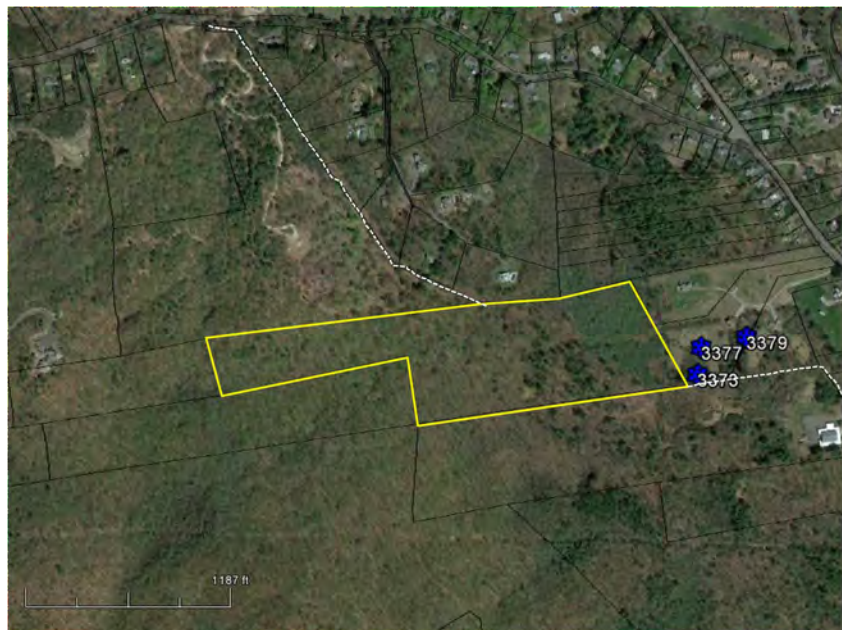
- (A) A view of the forested headwater wetland near Sylvester Road.
- (B) The vernal pool is surrounded by black gum, mountain laurel and witch hazel, with high bush blueberry and winterberry on the higher hummocks.
- (C) A typical patch of woods within the conservation area includes mostly oak, but also white pine, red maple, black birch and scattered hemlock. Witch hazel, mountain laurel, maple-leaved viburnum, huckleberries and low blueberries are common. Herbs include wild sarsaparilla, spotted wintergreen, partridgeberry, and trailing arbutus. Bracken is common along the roadside.
- (D) Low blueberries and huckleberries form an opening near the summit, which looks southwest across the Mineral Hills.
- (E) A rocky jumble and den site for porcupines occurs just above the vernal pool.
- (F) Although plant diversity is low overall, one of the orchids that occurs here is Rattlesnake Plantain, which is easily recognized by its patterned whorl of basal leaves.



Conservation Parcel 7: Formerly Spring Meadow Subdivision

Set aside in 2000 as part of a 4-lot subdivision, these 31+/- acres include an interesting mix of uplands and wetlands, and although the land boasts an elaborate network of trails—plus connects to the broader trail system in the Sawmill Hills, it remains, fifteen years after its creation, unknown to most people. Why? Because access, parking, and putting up a sign isn't simple.

A conservation area sign, for instance, isn't really an option as this entire property is essentially back land, located behind private homes and away from any public road. Similarly, the property's two access points aren't so easy to mark. One begins on Chesterfield Road and follows a now-abandoned electric line easement, but it has no real path, no easy parking, and is a half a mile away from rest of the conservation land. The other access point is easier in many respects. Not only is it closer to the conservation area, it also has a well-defined path. The trouble is that unless you find it, you'd never know about it. To get there, you have to park along the road-side edge near the end of



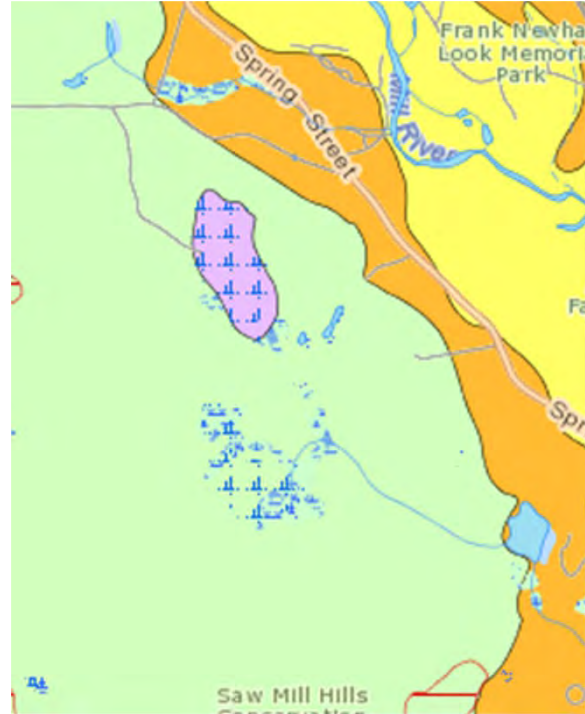
The conservation property, showing the boundary in yellow, the two access routes (white dashes) and three certified vernal pools. Note the two new homes, north and west of the property. The National Guard owns the adjacent land to the south; its building can be seen on the edge of this image.



The subdivision plan, showing the conservation land and the 10-foot access path (green line), was approved in 2000.



The approximate location of the property, in proximity to glacial Lake Hitchcock (*greenish*) and upland areas (*gray/white*).



This surficial geology map shows the former bog/wetland (*pink*) surrounded by till (*light green*). To the east, the orange area along Spring Street represents water-sorted sands and gravels. Yellow along the Mill River is recent river deposits.

Colonel Lavallee Lane (not a dead end road that few people take) and then head north along the chain link fence line that marks the boundary of the National Guard property. At the end of the National Guard land, you cross an old farm fence and reach the southern boundary of the Spring Meadow subdivision and the beginning of a ten foot public access path. It is not marked at this point either, but the path is clearly visible.

From this point, the level path proceeds due west along the back border of the house lots. The path passes two of the subdivision's three certified vernal pools, all of which are old kettle-hole ponds that were formed when blocks of ice were stranded and then buried during the era of glacial lake



A view of the long, large kettlehole along the trail to the conservation area. This groundwater-fed wetland is a certified vernal pool.



The view of the property in 1965 shows the prominent electric line angling through the property. The dark blotch near the center, just north of the electric line, is the former bog, now drained. A long, linear vernal pool/kettle hole is obvious in the open field.

Hitchcock. At that time, about 15,000-12,000 years ago, this level landscape was a sandy outwash plain and beach. In this section of Florence, the shoreline of Glacial Lake Hitchcock would have been (more or less) where the upper portion of Spring Street is now.

The conservation area begins ~850 feet further, and although its boundary isn't marked, it is easy to figure out because of the topographic break and the beginning of a large wetland. Although now a red maple dominated swamp, this area was historically a bog with cranberries, sphagnum moss and undoubtedly other bog species (Fred Morrison, pers. comm.). Sometime during the last 200 years, the bog was ditched, possibly to harvest "peat" and "muck," which were popular soil additives during the 19th century, and probably to drain it.



A view of the former bog, now red maple swamp. It is possible that a few cranberries still occur in the sphagnum hummocks.

West of the 5-acre wetland, the uplands begin and for about 1,500 feet, the land climbs gradually. The forest here is generally young and it is laced with a complicated and confusing network of trails, some of



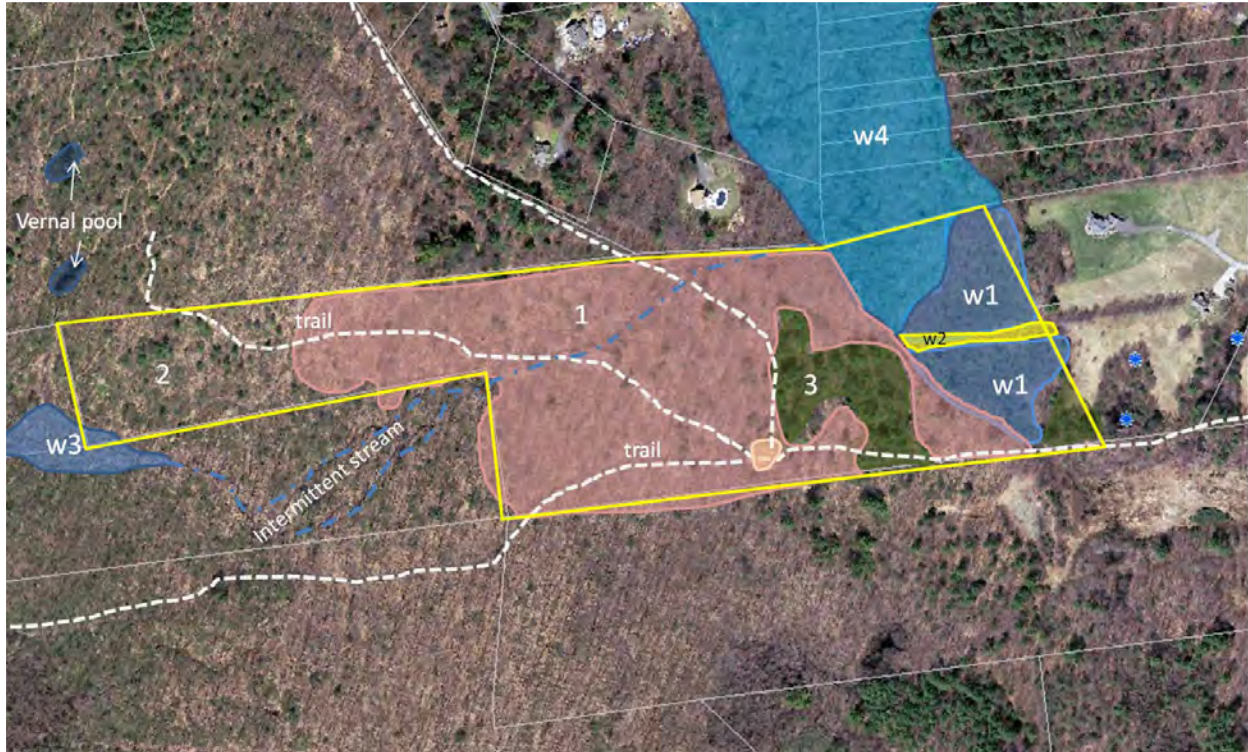
(A) The eastern edge of the conservation area is 5-acre red maple swamp, with a lush understory of skunk cabbage, sensitive fern, golden saxifrage, high bush blueberry and many other species. (B) The swamp is divided by the old electric right of way, which is still open and dominated by *Carex riparius*, skunk cabbage, sensitive fern, meadowsweet and cattail.



(C) The forest on the western side of the wetland was heavily cut and is now resprouting with loads of ironwood and witch hazel. Canada mayflower is common in the understory. (D) A small clearing and an intersection point for several trails.



(E) The old electric line is now growing up into a mix of red maple, birch and other species—including tulip tree, a species that is uncommon in Northampton, but regularly observed in the Sawmill Hills (F) A cut-off utility pole in the foreground of the electric easement. First installed in 1918, it was expanded in 1937 and 1970. The current width of the easement is 100 feet.



Vegetation Patterns & Trails

- 1: Cut-over forest, with red maple, ironwood, gray birch, black birch, shagbark hickory, red oaks, scattered hemlock
- 2: Red oak dominated canopy with an abundance of mountain laurel in the understory
- 3: White pine stands

W1: Red maple swamp with skunk cabbage, cinnamon fern, sensitive fern, highbush blueberry, and yellow birch

W2: Old electric easement, cleared and open. Skunk cabbage, meadowsweet, skunk cabbage, sensitive fern, sedges, grasses

W3: Swamp forest, with red maple, tulip trees, red oak, witch hazel, mountain laurel, dwarf ginseng, interrupted fern, sphagnum, winterberry, etc.

W4: Former bog, now ditched and drained. Beavers were active here in 2014.

which were created by the National Guard (which used to use the property) and others that were made during a logging job that took place sometime during the last twenty (or so) years.

The till soils in this section are slightly more fertile than in many parts of the Sawmill Hills, so that in addition to oaks in the uplands, there is an abundance of ironwood, shagbark hickory and black birch. Red maple is also common and so is white pine. Hemlocks are scattered and there is also a small but healthy stand of beech.

Two small, intermittent streams cross the property and their borders also reveal the sweeter soils. Their mossy borders support a rich mix of hellebore, common toothwort, yellow violets, dwarf ginseng, wood anemone and New York fern.



(A) A logging road through the heavily cutover and now resprouting forest. Witch hazel is very common in this part of the forest. (B) The intermittent stream drains into the former bog, but first flows behind the homes on Shepherd's Hollow Road. A mix of false hellebore, skunk cabbage, ferns and many other wildflowers grow along its banks.



(C) A clone of American beech, a relatively uncommon species in Northampton, occurs on the property. Even more unusual, it is unblemished by the non-native fungus known as beech bark disease. (D) Common toothwort, a member of the mustard family, is an indicator of richer, more fertile soils and can be found growing along the intermittent stream channels.



(E) Wood roads and trails lace this conservation area. (F) At the western edge of the property, the slopes are steep, bedrock is close to or at the surface, and the thin soils support a mix of oak, hemlock, birch and lots of mountain laurel. The elevation change within the conservation area is about 230 feet, from 340' to 570' above sea level.

Beyond the stream, the land begins to rise more quickly and at the western end, the steepest slopes have gradients of 25-35%. In this section the forest is dominated by red oak, with extensive thickets of mountain laurel. Young chestnut oak and red maple can also be found here, along with striped maple and some impressive rocky jumbles. This is the habitat for rufous-sided towhees, wood thrushes, and scarlet tanagers.

The property's southwestern corner touches the edge of a forested wetland that forms the headwaters of the small streams that eventually cross the conservation area and empty into the former bog, now a red maple swamp.



Water sheets across the forested wetland, which includes some impressive tulip trees, including one that appears to have old growth bark characteristics.

Invasive Plants

Within this conservation area, like so much of the Sawmill Hills, invasive plants are few and far between. At present, there is a small amount of Asiatic bittersweet in two locations (see map) and a few barberry, multiflora rose and euonymus occur in an upland clearing on the old electric line, but the up-



The locations of invasive plants on the property and along a drainage ditch off-site with AB representing bittersweet. Much more bittersweet occurs in the abandoned gravel pits on the National Guard property to the south.

lands are otherwise free of invasive plants—even in the areas that were logged.

More concerning is the presence of invasive plants on the surrounding properties. Young Asiatic bitter-sweet is fairly widespread on the National Guard land and the edges of the former bog have also been invaded by multiflora rose, Japanese barberry, and glossy buckthorn. There is also an increasing amount of Japanese knotweed on the stream that drains this wetland and crosses Chesterfield Road.

Recommendations

- Control invasive plants in the few locations, possibly by working with the Spring Meadow Home-owners Association, National Guard and/or other neighbors, and try to encourage additional control of invasives at abutting properties
- Create a trails map
- Acquire/negotiate permission for trail use of nearby properties
- Install public access signs on Colonel Lavallee Lane, Spring Meadow subdivision/National Guard fence boundary and at the beginning of conservation land
- Remove barbed wire coils (*photo*), presumably installed by the National Guard. At least two coils were found in the forest.





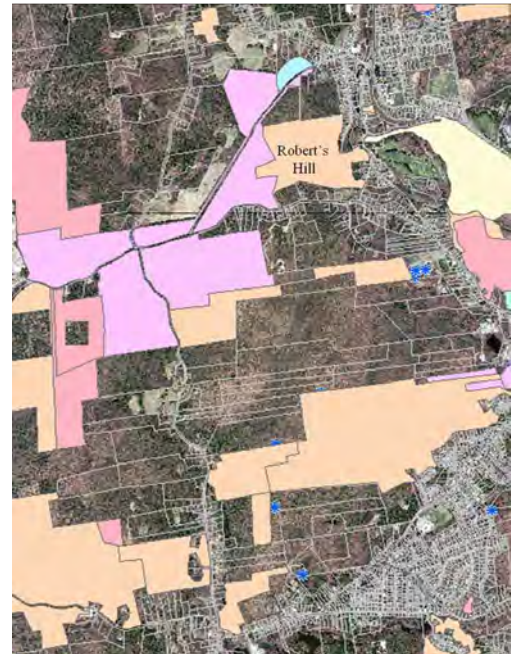
Conservation Parcel 8: Roberts Hill Greenway

When I first inventoried Roberts Hill in 1993, it was one of the largest conservation areas in Northampton, and its

104 acres represented about 13% of the City’s total conservation holdings. Today, twenty-odd years later, the City conservation portfolio has grown so much that Roberts Hill now accounts for only 4% of the total. And what’s more, rather than being the sole representative of the Sawmill Hills, it is now one of nearly twenty parcels that have been protected within this large block of land.

Those changes in its acreage ranking, however, don’t diminish the value of the Roberts Hill as a conservation area. If anything, its value—especially to local residents—has probably increased during the last twenty years as more people have “discovered” this local natural area.

More visitors is just one of the important changes that have taken place at Roberts Hill. In terms of stewardship and maintenance, over the last twenty years, the dam at Howard’s Ice Pond was repaired, and the Leeds Civic Association continued hosting annual clean-ups and trail maintenance days. In additions, volunteers certified one of its vernal pools and opened the view from lookout on the highest knob.



Although Robert’s Hill lies outside of any estimated rare species habitat, but it does play an important role for wildlife —especially for forest dependent species. Its value is enhanced by its location next to several hundred acres of City-owned watershed land and nearly a thousand acres of conservation land to the south in the Saw Mill Hills.

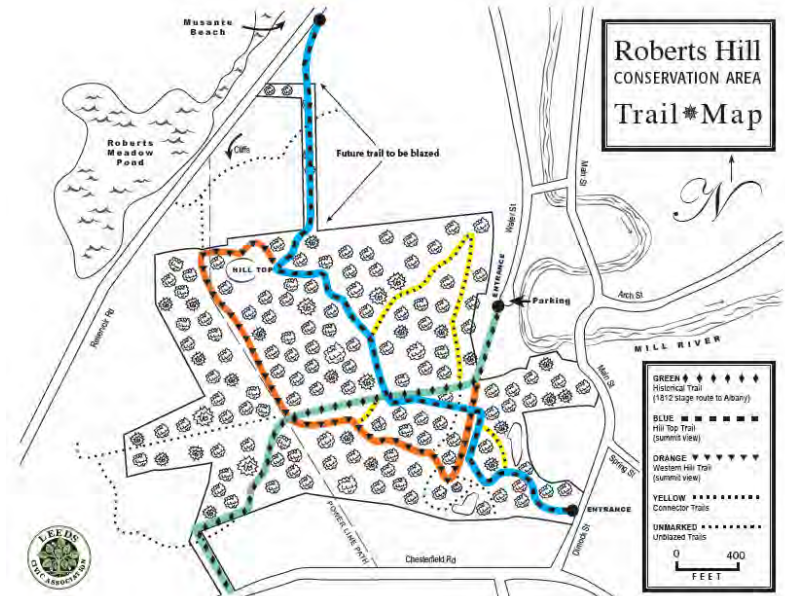


One of the city’s first conservation areas, Robert’s Hill boasts an elaborate trail network, access to the Mill River, an historic ice pond, a variety of habitats and this impressive view.

In terms of the ecology of Roberts Hill, one of the biggest positive changes has been demise of the gypsy moth. After nearly seven decades of gypsy moth outbreaks, the conservation area's oak-dominated forests are no longer threatened by this non-native pest, which has fallen victim to another non-native pathogen, in this case a fungus that kills only gypsy moth caterpillars. Sometime during the 1990s the fungus spread into the Connecticut River Valley and almost immediately, it nearly wiped out the gypsy moth population.

Today, the fungus keeps the gypsy moth's population at low numbers—at Roberts Hill and everywhere else in our region.

Although not quite a positive, another piece of good news is that—relative to many other conservation areas—invasive, non-native plants are only a minor issue at Roberts Hill. At this point, they are entirely absent from the conservation area's interior and where they do occur, they are in low numbers. So far, invasive plants have been found in just four places, all of which were altered in the past. The two “worst” invasions are along Dimock Street: along the trail/sewer line, you can



In 2014, thanks to the work of Leeds resident Dave Litterer, visitors to Roberts Hill will find it much easier to find their way on the trails. In collaboration with the Leeds Civic Association, Litterer blazed and color-coded the property's trails, GPS'd their locations and created this trails map, which is available at <http://www.leedscivic.org/wp-content/uploads/2014/04/Roberts-Hill-Map-Color.pdf>. This is a welcome change as the trail network was previously remarkably confusing!



Named in honor of Robert Lyman, the name Roberts Hill is now limited to this single knob, but in the early 1800s, all of what we now call the Sawmill Hills was known on the map as Roberts Hills. Lyman was one of Northampton's earliest settlers, a perpetual wanderer and hunter and the one who found the deposits that would become the lead mines in Southampton. The elevation contours on this image reveal how steep much of this conservation area is; at its highest point, it measures 581 feet above sea level.

find privet, multiflora rose, Japanese barberry, Morrow's honeysuckle, and catalpa and up the street, near an old foundation, you can find Norway maple, garlic mustard, winged euonymus, Japanese and Asiatic bittersweet. The other two spots with invasive plants are along the edge of the old ice pond, where a few glossy buckthorn and Asiatic bittersweet have seeded in, and along the edge of the Mill River, where both bittersweet and Catalpa occur.

The latest significant change at Roberts Hill is negative. This conservation area, like everywhere else in Northampton, has become invaded by hemlock woolly adelgids. What were healthy hemlock stands in 1993 are now thin and dying.

Vegetation Patterns

Although the hemlocks are dying, they are still alive and the habitat patterns that were described in 1993 at Roberts Hill are still, in the absence of fire, logging, or major wind storms, by and large the same. In the uplands, the drier, rockier sites are still dominated by chestnut oak, while the lower, moister slopes are covered with a mix of oaks (red, white, black and even some scarlet), white pine, hemlock and other hardwoods (e.g. red maple, hickory, black birch, sassafras, ash, tulip tree). The stands of white pine that colonized the former pastures are still healthy, and the hemlocks still cover the steep, rockier hillsides and the wetter hollows and ravines.



Ecologists predict that all of the hemlock trees in our area will die out within the next few decades, primarily because of hemlock woolly adelgid. This grove on Roberts Hill will probably be replaced by birch and other hardwoods, but how the loss of such a major species will affect our region's ecology is uncertain.



Roberts Hill is underlain by thick-bedded gneisses and mica schists. This is the view from the lookout, which takes in the hills in Williamsburg.



In the 1950s, Roberts Hill was mostly forested, but cut by two powerlines and sewerline. The scar from the road that once connected Water Street to Chesterfield Road is clearly visible along the slope, and there are two good sized areas of open pasture, one to the north of the east-west powerline and the other on the flat land near Howard's Ice Pond. The Howard family lived in the house on the corner of Dimock and Chesterfield Roads. Fred Howard was working in the button mill when the 1874 flood struck and his letters to his brother describing the flood were found in the attic decades later. They have been used by historians ever since.

Vegetation Patterns on Roberts Hill



1: Oak-dominated forest, with an abundance of mountain laurel and witch hazel in the understory. Red maple, black birch, white pine, hemlock and scattered sassafras. On highest, driest areas grow low blueberry, huckleberry, bracken and cowwheat. In areas with deeper soils, Canada mayflower, partridgeberry, wintergreen, and wild sarsaparilla. Near the southern powerline, the lower flanks of the hill were cleared pasture.

2: Logged in 1987, this slope includes a mix of hemlock, oak, black birch and scattered shagbark hickory.

3: A former pasture, this area has grown into mostly white pine, with a scattering of oaks, their branching architecture proof that they grew in an open field. A road connecting Chesterfield Road to Water Street in Leeds once cut through here.

4: Moister, more gradual slope dominated by a mix of hemlock and pine, with hardwoods and an abundance of mountain laurel.

5: Steep slope of mixed hardwoods, hemlock and pine

6: Former house site and a richer slope that includes sugar maple, a very large butternut, and a few big tulip trees. Several invasive plants (garlic mustard, Norway maple, winged euonymus, etc.) occur here as well.

W1: "Muck hole"

W2: Howard's Ice Pond, note the large tulip tree nearby as well some invasives

W3: Swamp forest, dominated by hemlock and red maple

W4: Certified vernal pool in small, historic quarry

W5: Low swale and potential vernal pool

Sewerline/water line easement: This dates back to the 1870s. Portions along the path have several invasive plants. The vegetation along the stream side is richer and more fertile than elsewhere in the conservation area.

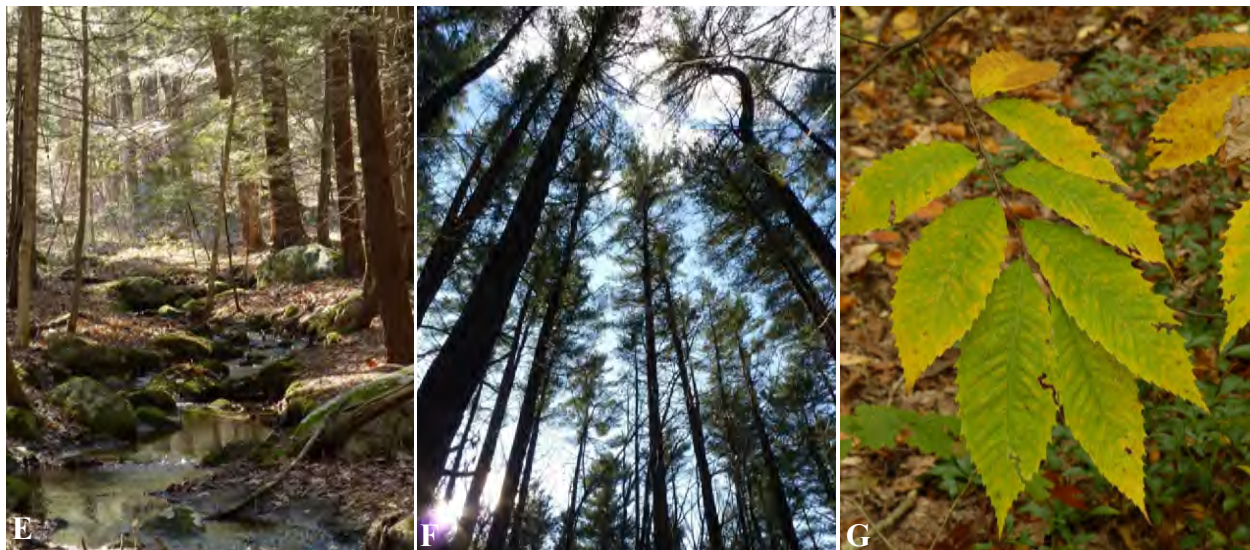
Powerline easements: Although historically open and altered, the powerline ROWs do not support any invasive plants. They are now a mix of hardwoods and along the north-south ROW, there is an abundance of mountain laurel.



(A) A view of the lower pond that is used in the winter for skating. In the foreground, the top of a sewer manhole cover is visible at the edge of the leaves. (B) White spermaphores—or packets of sperm—left by male spotted salamanders on the bottom of the pond, which is also used by spring peepers, wood frogs, gray tree frogs, green frogs, pickerel frogs and red-spotted newts.



(C) A view of a typical patch of woods at Roberts Hill includes a mix of oak, pine, hemlock, and a variety of hardwoods above a thicket of mountain laurel. (D) Jumbles of rock and rock outcrops are common at Roberts Hill.



(E) The stream that flows out of the former ice pond. (F) About 25 acres of pine and 25 acres of hemlock cover Roberts Hill. (G) American chestnut was once a prominent component in the canopy at Roberts Hill and many young saplings can still be found here.



The acidic soils at Roberts Hill support a limited number of species. One of the most common and easy to identify is American wintergreen, sometimes called teaberry.



The stone footings of the old and now long abandoned road that used to run between Water Street in Leeds and Chesterfield Road can still be found along the little brook that feeds the ice pond. The wooden logs across it are (obviously) new.



The vegetation below shady pine and hemlock is almost non-existent. In fact, in many areas of the conservation area, the dominant ground cover is nothing but dry oak leaves!

Recommendations

- Improve the trail to Chesterfield Road and potentially extend a new trail to the bed of the former Roberts Meadow Brook (on DPW land).
- Create better, off-road parking along Dimock Street
- Evaluate whether the “muckhole” and the small depression along the former electric line are functioning as vernal pools and can be certified.
- Control invasive plants along the trail off Dimock Street, at the old foundations along Dimock Street and at Howard’s Ice Pond. None of these areas is heavily infested—yet. Japanese knotweed and catalpa should be monitored along the Mill River.
- Acquire the private parcels on either side of the access trail that begins on Reservoir Road; this would prevent it from being fragmented by development.



The best parking for Roberts Hill is near Musante Beach on Reservoir Road. From there, the trail climbs a steep hill of hemlock and then levels off, with the path passing through a thicket of mountain laurel and oak. This is the simplest way to reach the look-out.

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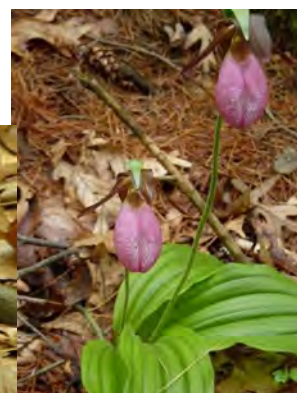
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13 A Natural History of the West Farms Greenway



West Farms Conservation Area



West Farms Greenway

Overview

Unlike most of Northampton's conservation areas, this property was not acquired with conservation as its primary purpose, but rather as part of a broader, limited development project. Orchestrated by the City, the project had four independent goals:

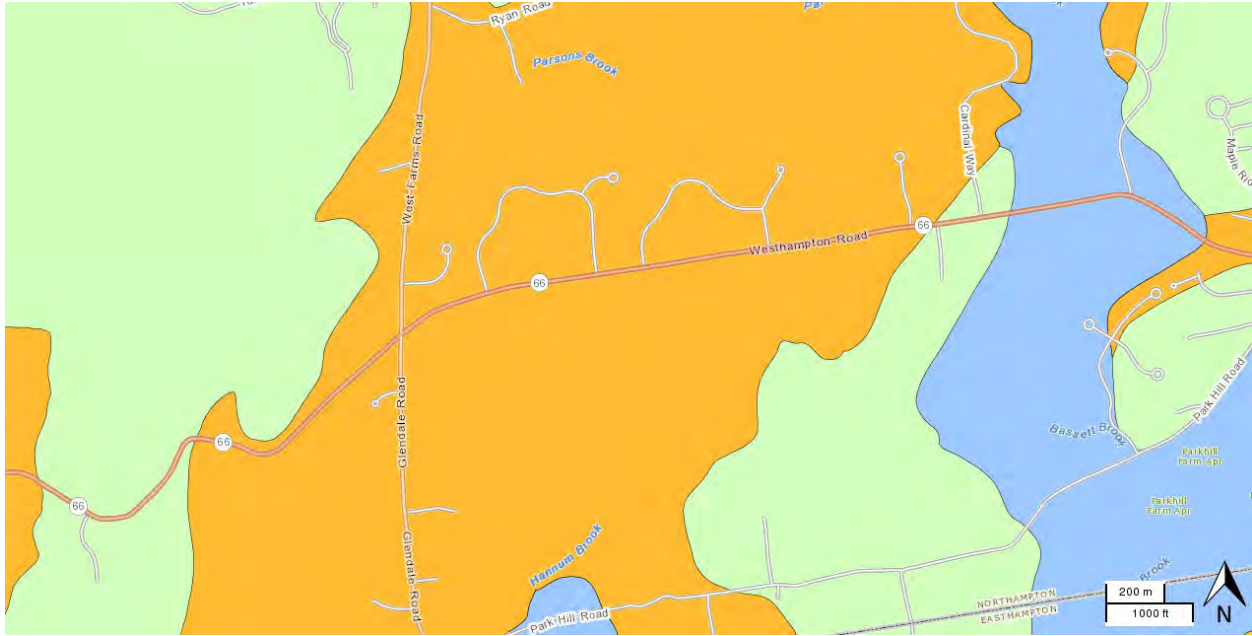
1. Establish a broader buffer between Route 66 and the then-open, but now-closed city landfill;
2. Create a small affordable housing project (in collaboration with Habitat for Humanity);
3. Set aside a future playground lot; and
4. Protect the remaining land as a conservation area.



The city-owned property outline in yellow, with a blush of orange denoting the land dedicated for conservation and the turquoise blue as the land earmarked for a future playground. Due south are the scars left behind by former gravel pits and the city of Northampton's landfill. To the east is a large patch of pitch pine/white pine woods and a former pig farm, now growing up into brush.

Although the underlying purposes were different than most conservation acquisitions, it turns out that the 16-acres include a fairly good example of a pine barren, now one of the rarest habitat types in the Commonwealth and Northampton. The land also includes a vernal pool and a small patch of woods that were historically cleared and are underlain by slightly richer soils.

Geology



The surficial geology of the area shows vast outwash plains (orange) in this part of Northampton. Light green equals unsorted glacial till, while light blue are clays left behind during the era of glacial Lake Hitchcock. *From MA GIS Oliver.*

If we could go back 14,000 years and explore this part of Northampton, we would find braided rivers, milky with sediments from the retreating continental glacier. As they poured into the shallow margins of glacial Lake Hitchcock, the velocity of the water slowed down and the sands and gravels that had been held in suspension dropped out. Over time, these water-sorted sediments created the deep, broad outwash plain that underlies and characterizes this section of Northampton. In some areas, these deposits extend 100 feet down before intercepting the sandstone bedrock below. The sandstone is 200-million year old New Haven Arkose, but the sands and grav-

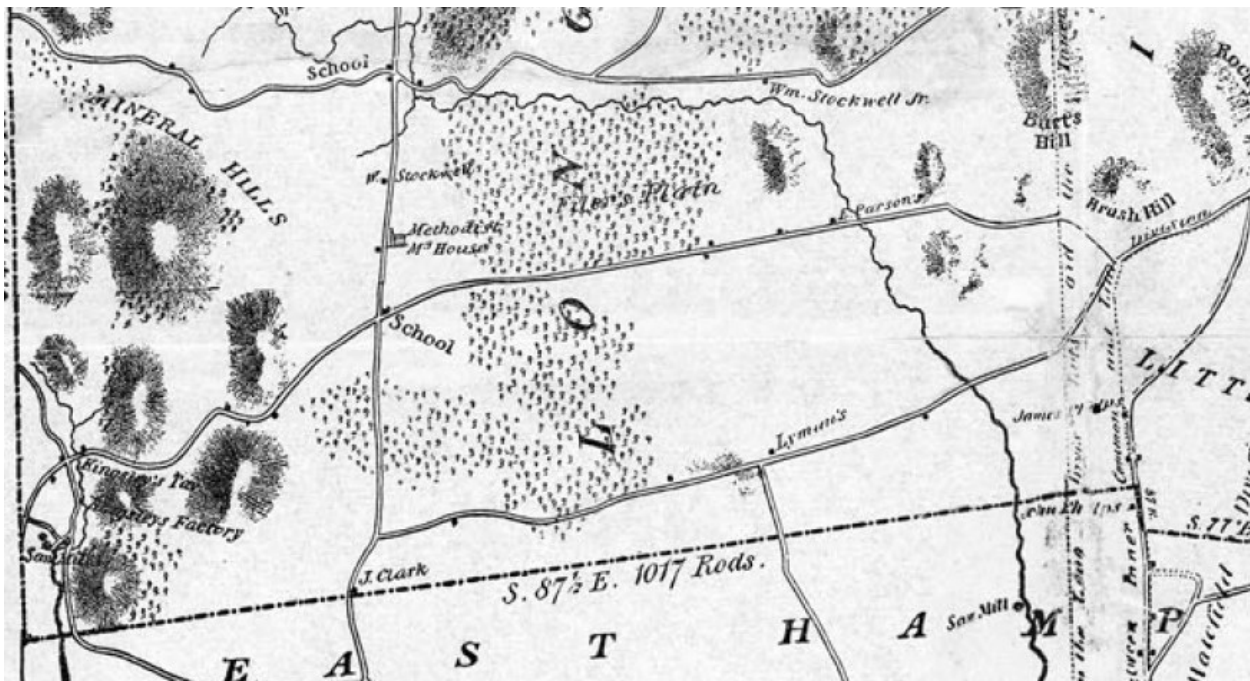


els were derived from 450-million year old metamorphic and igneous rocks that lie to the northwest.

During the last 12,000 years, streams, rain and erosion have modified this landscape, cutting down through the sands, and created the conservation area's varied terrain. Along Route 66, the land is mostly level, but to the south, the land drops off steeply before flattening out again and then sloping south. A vernal pool lies in the lowest hollow, and forms the headwaters of Hannum Brook, a small stream in Easthampton that flows into the Manhan River. Other vernal pools are found on the north side of Route 66; these are kettleholes that formed when large blocks of ice from the glacier were buried by sands and sediments. When the buried blocks eventually melted, the overlying sands dropped down, leaving behind depressions in the landscape.

Human History

By the time the English explored this area, the Nonotuck had been here for thousands of years. For at least five thousand years, they used fire as a tool to manage and manipulate their landscape--to improve their hunting grounds, eliminate undergrowth to make travel easier, and once agriculture arrived, to clear land for crops. In many upland areas, the fires created park-like for-



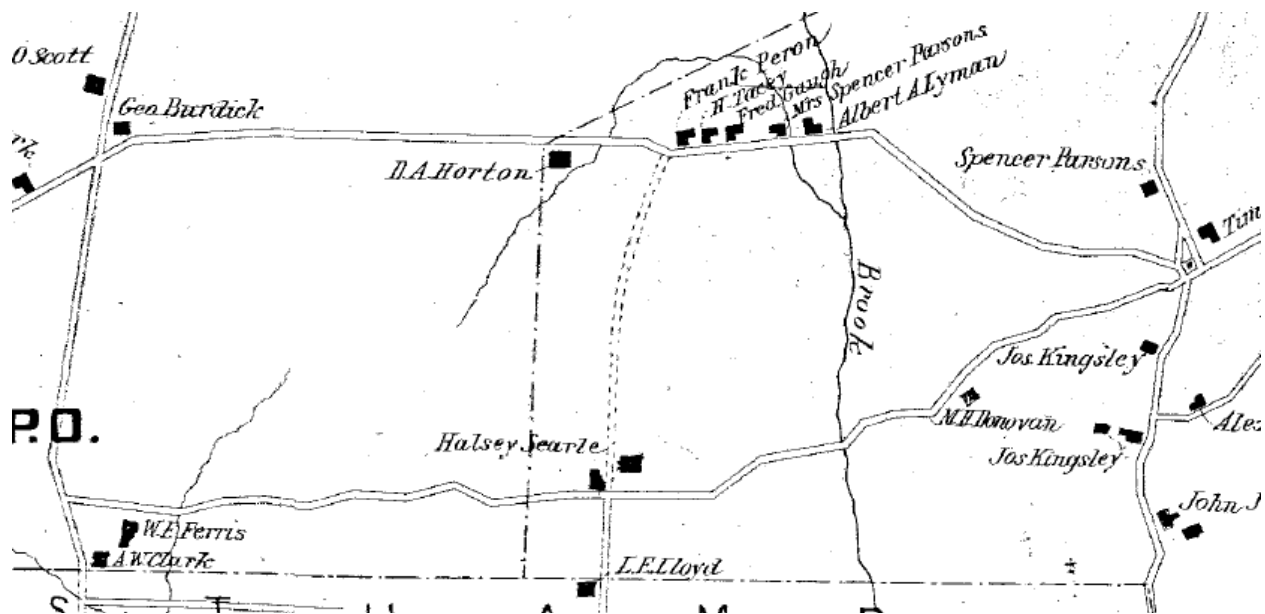
The southwestern corner of Northampton was sparsely settled in 1831 when this map was created. At that time, the land that now contains the Willard Gravel Operation was known as Filer's Plain.

ests, with massive canopy trees and a grassy understory. But in places underlain by sand like this one, a different kind of plant community developed after fire. The plants growing on these sites were specialists, adapted both to frequent fire and a tolerance to tough environmental conditions—thin, acidic soils underlain by droughty, nutrient-poor sands. Instead of massive oaks and chestnut, places like this conservation area would have been dominated by pitch pine, scrub oak, low-bush blueberries, and grasses



Pitch pine was once exceedingly common in Northampton and its resinous ranch knots were used by early European settlers for lighting.

like little bluestem and switchgrass. The English called these sandy, open grasslands and pitch pine barrens “plains.” On the 1831 map, this area not far from Filer’s Plain.



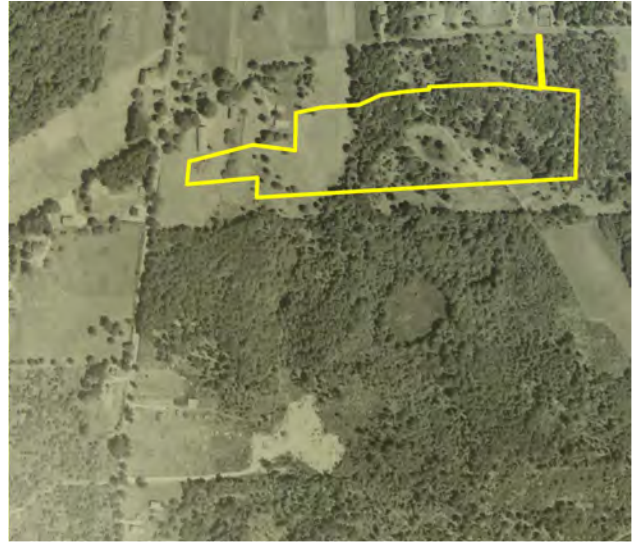
The 1895 map for Northampton shows few houses along what is now Route 66. The tavern, which was present in 1831, is now owned by George Burdick and lies northwest of the conservation area. It still stands today at the intersection of West Farms Road, Route 66 and Glendale Road.

Because the English were so focused on agriculture and livestock, these areas were a low priority. Pigs could feed on the acorns, and pitch and candlewood could be collected, but otherwise,

these sandy places made for lousy farming or poor woodlots. During the colonial period and long after the American Revolution, few people settled here. In fact, Northampton's 1831 map shows just four houses along more than a mile of what is now Route 66, and by 1895, there weren't many more! It wasn't until the mid-20th century that this area saw any real development, and then, in an odd reversal, the big attraction was what had discouraged people for so long: the sand itself.

Sand became a commodity after WWII when a building boom drove the need for sand and gravel. In this part of Northampton and Easthampton, more than half a dozen new gravel mining operations got underway. During the 1940s, 50s, and 60s, hundreds of acres were stripped and mined. Somehow, this property escaped being mined, but an enormous gravel pit was dug immediately to the south and in 1969, it became a landfill. Other large sand pits occur to the north (Willard's) and to the west (Brakey's).

During the 1950s and 60s, this area also had a mini-building boom. The land was inexpensive, it was mostly flat, and the sandy soils were easy to build on. Dozens of new homes went in, and since then, some new subdivisions and lots have been developed.



The conservation area through the years of 1952, 1965 and 1986. Although it remains mostly open pasture and unchanged, the land due south became a massive gravel pit operation and then Northampton's landfill.



During the 1950s, parts of this property were cleared and open and were used as hayfields and pasture. Other parts of the land, however, were allowed to grow into forest and today are a mix of white pine, pitch pine and oak. Since then, in the absence of clearing or fire, this property has grown up into a mix of species that reflect both the property's land use history and differences in the underlying soils and topography.

Vegetation Patterns

Today, this conservation area is entirely forested and based on the mix of species, can be separated into five major areas (see *Vegetation Communities* map).

White Pine Dominated, with Oak and Scattered Pitch Pine (1)

Behind the new condominiums and surrounding the future playground lot, the sandy flats are dominated by white pine, but include an abundance of white oak, red oak and black oak. Pitch pine is common too, but the trees are scattered and in the absence of fire, they



are gradually being outcompeted by the other canopy trees. The forest here is mostly open and easy to walk through, with occasional small patches of lowbush blueberries, deerberry and mountain laurel.

On the forest floor, the plants are typical of dry acid soils. Canada mayflower, partridgeberry, common wintergreen and starflower are all common. The botanical highlight is the abundance of pink lady's slippers. In fact, I know of no other place in Northampton where you can find so many.



(A) A broad swale was carved by water and is now dry and isolated. On the other side of Route 66 are two kettleholes that were formed by buried blocks of ice and now intercept groundwater. These areas used to drain through this ravine.

(B) Shady, hemlock woods grow on the slope near the western boundary of the conservation area.

(C) A sugar maple grows along the old wood road that once crossed the property and led to fields to the south-east.

(D) A small cluster of pink lady's slippers, a common orchid in Massachusetts.

White Pine/Hemlock-Dominated Woods (2)

Heading west, the forest changes as the land dips to the remains of an old road, beside which is a large patch of pachysandra and a couple of catalpa. In this swale, not far from the vernal pool, is a single sugar maple. Its branching architecture reveals that it once grew in a clearing. From here, the land rises again and hemlock becomes much more common, with white pine as a co-dominant. The lady's slippers have dropped out, and below the hemlock stands, there are no under-story plants. In areas where the pine is more common, witch hazel and mountain laurel appear in the shrub layer and partridgeberry is common.

Formerly Open Land/Deciduous Forest (3)

On the western edge of the property is a young, predominantly deciduous forest. This area was open until fairly recently and what's curious is that most of the scruffy young trees are sugar maple, a species that re-



Top: Young forest and a small clearing in the former pasture (NW corner of conservation area); Middle and bottom images are the woods near the vernal pools.

quires richer, more pH neutral soils. The other trees in this part of the property are white pine, oak, ash, hemlock and black cherry.

Unfortunately, this area also includes the most invasives on the property. The good news is that the patches are still fairly small, but Asiatic bittersweet, Morrow's honeysuckle and even some swallow-wort have all established here.

Deciduous Forest Near Vernal Pool

(4)

Located at the base of the slope on a nearly level grade, this area was cleared and open fifty years ago, but has since grown into a mix of black birch, red maple and white pine. The water table is fairly close to the surface and the wetter soils support tall swaths of cinnamon fern, as well as patches of New York Fern, bracken, and wild sarsaparilla.

Vernal Pool

Located in a small depression that intercepts groundwater, this circular-shaped vernal pool is not certi-



Two views of the vernal pool, in early June and late August. This pool is part of the headwaters to Hannum Brook.



The entire conservation area falls within a MA NHESP priority habitat for rare species.

fied and doesn't even appear on the datalayer of potential vernal pools. It is surrounded by some impressive pin oak and large red maple, as well as shrubby tangles of winterberry. Hayscented fern, cinnamon fern, spinulose wood fern, and New York all grow in abundance nearby.



A female box turtle, a protected species in Massachusetts, lays her eggs in the gravels not far from the conservation area. Sand barrens like this site were always rare features in the interior parts of the state, but because of development, roads, and lack of fire, they are now one of the most imperiled habitat types in the state.

Wildlife

Although this conservation area is relatively small, it includes one of the largest remnant patches of pine barren habitat. Historically pitch pine barrens and sandplain grassland habitats accounted for about 10% of the city's acreage, but today, due to fragmentation, development and mining, they account for less than ½ a percent.

As a community type, pitch pine barrens support an unusual mix of specialist animals, particularly reptiles and insects. No rare species were observed on this particular parcel in 2014, but it falls within the Estimated Habitat of Rare Wildlife and during the last twenty



years, I have found five species of conservation interest in the immediate vicinity; these include box turtle, wood turtle, spotted turtle, black racer and hog-nosed snake. Whip-poor-wills nested here in this area historically, but none have been observed since before 1987.

In addition to rare and unusual species, many common animals use this woodland habitat. Pileated woodpeckers and pine warblers were heard and deer sign was abundant. All of the mammals that tolerate forest fragmentation (raccoons, skunk, opossum, red fox, coyote, gray squirrels, red squirrels, chipmunks) either live on or use this property.

The vernal pool is used as a breeding ground by wood frogs and spotted salamanders. Its value is slightly higher than a single isolated pool as it is within half a mile of four other vernal pools. None of these, however, are certified or shown as potential vernal pools.

Recommendations

Although this is a fairly small conservation area, it offers a glimpse at a forest type that is regionally and locally rare. The woods include some old paths that could easily be improved so that people could enjoy this patch of woods, which, even barring improvements, is fairly open and easy to walk through.

The biggest challenge here is access. There is no easy place to park and the “informal” trail that is supposed to run along the eastern edge of the condominiums was never created. There is also no sign to let people know that this land is open to the public.

Aside from controlling the existing non-natives in the young forest, it would be wise to monitor



A trail from the past is still present and used by a few people.

the entire site to make sure that Asiatic bittersweet doesn't become more abundant. Its seedlings were found throughout most of the property.

To ensure the integrity of this site, it would be beneficial to acquire the parcel to the east. This would provide better access and help with management activities (including a potential controlled burn).

Finally, the lot for the future playground should be relocated to the young forest to avoid cutting down more pitch pine and white pine.



Some trash and debris have been left in the conservation area, not far from the new homes that were associated with this limited development project.



The light blue area is currently slated for a future playground. In order to protect more of the pitch pine forest habitat, it would be better to relocate the future tot lot to the western part of the property that was a pasture/clearing just a few decades ago. This image also shows the pitch pine forest to the east, which would be good to acquire so that this bigger area could be managed to promote this special habitat type and the rare and unusual species it supports. If the land to the west were acquired, part of its old field habitat could be used for the playground, or alternatively a portion of the former landfill could be used for the playground, assuming that it had no history of dumping or contamination and was safely away from any potential threat.