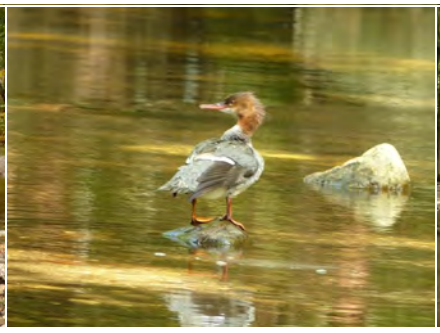
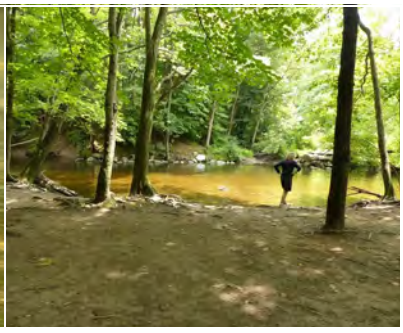
An Overview of the Mill River Greenway

Prepared by Laurie Sanders, M.S.
December 2014

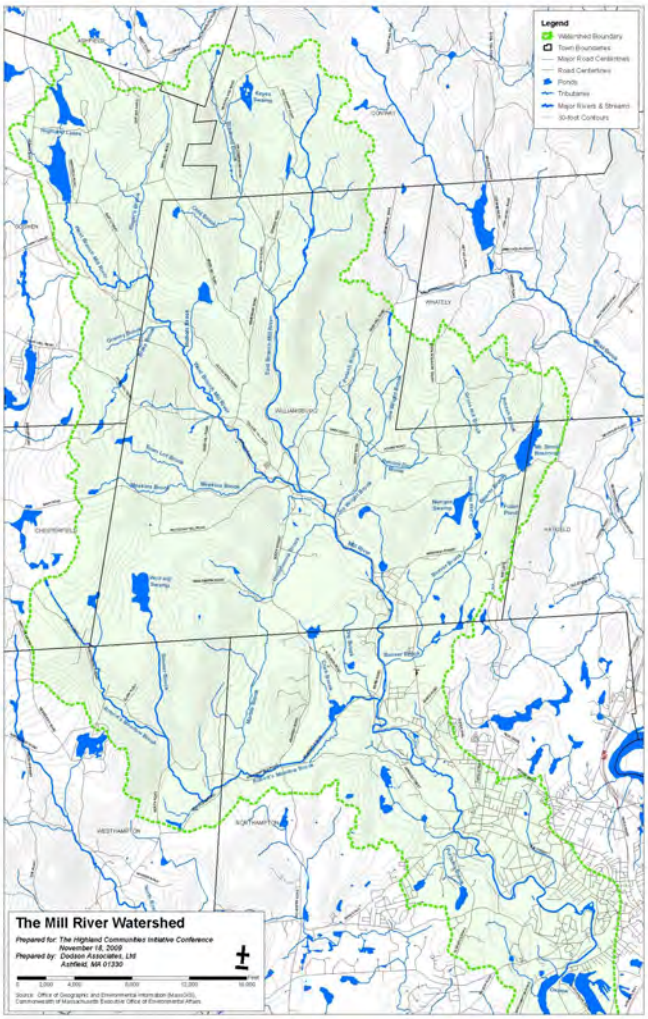



Mill River Greenway Overview

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.



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.*

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

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. The Yankee Hill Conservation Area 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 2014 ecological assessments of each of the City-owned conservation areas along the Mill River will help inform future stewardship and management efforts.

Conservation Area 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, Wintercreeper, Japanese Knotweed	Yes	Possible	Partly	No	No	Yes	At Veteran's Field

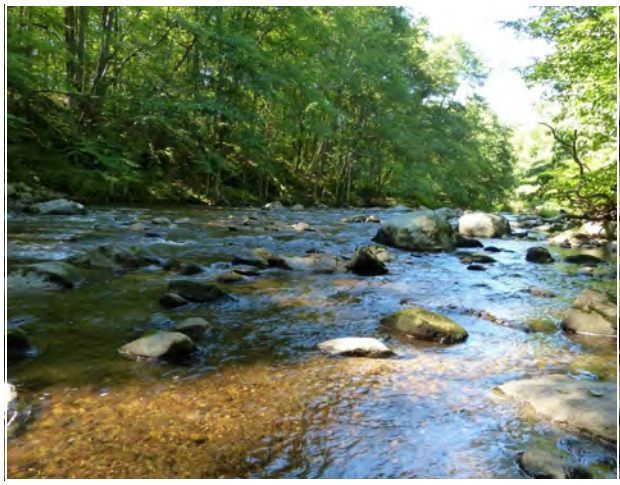
Table 1: Summary of natural invasive species issues, natural resource values and infrastructure for the city-owned conservation areas in the Mill River Greenway.

Support for this project was made possible by Northampton's Community Preservation Fund.

Photographs © Laurie Sanders.

The Natural History of the Bay State Section

Prepared by Laurie Sanders, M.S.
December 2014



Bay State Conservation Area

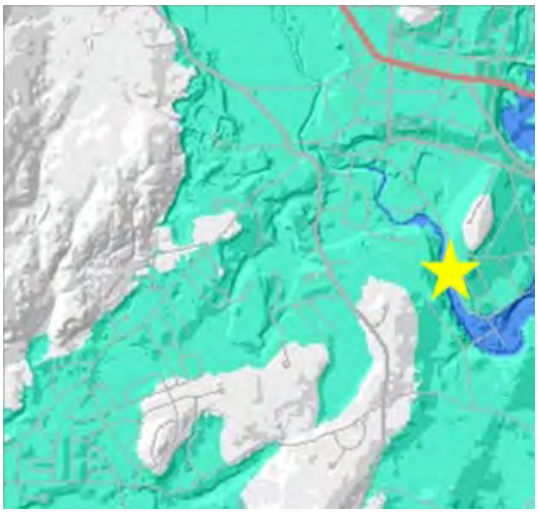
The Bay State Section

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.

The Bay State Conservation Area is part of a long forested corridor along the river. In this image, it is shown in bright green, with the Vistron Conservation Area and forested portion of Maine's Field to the north and the Yankee Hill Conservation Area downriver and to the southeast. The duller green property immediately south of the conservation area is fenced off 21E site that can oddly be considered "protected" too.

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.

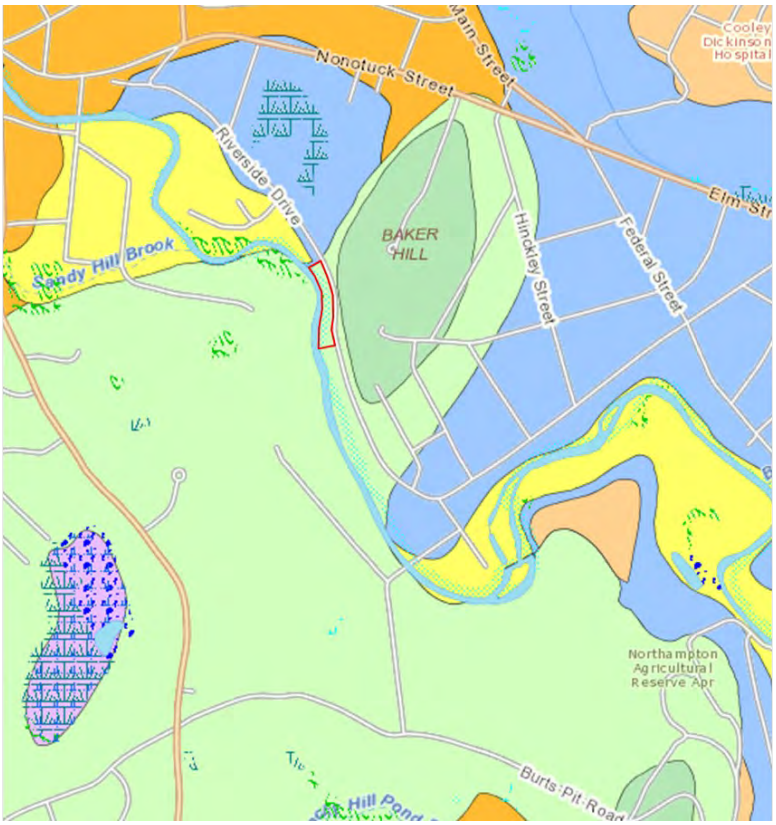
This stretch of the Mill River is rocky and fast-flowing. The land to the west is private, but mostly forested and through the passage of the Riverfront Protection Act, is essentially protected too.



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.

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.

Riprap was laid along the river in the past to prevent it from cutting further east toward the road.

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.

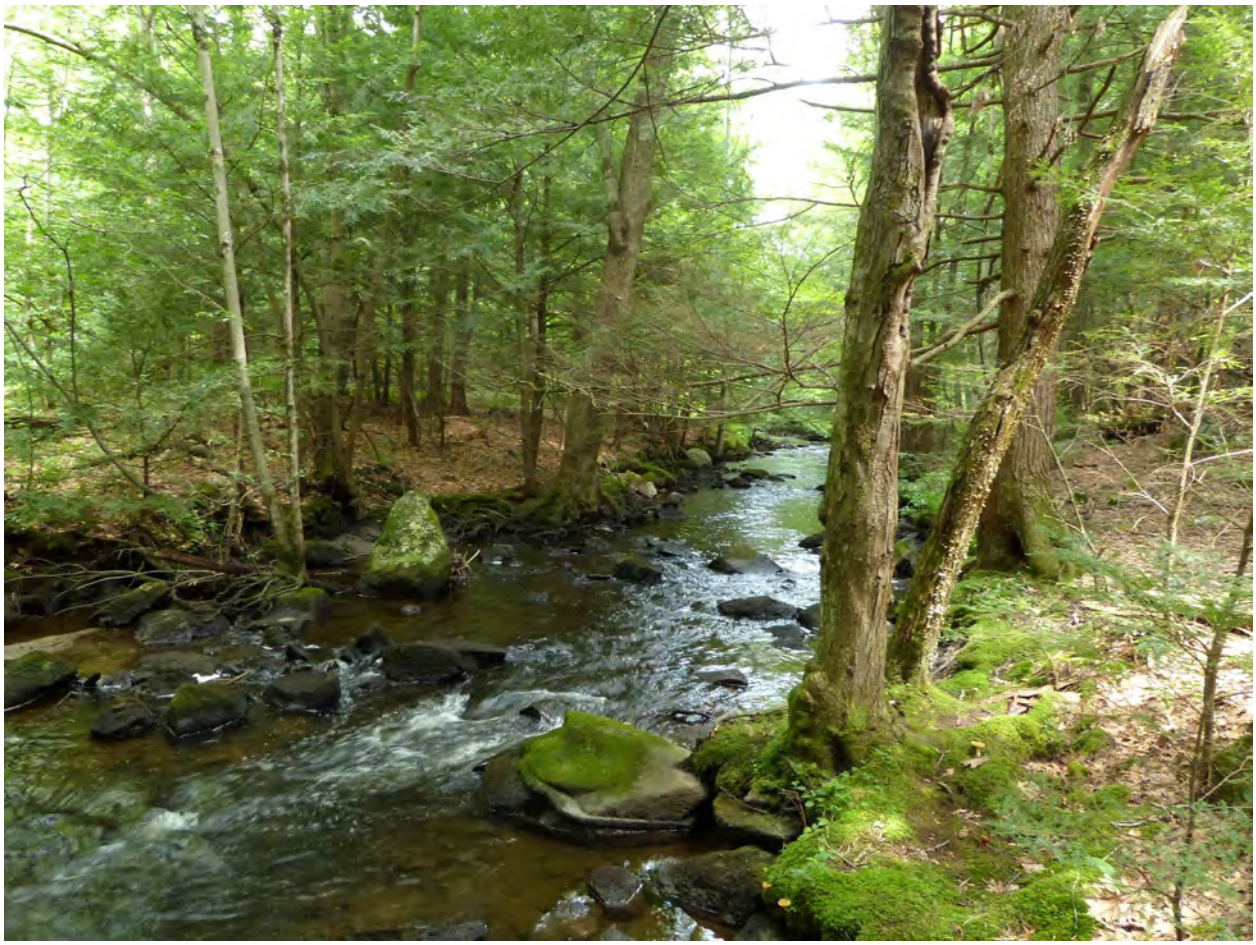
This report was made possible with support from Northampton's Community Preservation Fund.

Photographs © Laurie Sanders.

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



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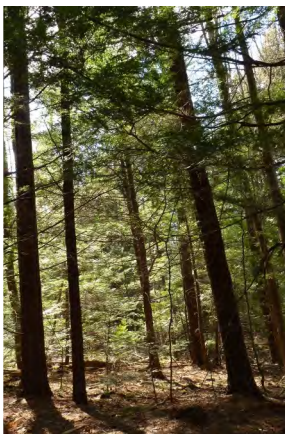
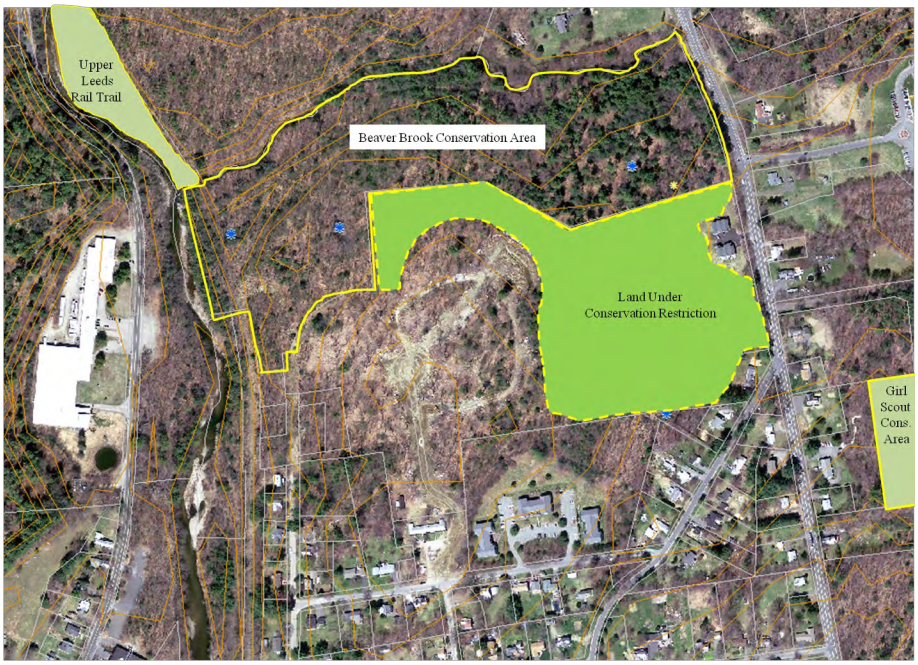


Beaver Brook Conservation Area

Beaver Brook Conservation Area

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.

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

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.

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 the Beaver Brook Conservation Area 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.

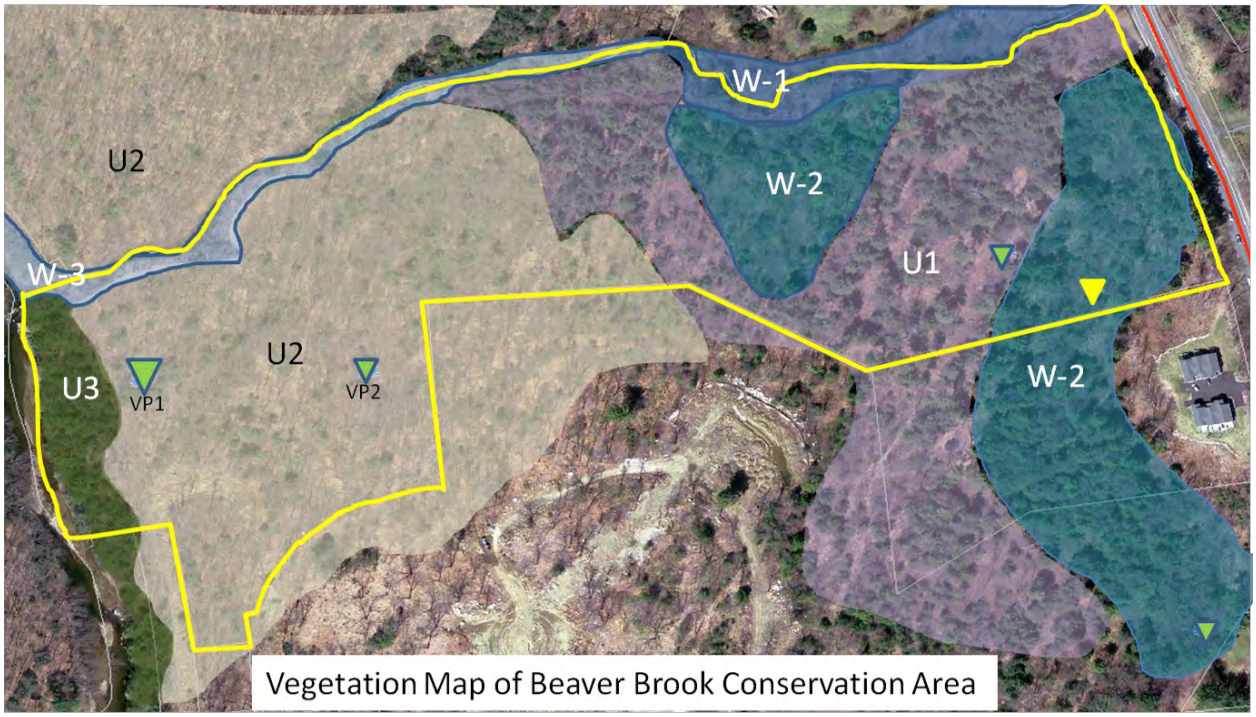
The trail that begins near the bike path threads through the mountain laurel and passes a large vernal pool. In the foreground of the photo of the vernal pool is the moss-covered trunk of a swamp white oak, a relatively uncommon tree species in the City.

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 remains 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.

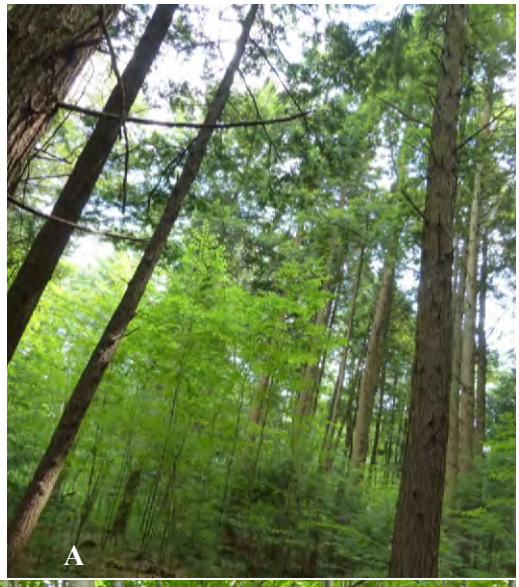
Topography & Geology

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



Vegetation Map of Beaver Brook Conservation Area

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).

The western half of the property is awash in mountain laurel and boasts a canopy dominated by oaks.

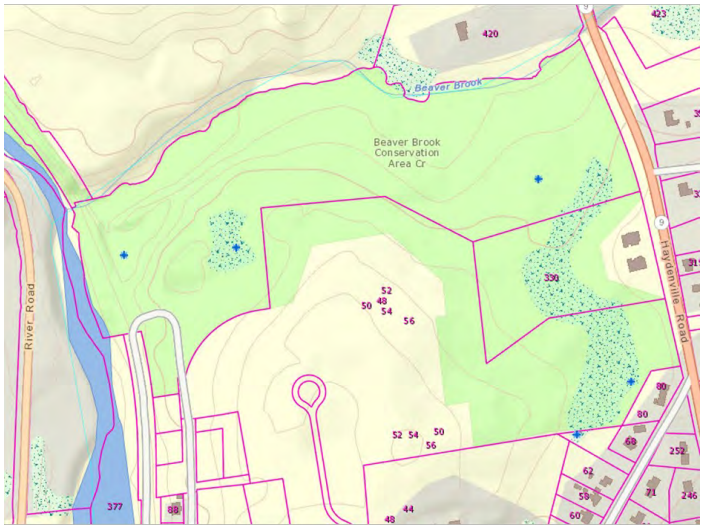
<u>Uplands</u>

U1: Hemlock and white pine, mixed with hardwoods (red maple, shagbark, birch, oak)

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.

Few plants grow in the shady understory of the hemlock grove.

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.



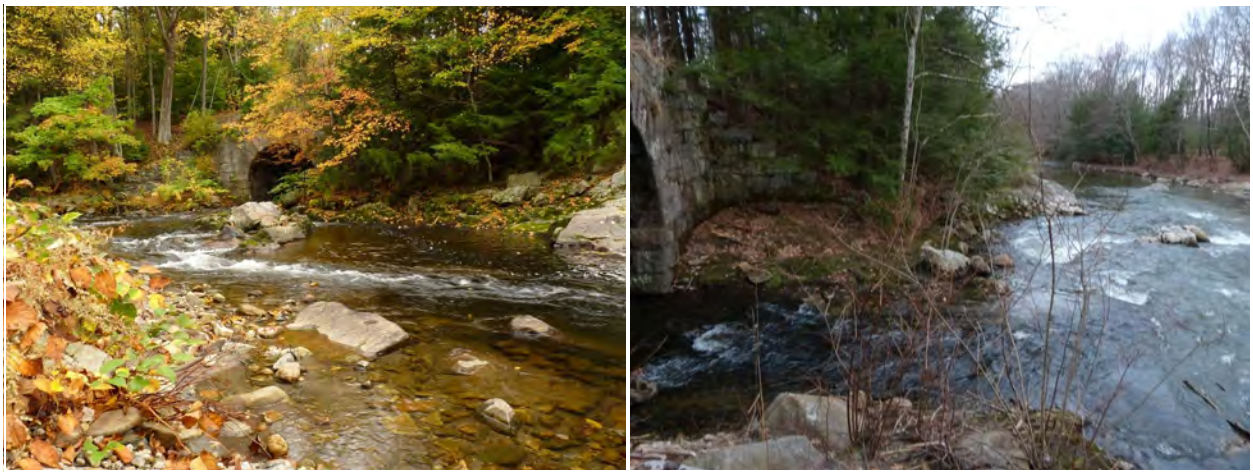
This topographic map nicely shows the outline of the conservation area and the land under conservation restriction, as well as the locations of the wetlands and certified vernal pools on the property.

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.

Mill River, Beaver Brook and Wetlands

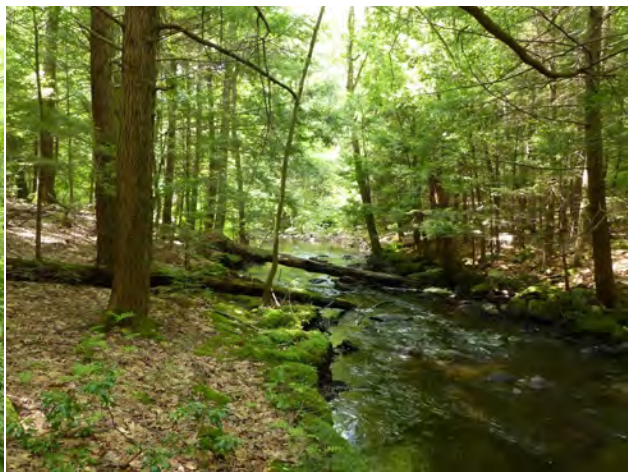
Mill River: This property includes a rocky stretch of the Mill River, with bedrock exposures, riffles and pools and of course, the arched stone bridge. This is one of the popular places in the area for swimmers and it is a nice place to snorkel. Japanese knotweed, however, is present along the banks—especially on the other side.



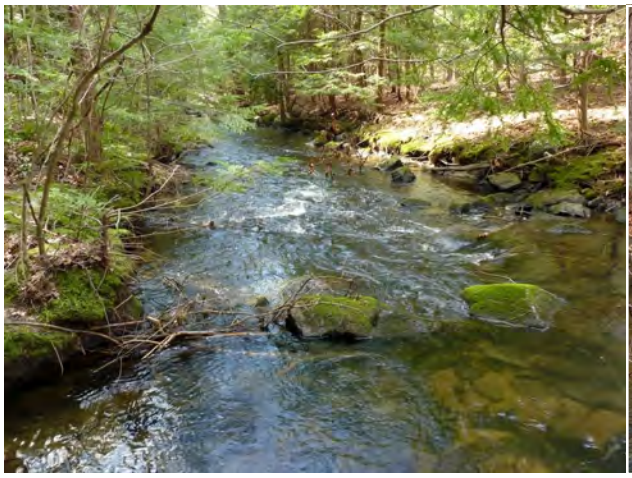
Two views of the Mill River stretch below the railroad arch. This area is a favorite swimming spot in the summer and a nice place to snorkel to see black-nosed dace, brook trout and shiners.

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 the Beaver Brook/Broad Brook Conservation Area. 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.

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. Lowbush 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-

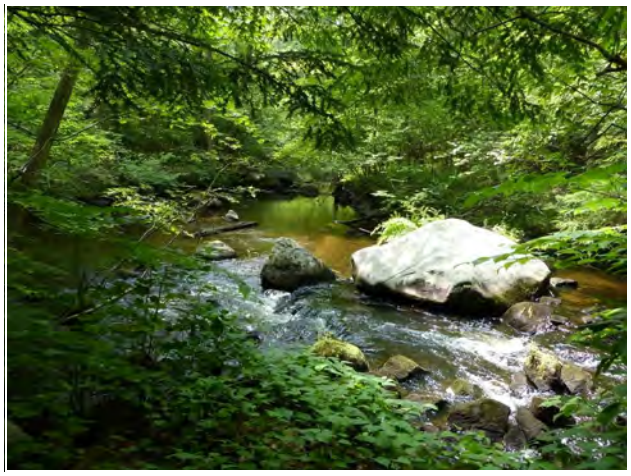
Wood frogs (*inset above)* are one of the amphibians that breed in the pools on the conservation area, including in this wooded pool, which is located in a perched wetland in the eastern portion of the conservation area. The sphagnum here may also provide suitable breeding habitat for the less common four-toed salamander.

mainder of the year. There is little surrounding vegetation in the understory. 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.

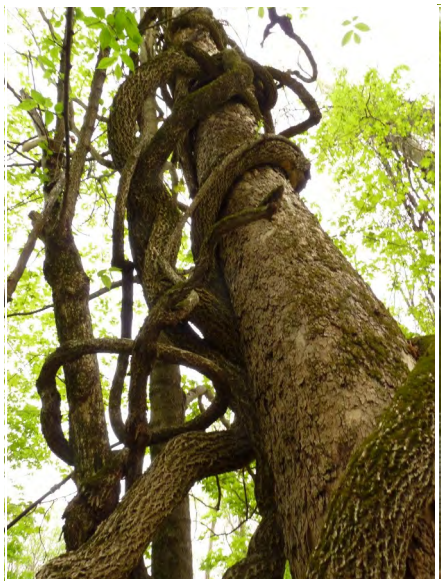
7. Install signs along Route 9 and at the entrance to the trail. Identify parking areas. Create a brochure/kiosk that describes the natural history of the land.

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

Photographs © Laurie Sanders.

A Natural History of the Florence Meadows Section

Prepared by Laurie L. Sanders, M. S.
December 2014



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 intervale. 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).

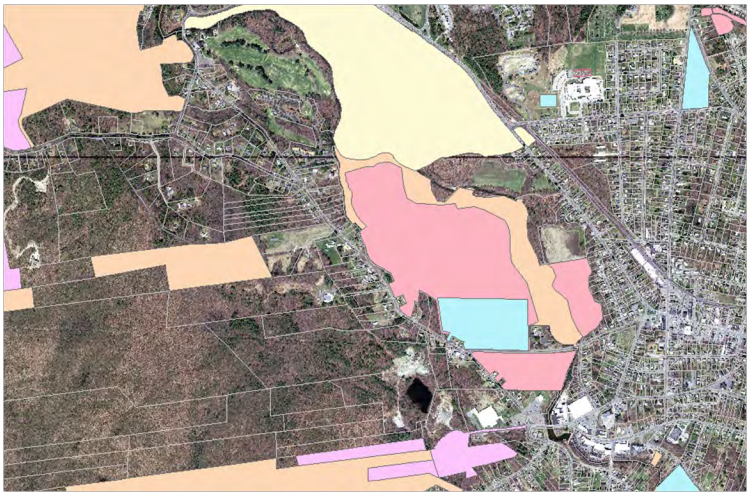
Searching for dead among debris, Florence Meadows. Photographed by A. E. and A. J. Alden, Springfield, MA. *Courtesy Digital Commonwealth.*

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.

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.

Since 2010, thanks to the contributions and vision of dozens of volunteers, GrowFood Northampton, The Trust for Public Land, Massachusetts' Department of Agricultural Resources,

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.

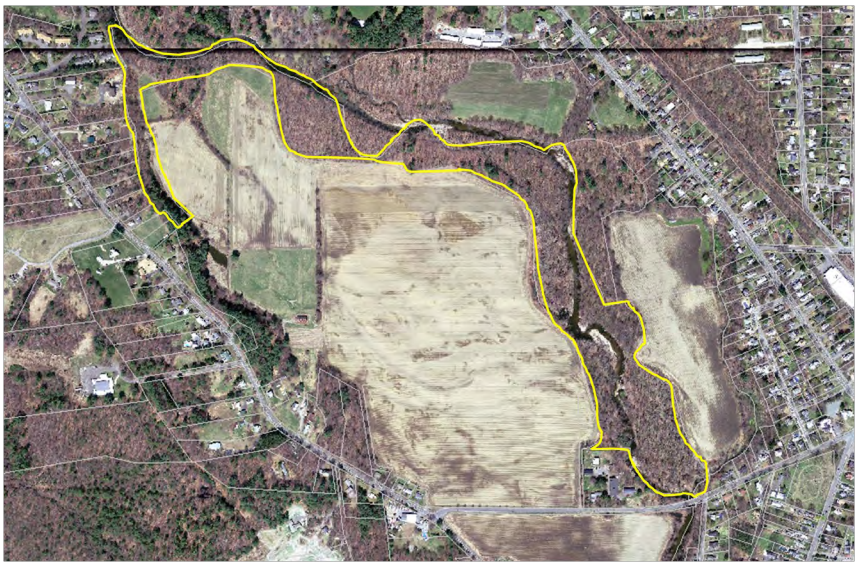


The long, wiggly 35-acre conservation area shown along the Mill River is bordered by protected farmland owned by GrowFood Northampton (light red) and Look Park (light yellow). Nearby are other conservation areas (orange—Sawmill Hills and Roberts Hill) as well as some land protected around the City's wellfields (pink). The light blue areas are recreation fields owned and managed by the City's Recreational Department.

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.

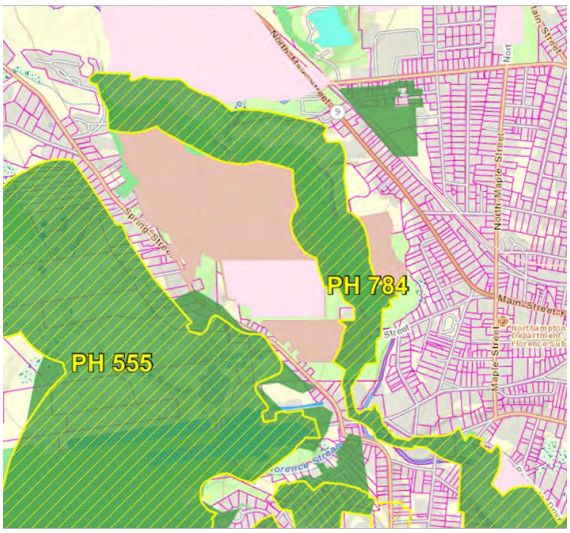
Introduction

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.



The conservation area lies within a Priority Habitat for Rare Wildlife (PH 784).

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.

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.

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 research in

Connecticut, the risk of Lyme disease is statistically higher in areas with high populations of Japanese barberry.

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.

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.

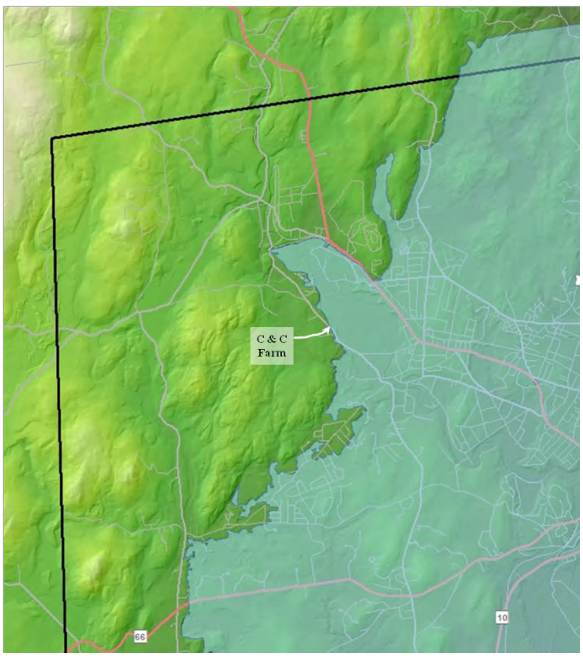
Courtesy: http://www.bio.umass.edu/biology/conn.river/hitchcock.html

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

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.

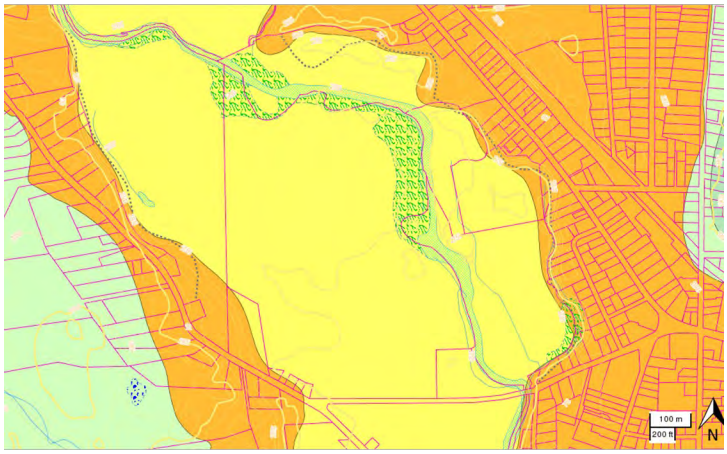


The location of the Crimson & Clover farm on the edge of Glacial Lake Hitchcock. *Image of lake courtesy of Northampton DPW, Andy Keuther.*

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.



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.*

Over time, repeated flooding and the deposition of silt have increased the area's fertility and floods have also been

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).

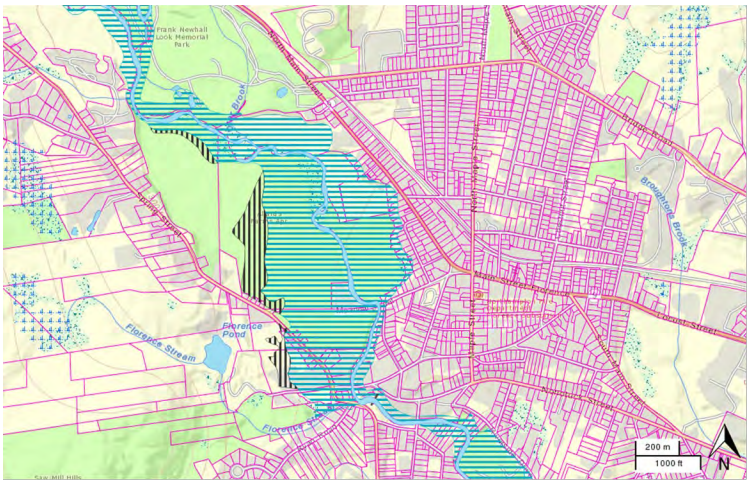
Searching for dead among debris, Florence Meadows. Photographed by A. E. and A. J. Alden, Springfield, MA. *Courtesy Digital Commonwealth. Original at Meekins Library, Williamsburg, MA.*

> *"...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



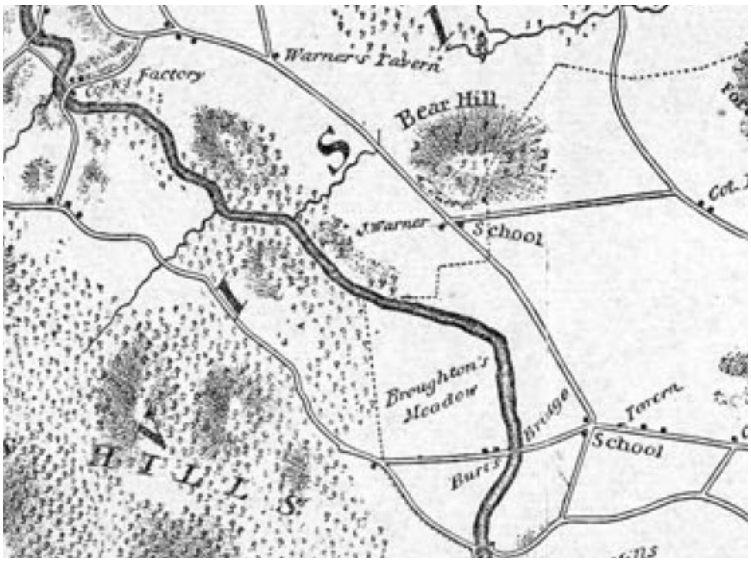
The blue horizontal hatching represents the 100-year floodplain. The black vertical hatching is the 500-year flood zone. Maps are according to FEMA.

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

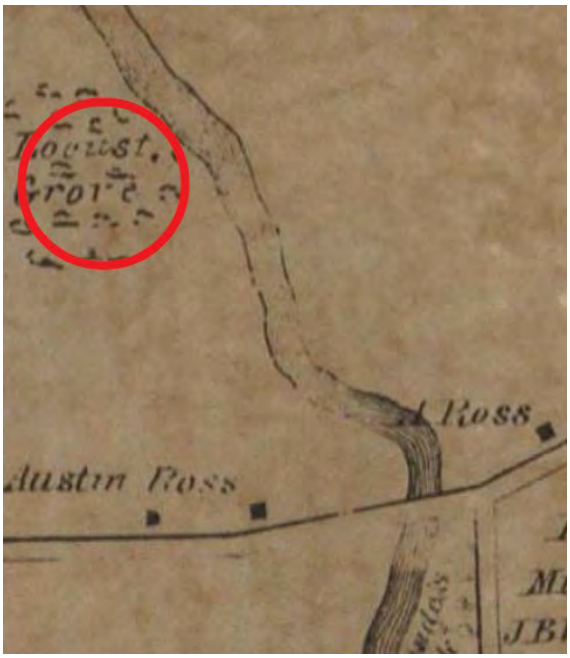


This property was known as Broughton's Meadow from 1657-1846. The 1831 Map shows the homes owned by Gaius Burt, who was only the second permanent settler in what is now known as Florence. Burt first purchased 30 acres, but eventually accumulated 100. He sold the property in in 1835 to Samuel Whitmarsh, who instigated the region's silk craze and changed the history of Northampton.

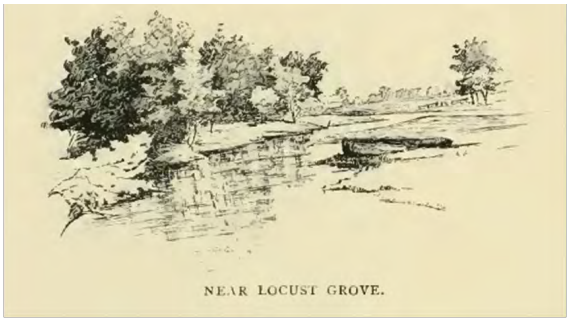
Meadow" and gave Robert Bartlett "instructions to burn them on the westerly and southerly sides of the same river" (Trumbull, 1898). According to Trumbull, annual burning continued for "nearly one hundred years."

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.



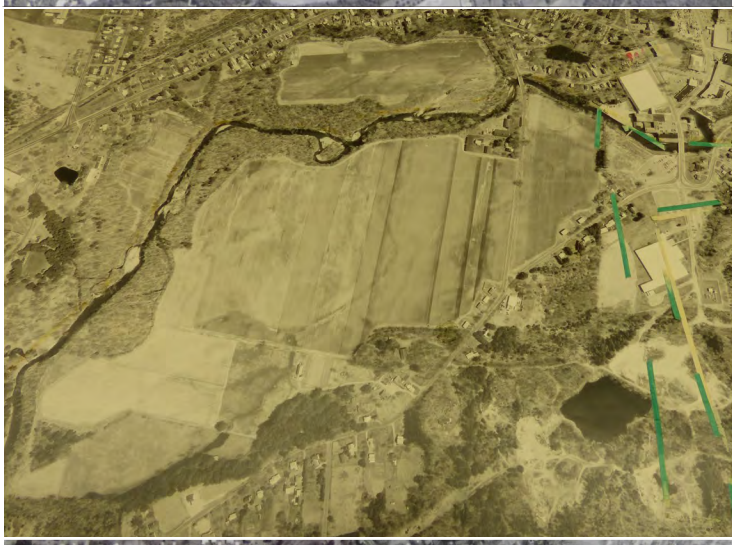
The pen-and-ink drawing of the Locust Grove along the Mill River. Note that the river is almost clear of vegetation. Whether this was artistic license or accurate is unknown. *From Sheffield, 1895.*

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.

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.

Aside from flooding and human alteration, the arrival of non-native plants and pathogens is the other important source of change. At this conser-

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.

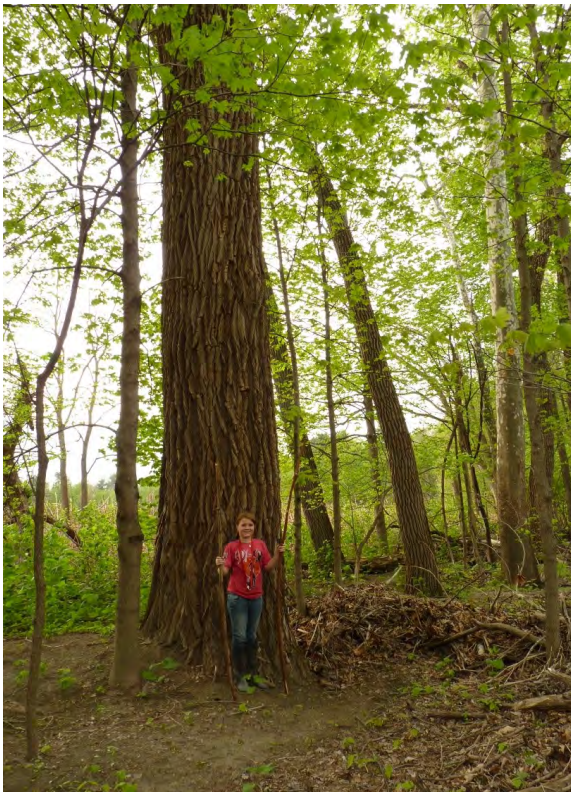
(A) A swath of garlic mustard, a species that has taken off during the last two decades. (B) Morrow's honeysuckle, an understory shrub that is common throughout Northampton, particularly in areas where the acidity of the soils are more neutral.

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 geolomorphological 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.

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.

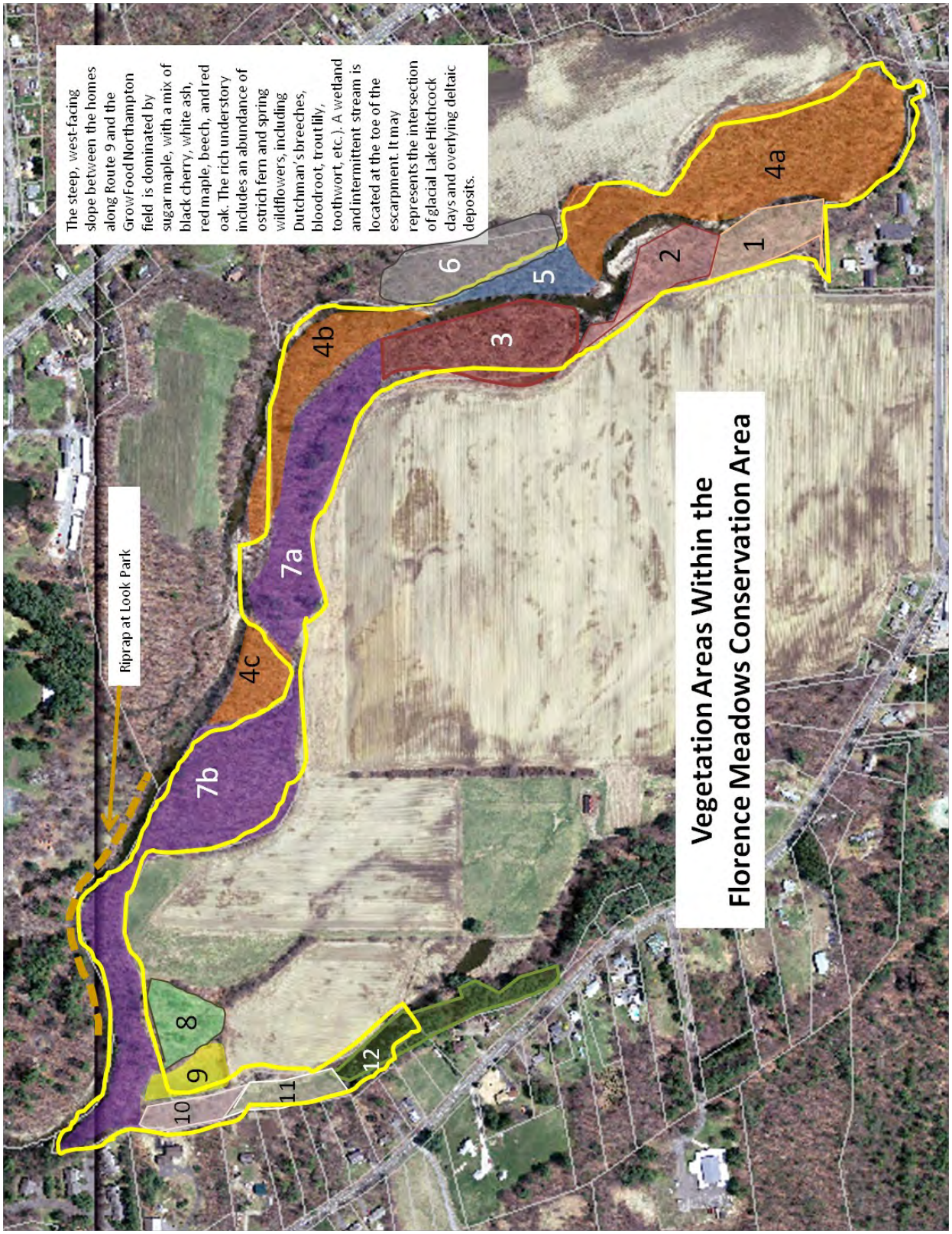
Furthest downstream and closest to the former Ross homestead and barns, the forest is dominated by black locust on the west and by a mix of cottonwood and black locust on the east. Moving upstream, cottonwood and sycamore dominate the lower, more flood prone areas, while a mix of hardwoods (sugar maple, 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.


Vegetation Areas Within the
Florence Meadows Conservation Area
The steep, west-facing slope between the homes along Route 9 and the GrowFood Northampton field is dominated by sugar maple, with a mix of black cherry, white ash, red maple, beech, and red oak. The rich understory includes an abundance of ostrich fern and spring wildflowers, including Dutchman's breeches, bloodroot, trout lily, toothwort, etc.). A wetland and intermittent stream is located at the toe of the escarpment. It may represents the intersection of glacial Lake Hitchcock clays and overlying deltaic deposits.
Riprap at Look Park
1
2
3
4a
4b
4c
5
6
7a
7b
8
9
10
11
12

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.

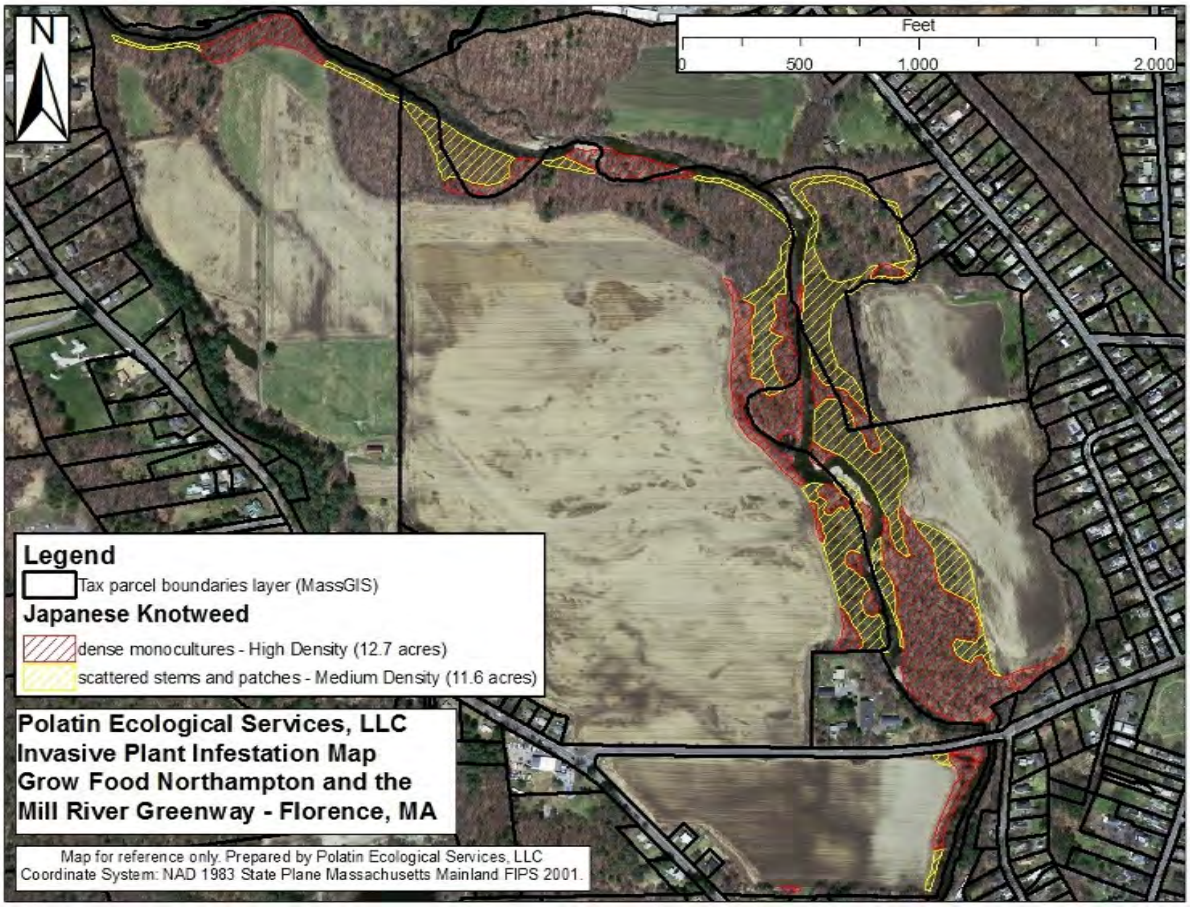
8. Off the conservation land, this triangle occurs on the other side of a wood road that leads to an old clearing. This area is dominated by red oak, white pine, hemlock, with witch hazel in the understory. Invasive shrubs are not common here.

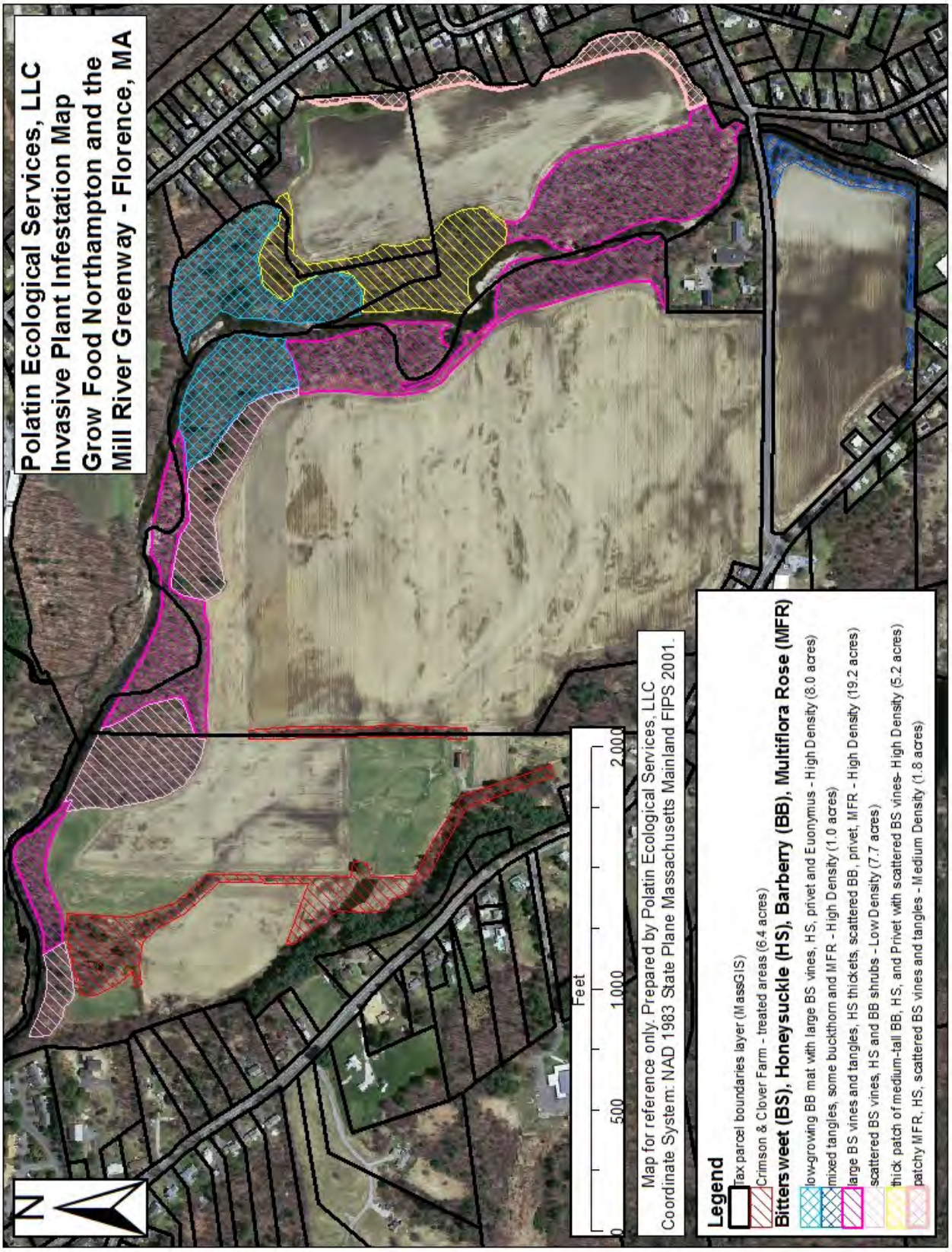
9. A former hayfield and open clearing.

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.



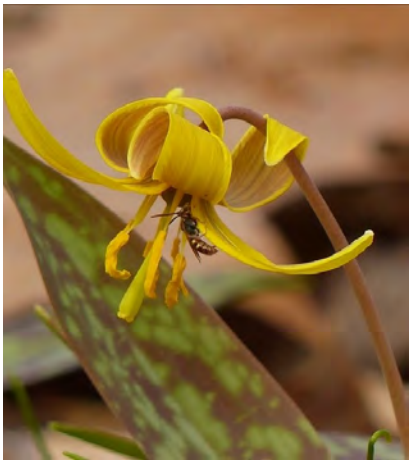

Polatin Ecological Services, LLC
Invasive Plant Infestation Map
Grow Food Northampton and the
Mill River Greenway - Florence, MA
N
0
500
1,000
2,000
Feet
Map for reference only. Prepared by Polatin Ecological Services, LLC
Coordinate System: NAD 1983 State Plane Massachusetts Mainland FIPS 2001.
Legend
Tax parcel boundaries layer (MassGIS)
Crimson & Clover Farm - treated areas (6.4 acres)
Bittersweet (BS), Honeysuckle (HS), Barberry (BB), Multiflora Rose (MFR)
low-growing BB mat with large BS vines, HS, privet and Euonymus - High Density (8.0 acres)
mixed tangles, some buckthorn and MFR - High Density (1.0 acres)
large BS vines and tangles, HS thickets, scattered BB, privet, MFR - High Density (19.2 acres)
scattered BS vines, HS and BB shrubs - Low Density (7.7 acres)
thick patch of medium-tall BB, HS, and Privet with scattered BS vines- High Density (5.2 acres)
patchy MFR, HS, scattered BS vines and tangles - Medium Density (1.8 acres)

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.

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.

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.

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.

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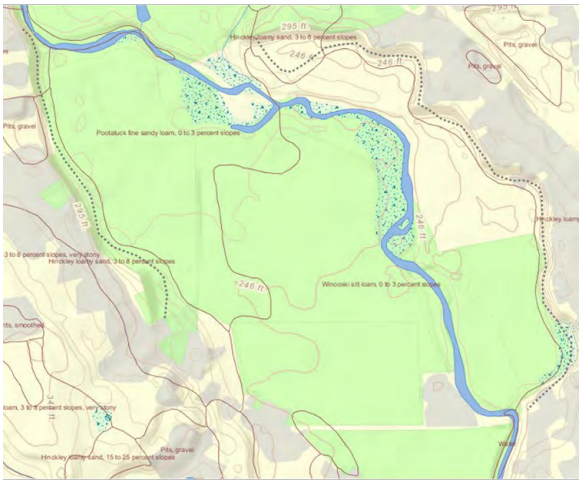
This report was made possible through support from Northampton's Community Preservation Fund.

Unless otherwise noted,
all photographs © Laurie Sanders.



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

Prepared by Laurie L. Sanders, M.S.
December 2014

Historic Mill River Near Veteran's Field

Historic Mill River Near Veteran's Field

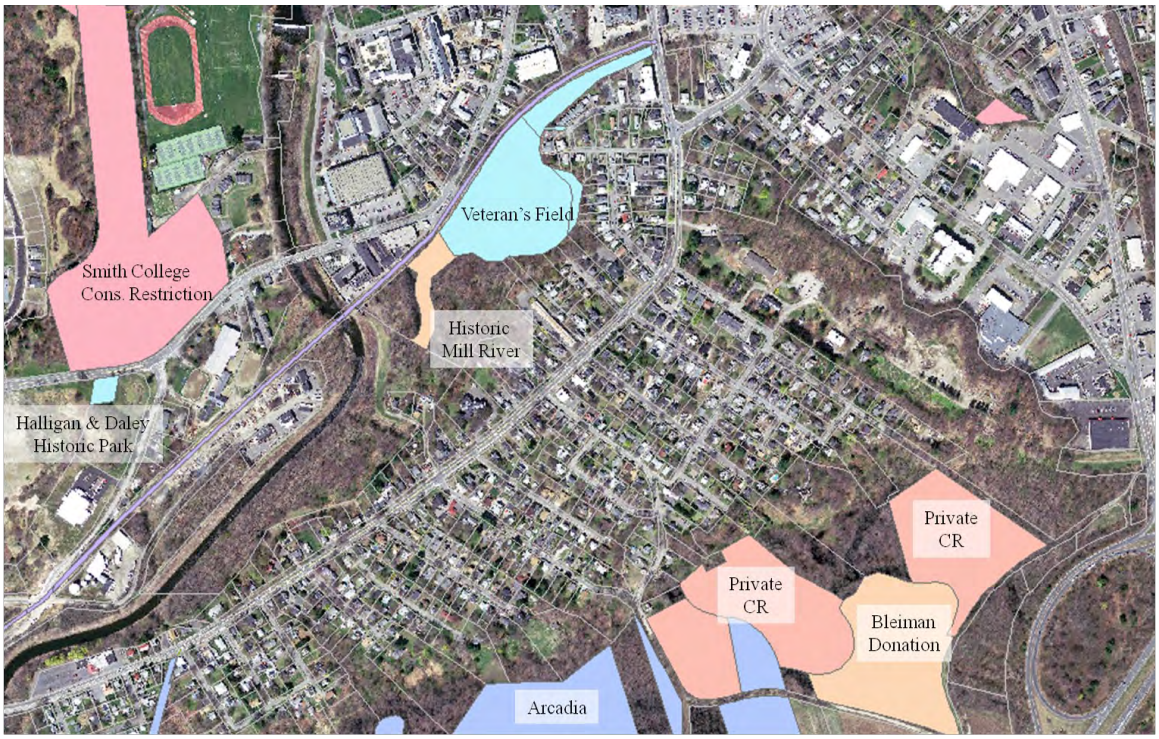
This 1.3 acre property is contiguous to Veteran's Field and includes a remnant of the abandoned Mill River channel, plus a narrow band of higher ground along the margins of the old bed. Invasive species are present within the conservation area, but surprisingly, are not that common. The neighboring properties, 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.

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.

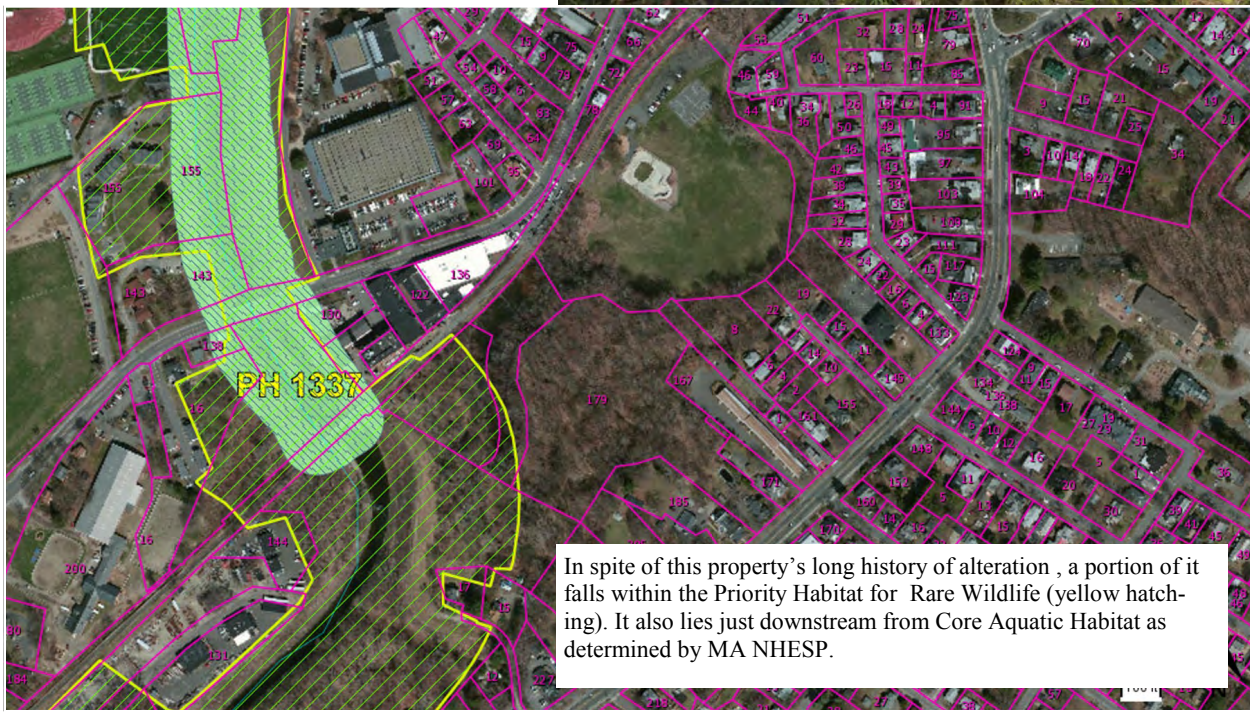
Uplands to Wetlands

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.

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

Photographs © Laurie Sanders.

A Natural History of the Leeds Memorial

Prepared by Laurie Sanders, M.S.
December 2014

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.

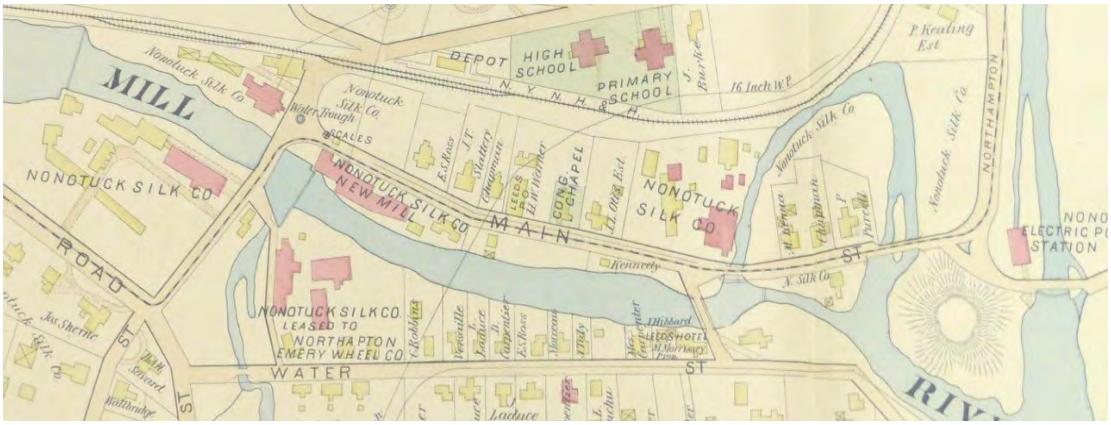
The good news is that that's not the way it has to be. With the proper permits, the non-native plants could be controlled (which would help the native species recover) and a portion of the conservation area could be opened to allow easy access to the river's edge. These initiatives would not only improve the ecology of this tiny conservation area, but it 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.

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.

History & Ecology

This conservation area was created not with conservation in mind, but history. In the late 1990s, a small group of local historians

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, in1874 this strip of land was owned by the Nonotuck Silk Company, one of the original investors in the failed dam of the Hampshire Reservoir.

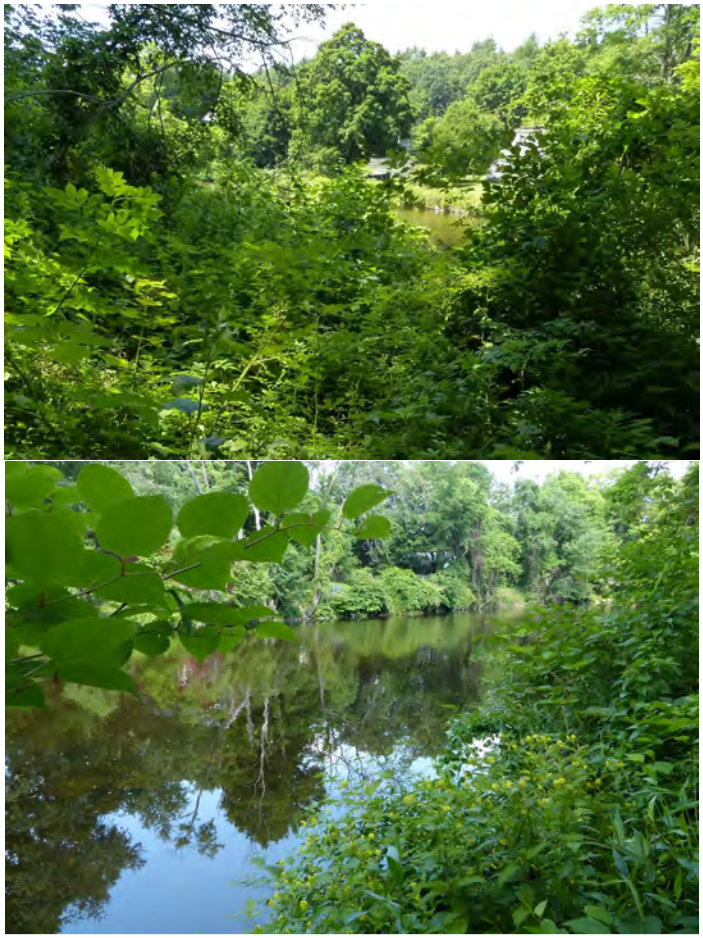
These two aerial views of downtown Leeds along the Mill River (1965 and 2013) reveal how the vegetation along this stretch of the Mill River has grown over the years.

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.



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.

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,

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.

Japanese knotweed, multiflora rose, barberry and bittersweet are displacing the native species.

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

Fringed loosestrife, a native species, in bloom.

Slippery elm is the most common tree.

Common Birds at the Leeds Memorial Conservation Area

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

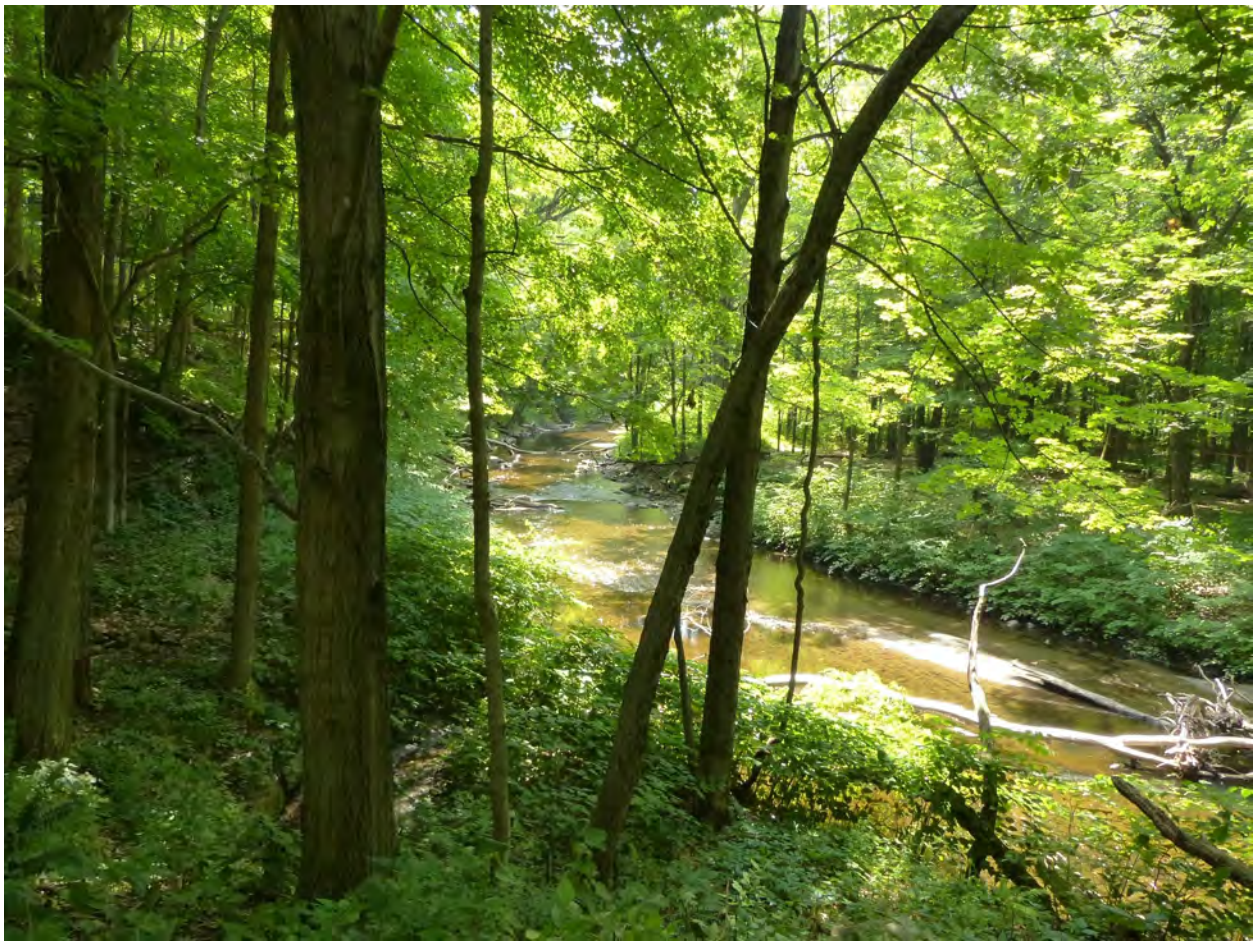
Although the main purpose of this site is as a tribute to the 1874 flood victims, it could become a much more welcoming piece of open space in downtown Leeds if the non-native plants were controlled and better access to the river was created. This plan would obviously require permission from the conservation 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.

The view of the conservation area from the Hotel Bridge.

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 the Button Factory Conservation area and Main Street, and the renewed effort to restore the Hotel Bridge for bicyclists and pedestrians—it makes even more sense.

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

A Natural History of the Button Factory



Prepared by Laurie Sanders, M.S.
December 2014

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.

As seen from the street edge….not too inviting!

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

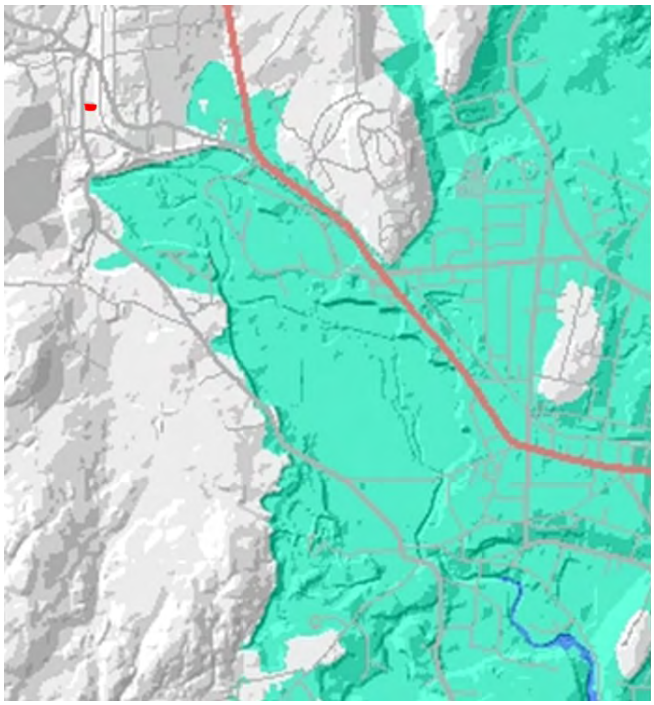
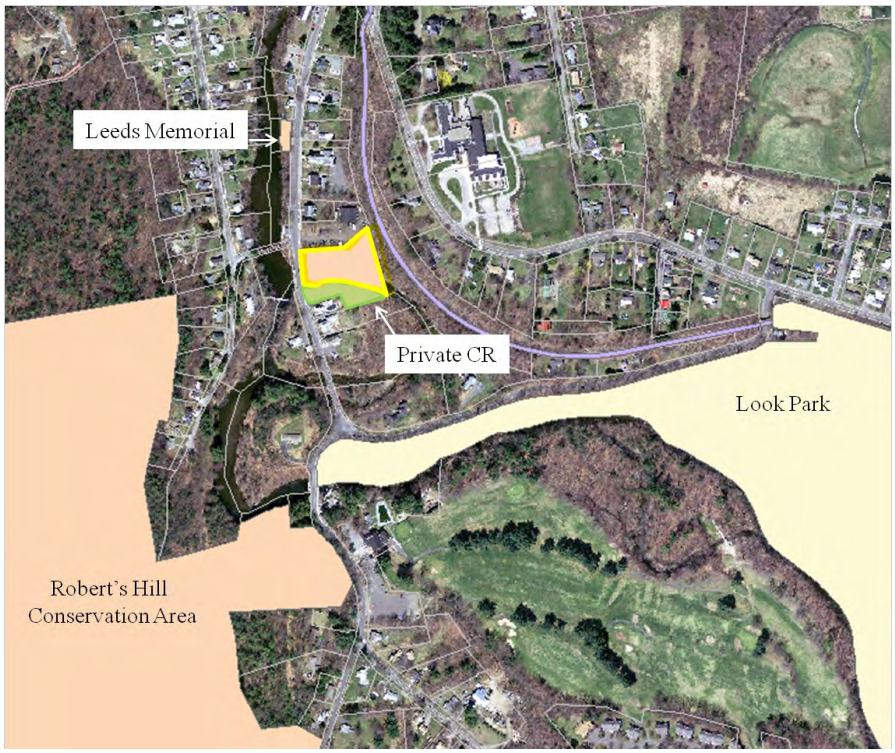


Figure 1. The tiny red dot is the location of the conservation area relative to the position of Glacial Lake Hitchcock. The white areas are either the surrounding uplands or islands within the lake. The two closest islands that would have been visible from the conservation area would be the drumlins 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.



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.

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

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.

Photo by Robert Emrick.
Courtesy of Forbes Library.

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.

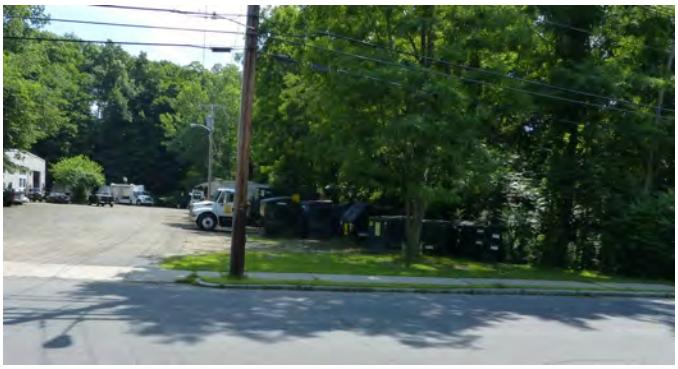
By the 1950s most of the buildings, as seen in this aerial image, had been knocked down.

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).

Today rock walls, old fill and other debris are the lasting physical evidence of the decades of manufacturing that took place on this site.

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.

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.

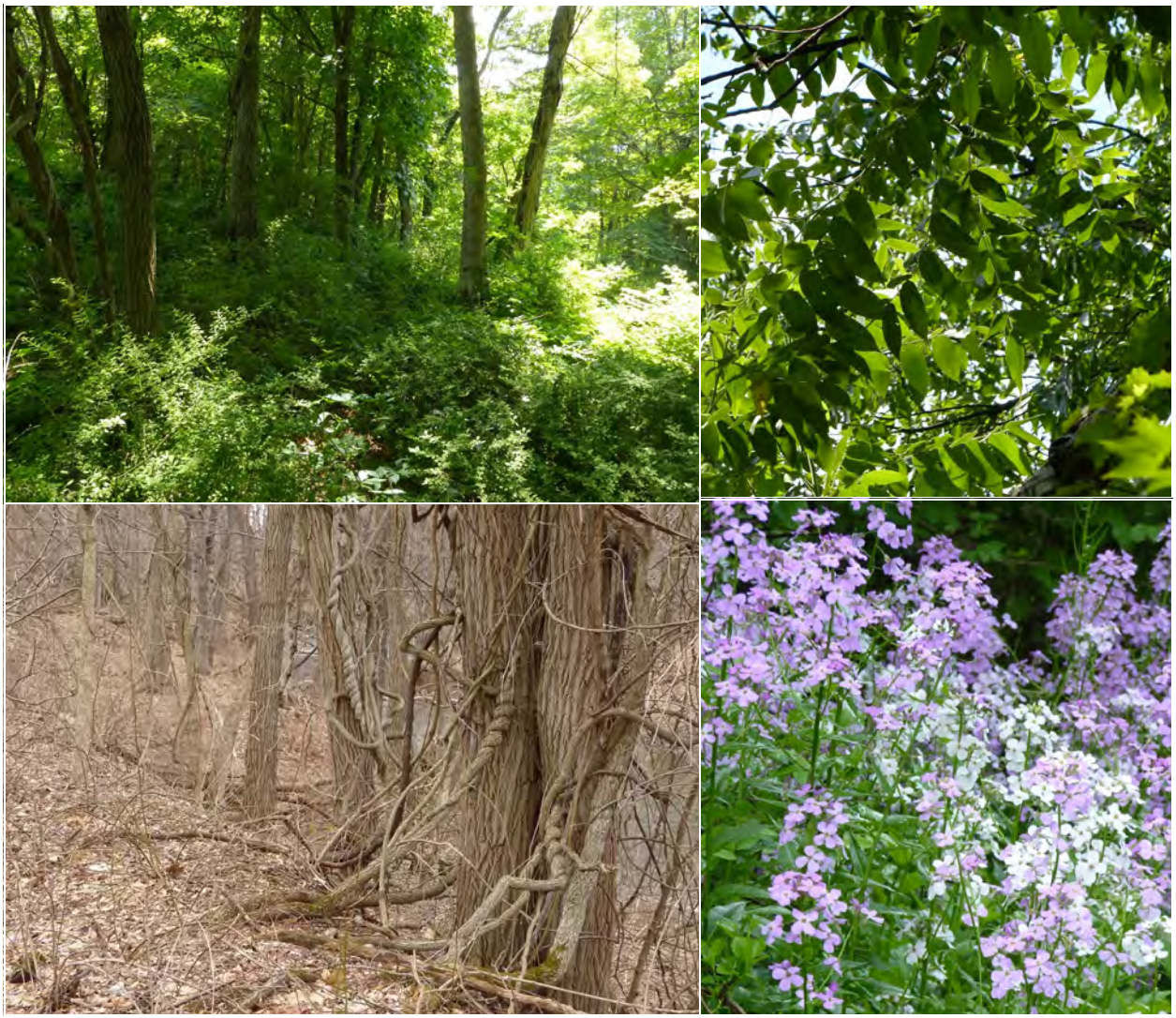
Vegetation Patterns Today

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.).

Uplands

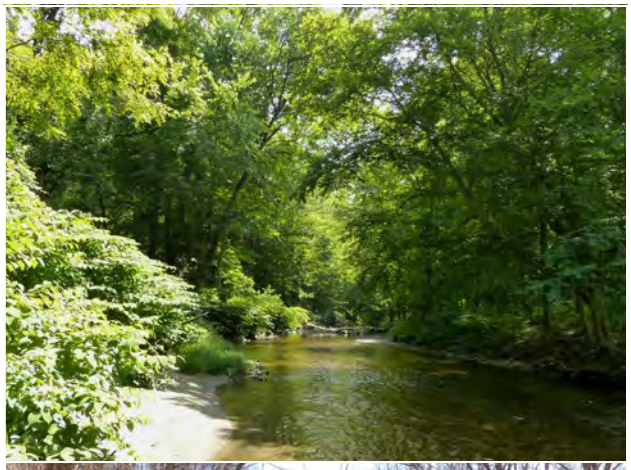
Along Main Street, beyond the clone of staghorn sumac, the forest includes a mix of tree species. Black locust is the most common component in the canopy, but other trees include elm, box elder, sugar maple, Norway maple, cottonwood, black cherry, black birch, white pine, a large catalpa and closer to the river, a very large butternut.

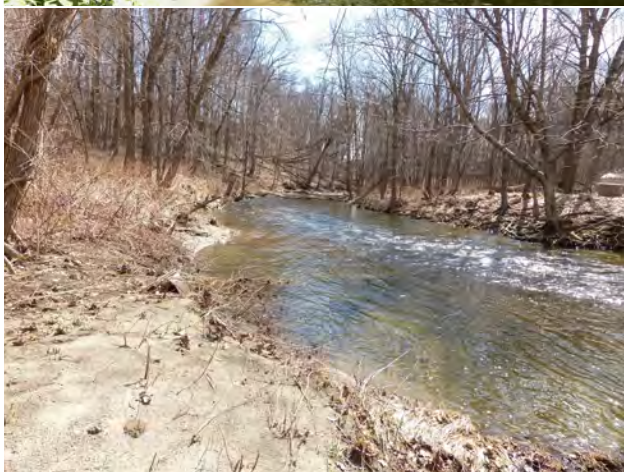
Below the canopy, the understory is a mix of native and non-native species, with the non-natives being the most common. They include multiflora rose, Asiatic bittersweet, Morrow's honeysuckle, winged euonymus, privet, barberry, garlic mustard, celandine, Dame's rocket and winter creeper. Native plant 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.

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.





Two views looking downriver, at different types of year.

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.

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.

Japanese knotweed crowds the shoreline. In foreground, *Carex torta*.

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, wildlife

sign is 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 bittersweet 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.

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 bittersweet vine. Go beavers!

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

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 the Button Factory Conservation Area, 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 Knotweed 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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Support for this document was made possible from Northampton's Community Preservation Fund.

Unless otherwise noted, all photographs © Laurie Sanders.

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-

cestors, who, with the help of fire, probably kept this stretch of the Mill River open and park-like. Arrowheads and stone flakes have been found right across the river in the fields of the former state hospital, which strongly suggests that the river's small floodplain was probably routinely burned. It's also quite possible that the Nonotuck took advantage of the site's rich, alluvial soils and farmed here as well.

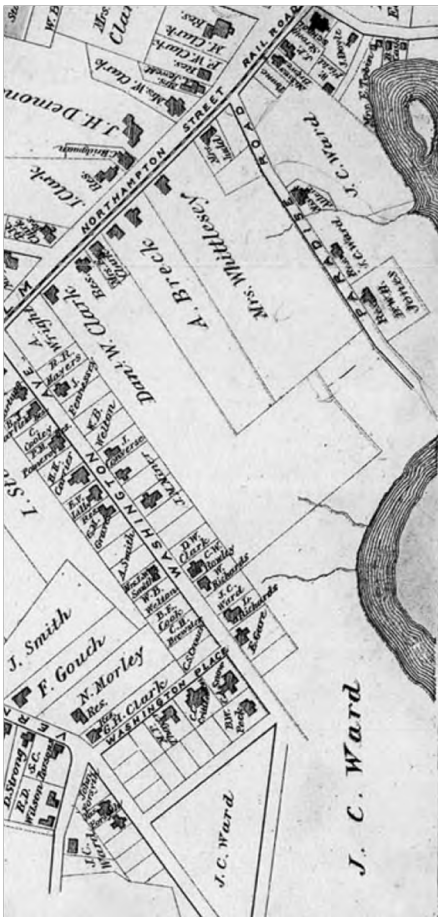
The 1831 map shows a tannery just above the bend that is now Paradise Pond and a sawmill and paper mills just upstream from the focus area.

Once the English settled in Northampton, they kept up the practice of annual burning along the Mill River and in upland forests for decades. Although there is no account of what this particular area looked like when the English arrived, there are descriptions of Round Hill and other places in Northampton. Based on those, it is a good guess that the land along the river was a meadow and the slopes and surrounding uplands were covered with massive, widely-spaced canopy trees. The fires helped to keep down the understory brush and at the same time, maintained a carpet of grasses, ferns, and wildflowers. In addition, because this place was so close to the original home lots, early on it was used by the first settlers as a place to cut timber and firewood. Trumbull's *History of Northampton* recounts how two men "chopping wood near Paradise Road" in 1675 were shot and scalped by Indians.

What took place in this vicinity during the 1700s is unknown, but the changes to the Mill River area during the 19th century are fairly well-documented. By the time the 1831 map of Northampton was prepared, more than a dozen mills were upriver, including a paper mill and sawmill just above in Baystate and a tannery (notorious for their awful smells and working conditions) near Paradise Pond.

As the century proceeded, the river's water quality got nothing but worse. By the 1860s, the number of upstream mills had climbed to about 70 (or so) and they were releasing all kinds of waste into the river. The villages were too, and by then, this stretch would have been even nastier because the State Hospital (1856) had built its sewage pipe to the Mill River and placed the outfall directly opposite from this tract.

By the 1870s, this bend in the river and most of the surrounding property was owned by J.C. Ward (hence the name Ward Avenue) and this part of town was known locally as Paradise Woods and the floodplain that forms much of these twelve acres was known as Paradise Meadows. During those days, anyone who wanted to could follow the carriage trail that began at the end of Paradise Road (shown on the 1884 map) and ride to Bay State.

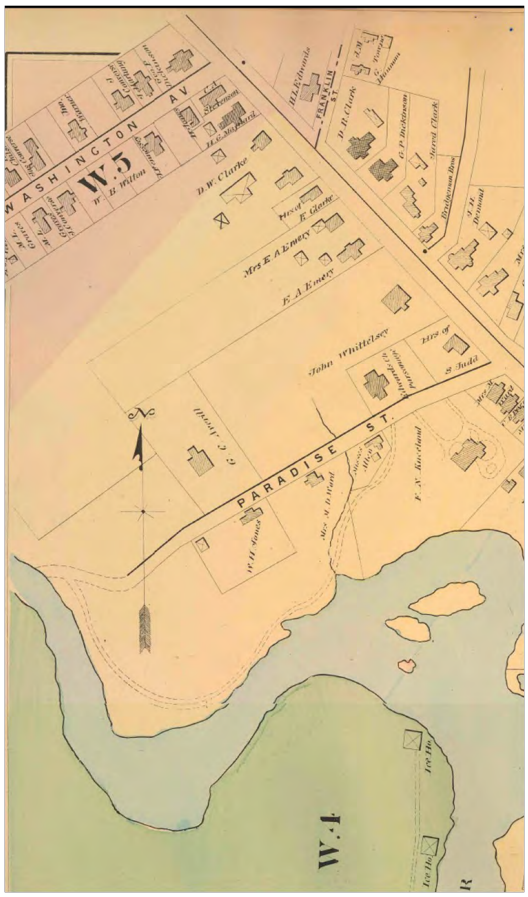


When the 1873 map was completed, much of the land in this area was owned by J.C. Ward.

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.



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.

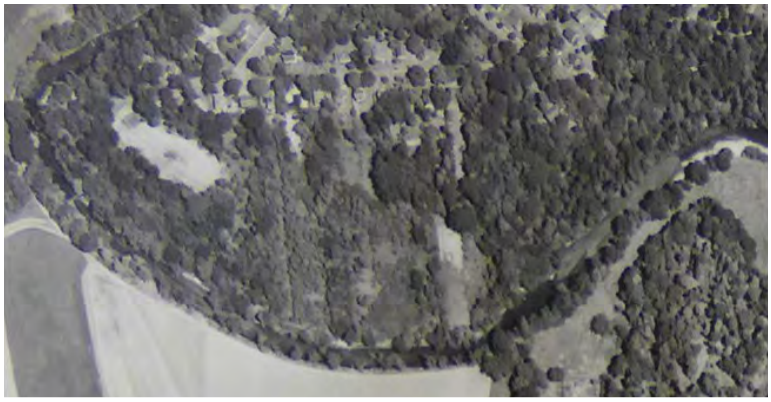
By the time the 1895 map was done, the hillside and area along the Mill River had been subdivided into lots.

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-

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 subcanopy. 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.

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.

In the 1980s the DPW replaced the sewer-line, which runs underneath much of the trail.

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.

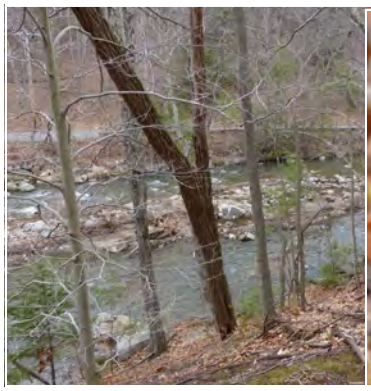
Please let me know if you have any questions or feedback. I'd be more than happy to respond.

Sincerely,

Laurie Sanders

A Natural History of the Upper Leeds Rail Trail

Prepared by Laurie Sanders, M.S.
December 2014



Upper Leeds Rail Trail Conservation Area

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 those operations was in the same spot as the upper Leeds Dam is today.

Natural Resource Summary	
Estimated Habitat for Rare Species	Yes
Vernal Pools	No
BioMap	Yes
Supporting Natural Landscape	Yes
Coldwater Fisheries	Yes
Climate Change Resilience	No
Water Supply	No

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

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.

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.

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

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.).

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 brassworks.

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 1962, it abandoned the stretch between Florence to Williamsburg altogether.

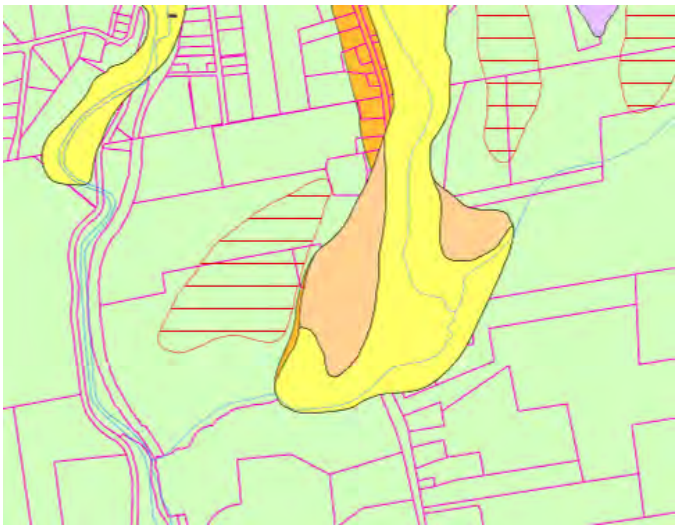
A few old railroad ties can still be found along the abandoned line.

A large, old trunk of a black locust grows along the steep bank above the Mill River.

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.



Light green shows the till deposits that characterize this conservation area. Other colors and hatching show other types of post-glacial deposition.

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.

Behind the loose rocks and young trees is an exposure of bedrock. These rocks are metamorphic and about 450 million years old.

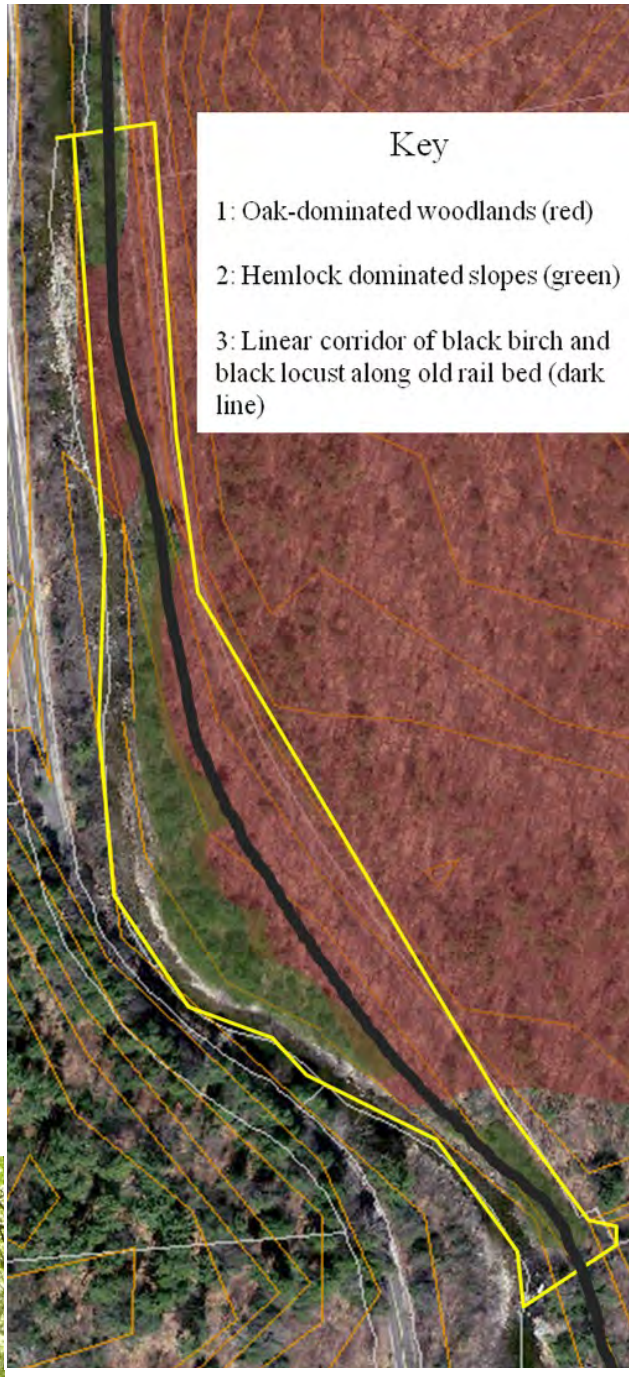
Since the lake drained, the Mill River has continued to eat down through the till deposits, but within this stretch, the river was sharply confined by the surrounding bedrock. Still, wherever it could, it has moved back and forth, cutting and depositing sand, gravel and cobbles. Near the southern boundary of this conservation area, these deposits have formed a 1.5-acre lobe that provides easy access to the river.

Vegetation Patterns

As previously mentioned, during the last century, the land along this stretch of the Mill River has re-forested, 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.

<u>Hemlock Dominated</u>

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.



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.

Moss-covered rocks and fallen leaves cover the forest floor, now deeply shaded by the hemlocks above.

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 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.

A mix of black birch and black locust have grown up along the old abandoned rail line.

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.

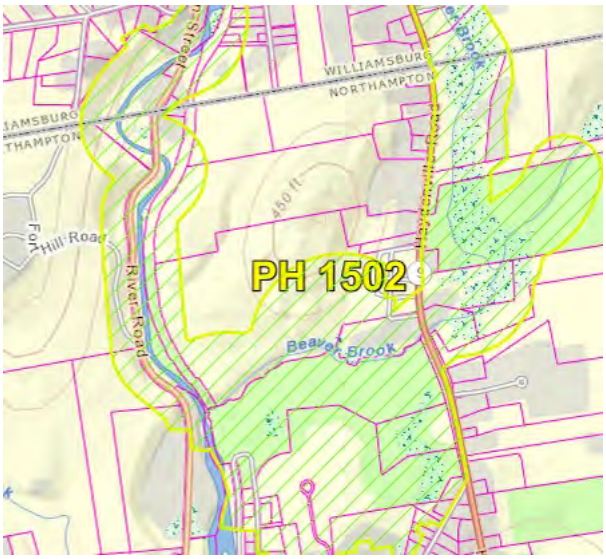
Ecological Attributes & Issues

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?

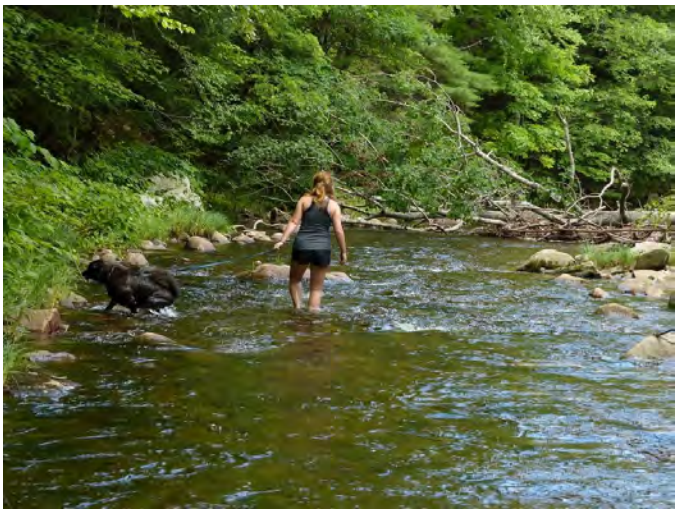
Due east of the old rail line, along the crest of the hill and beyond the City-owned property grow a series of massive white oaks. Their open, branching architecture reveals their history: they began as trees in an open pasture and the surrounding forest grew up around them.

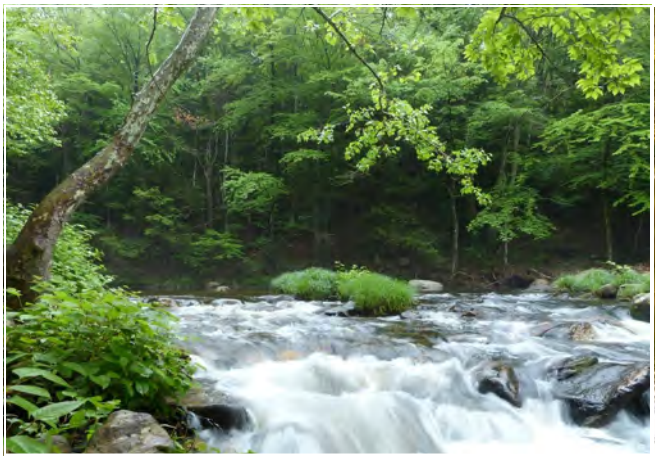
Recommendations

1. Whether this portion of the abandoned rail trail will be paved or kept as a gravel bed is not part of the scope of this project, but the decision will definitely affect the area from recreational and aesthetic standpoints, and potentially ecologically as well. If the trail is paved, the path will require a wider clearing and more alteration, which may in turn promote the growth of more invasives along the old rail corridor. Alternatively, if the trail is kept as a gravel path, it will be important to maintain its condition so that it does not erode and cause sedimentation problems in the river.
2. At this point, the invasive plants within this section can-and should-- be managed.
3. 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.
4. 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

This large and interesting-shaped rock is positioned right along the edge of the rail trail path.

forested land is free of invasive plants. Invasives occur in the wetlands 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.





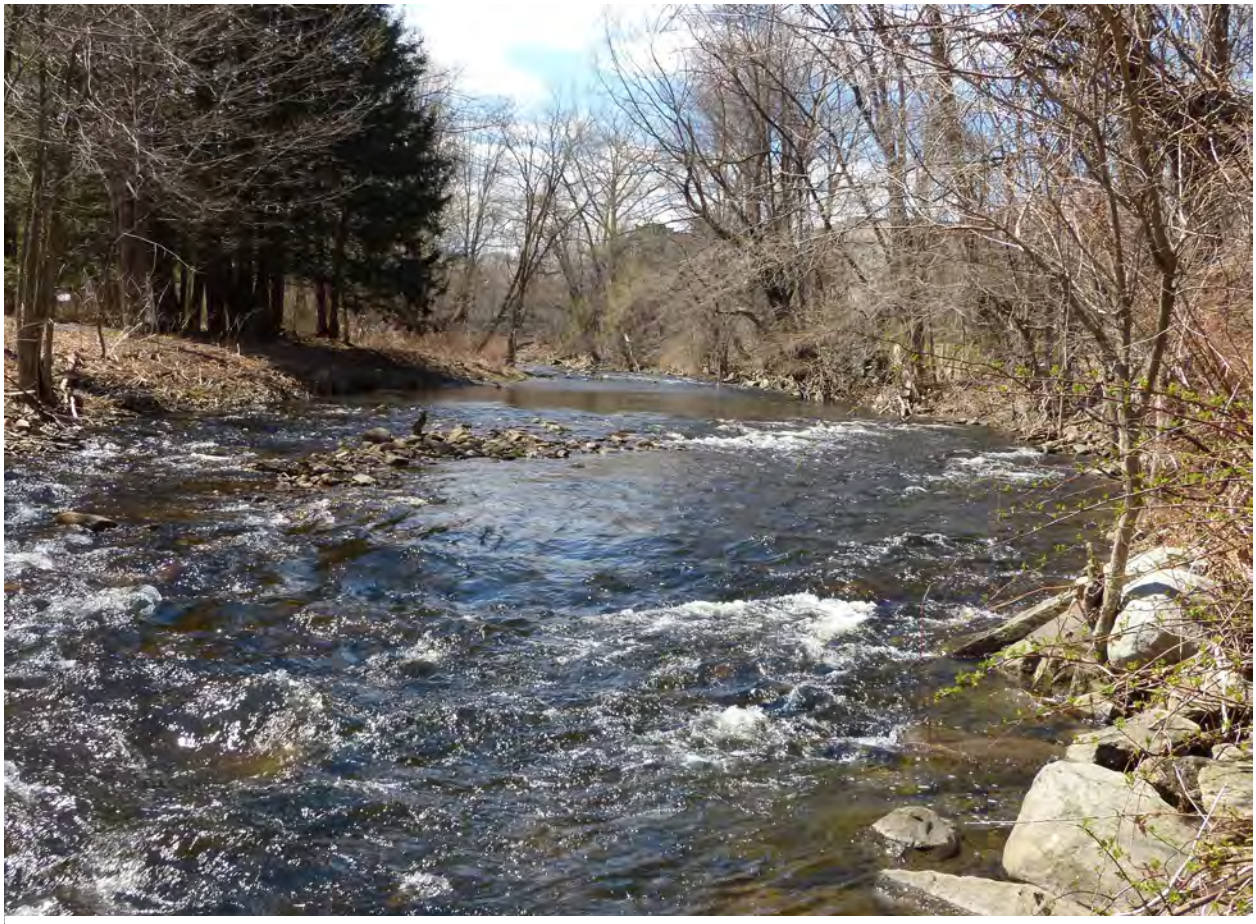
The conservation area lies on the other side of the Mill River, rushing here after a summer thunderstorm.

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.

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

Photographs © Laurie Sanders.

The Natural History of the Vistron Section



Prepared by Laurie Sanders, M.S.
December 2014

Vistron Conservation Area

The Natural History of 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.

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.

Raising silkworms and producing profit-

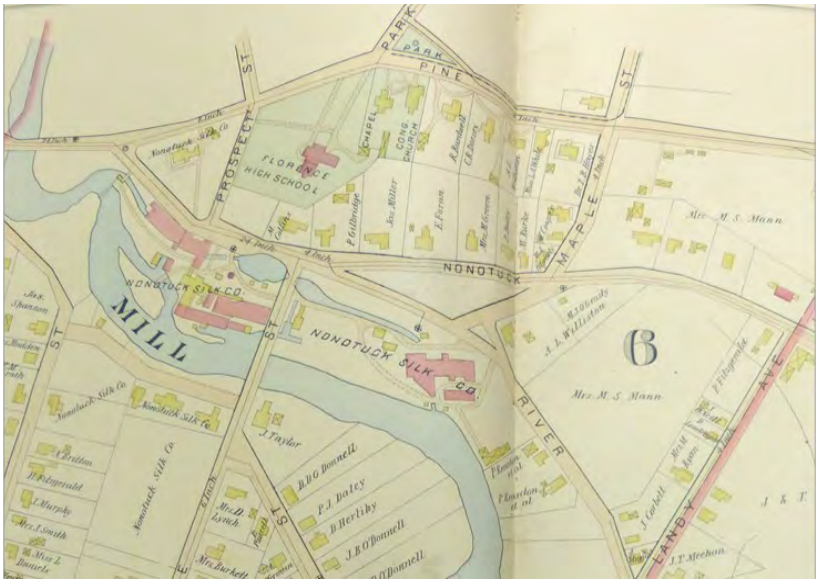
NONOTUCK SILK COMPANY'S DAM.

OLD SILK MILL BOARDING HOUSE. VIEW NEAR THE DAM. LILLY PLACE.

REAR VIEW OF BRAID MILL—ORIGINAL COMMUNITY BUILDING IS SHOWN IN CENTER.

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.



This 1895 map shows a series of storage buildings associated with the Nonotuck Silk Mill on near the property.

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.

In the 1950s, the property (shown here in yellow) was an open clearing.

The buildings were subsequently purchased by Pro-Phyl-Lac-Tic (or Pro-Brush), a long time local manu-

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 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 buildings 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.

Young shoots of Japanese knotweed, one of the most aggressively spreading non-native plants in the eastern United States.

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 multiflora 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-

tion to these old familiar invasive species, a "new" invasive has appeared as well. A member of the bittersweet and euonymus family, it is known as wintercreeper 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.

Animal scratch marks on a fallen trunk.

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.

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

Sheffield, Charles. 1895. The History of Florence, Massachusetts.

Tonry, Claire. 2005. Phase 1: Environmental Site Assessment, Vistron Section of the Mill River, Riverside Drive, Florence, MA. pp. 1-9.

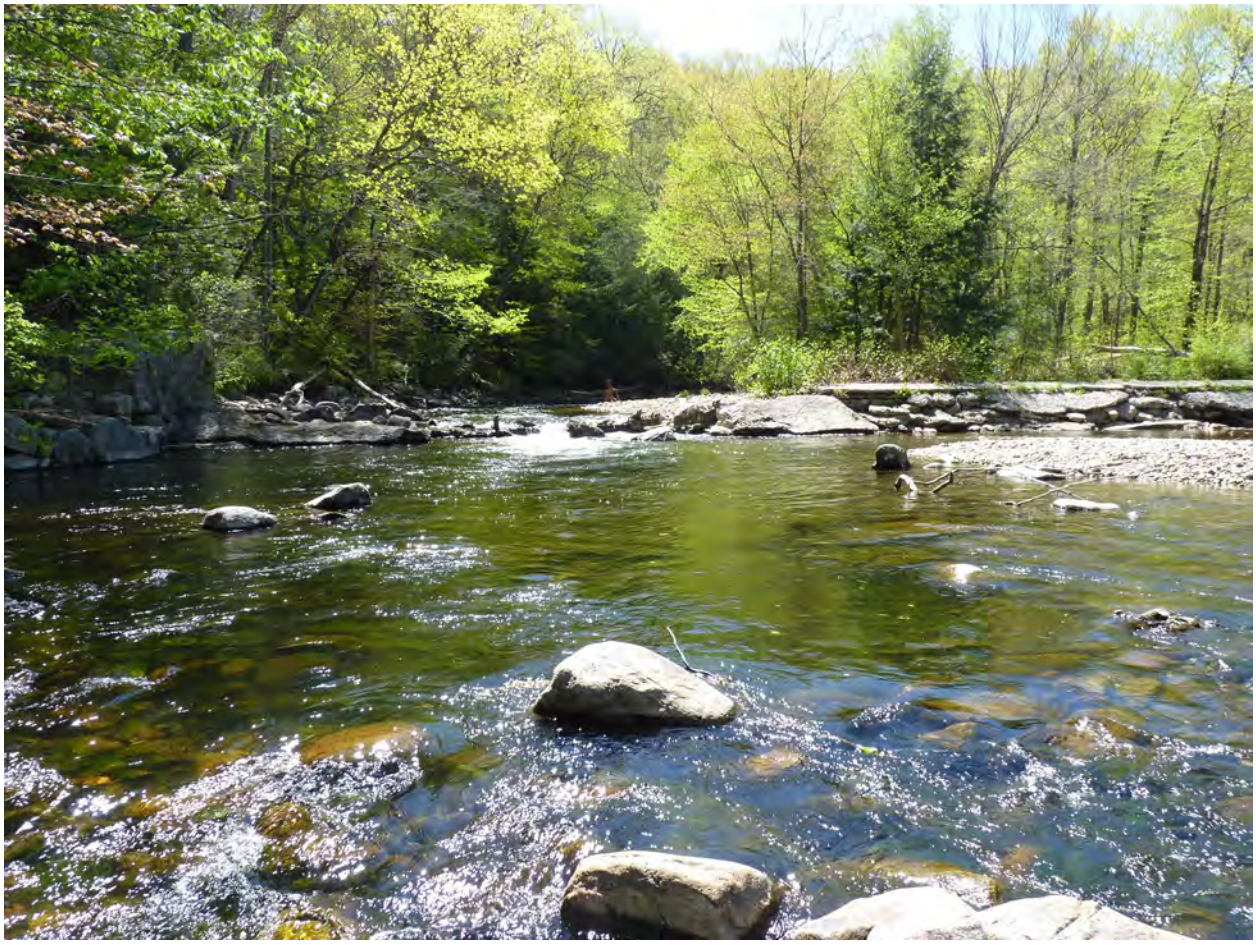
Asiatic bittersweet vines twist into the canopy.

This document was made possible through funding from the Community Preservation Act.

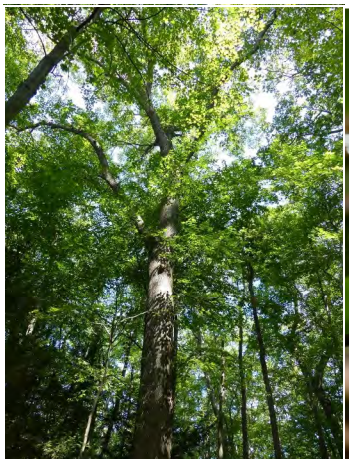
Unless otherwise noted, all photographs © Laurie Sanders.

Images of the Nonotuck Silk Mill, in real life and an artist's rendition, loosely based on reality.
From Sheffield's History of Florence.

The Natural History of the Yankee Hill Section



By Laurie Sanders, M.S.
December 2014



Yankee Hill Conservation Area

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.

The Yankee Hill Conservation Area was donated in 1989 by James H. Graham, co-owner and co-founder of Yankee Hill Machine 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.

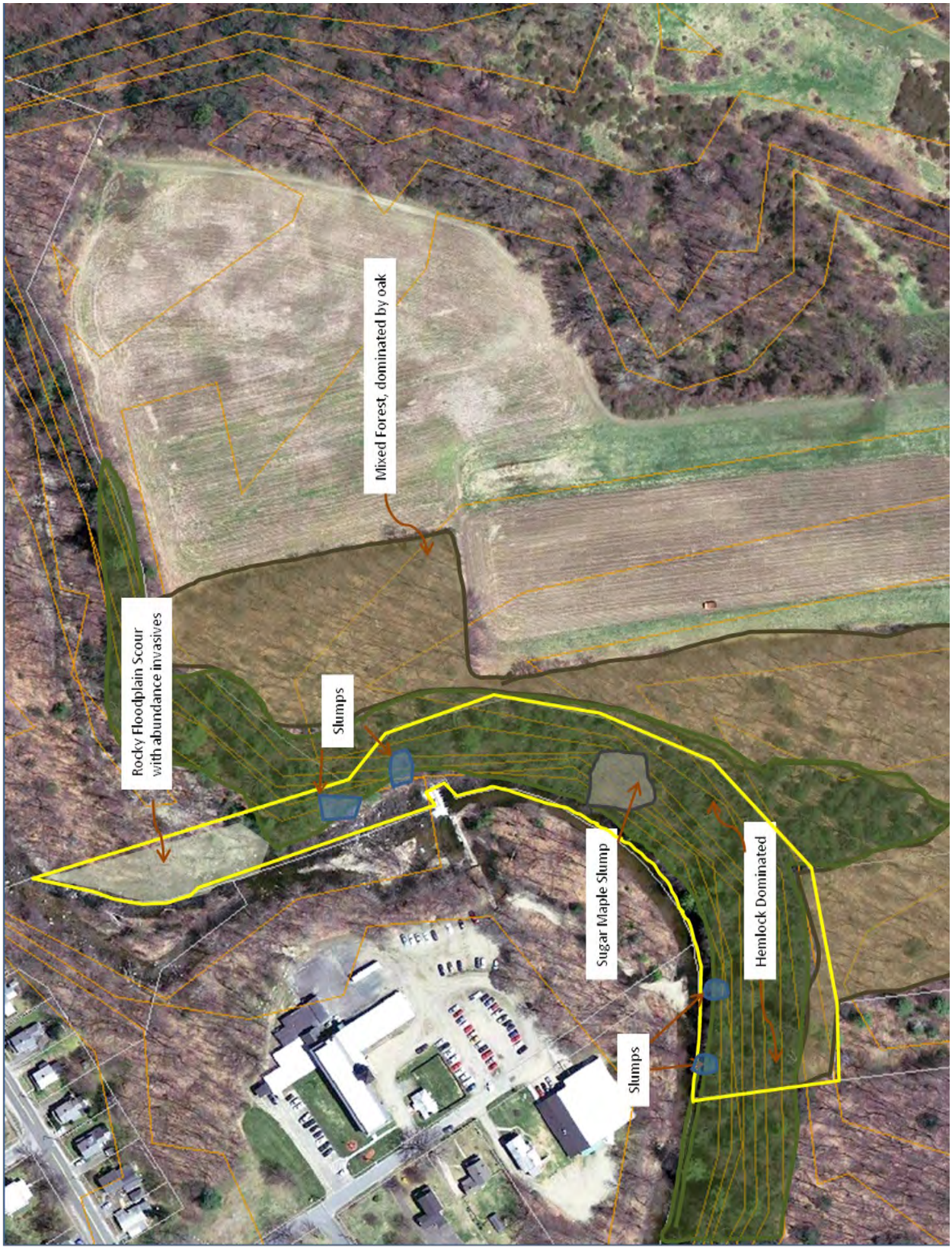
A small cluster of Japanese knotweed is growing at the top of slump. It is in the center of the photo.

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?

The hemlocks along Yankee Hill already have thinner canopies due to the presence of hemlock woolly adelgid.

"Hemlock woolly 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


Rocky Floodplain Scour
with abundance invasives
Slumps
Mixed Forest, dominated by oak
Sugar Maple Slump
Hemlock Dominated
Slumps

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 understory.

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).

The Geology of the Yankee Hill Conservation Area

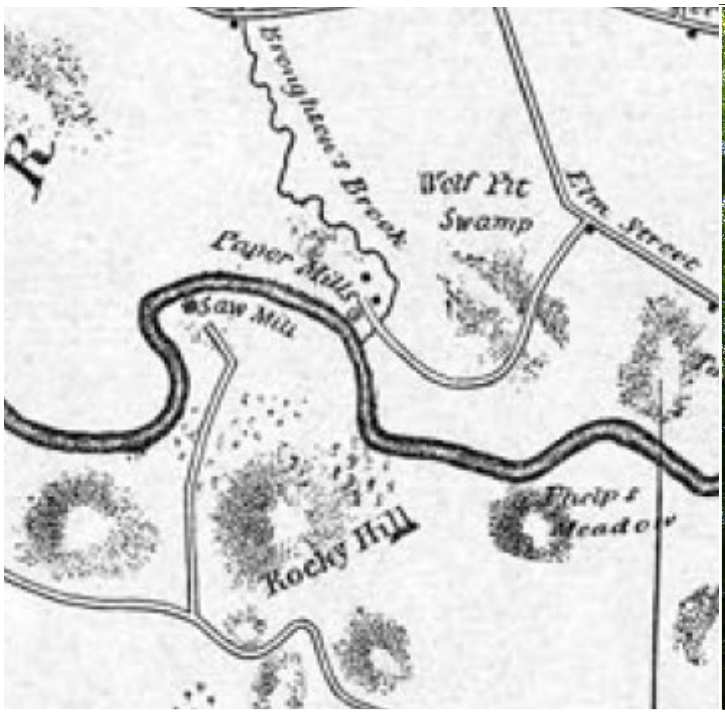
This conservation area remains the only site in Northampton with active landslides. This is because of the interaction between the Mill River, the site's glacial history and groundwater.

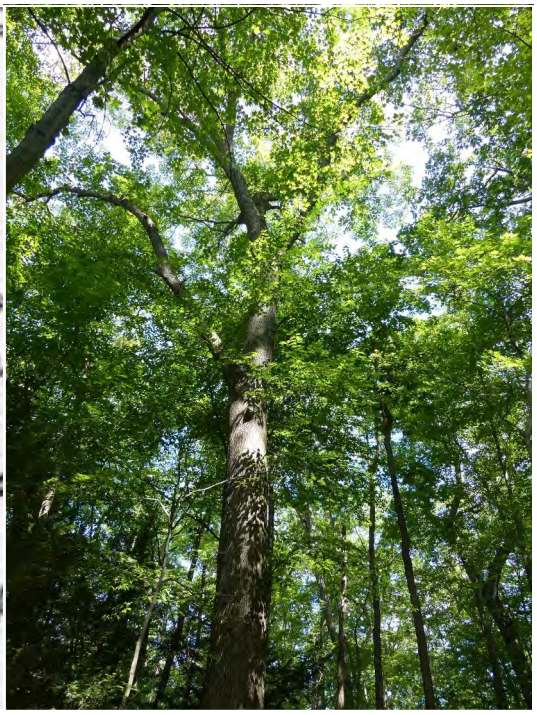
In this part of Northampton, the Mill River has carved its channel into an area underlain by compact glacial tills, including a top layer that was deposited 20,000 years ago by the Wisconsin glacier and an even more compact, clayey till left behind 140,000 years ago by the Illinoian glacier. In both 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. Asters, 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).





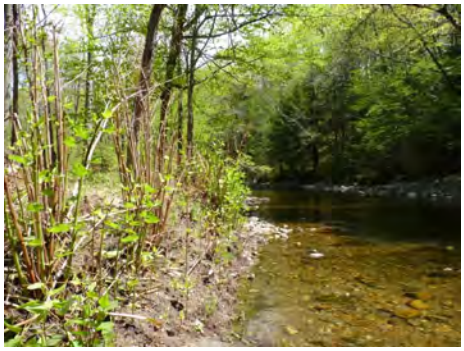
Although this site was undoubtedly logged in the 1800s when a sawmill was nearby, since then many of the trees have been allowed to grow and it is likely that some of them are more than 150 years in age. The photo below shows the site was entirely forested in the 1950s.

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 vulgaris*).

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.

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.

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

Photographs © Laurie Sanders.