A Natural History of the Beaver Brook/Broad Brook Greenway

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Beaver Brook/Broad Brook Conservation Area

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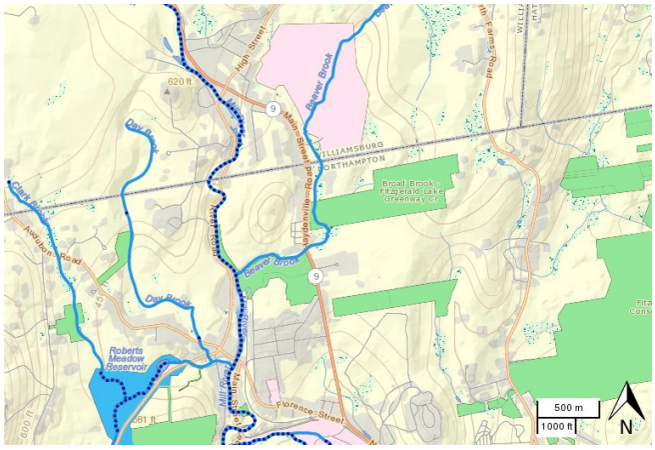
Preface

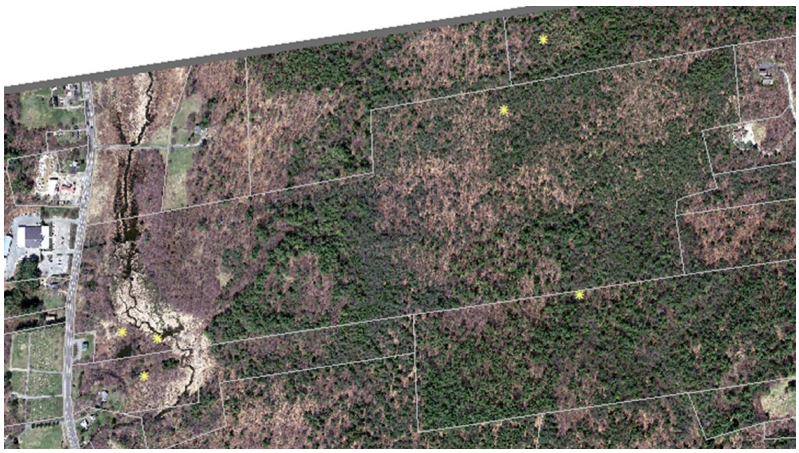
Since the City first expressed interest in acquiring this 102-acre property in 2009, several studies have been conducted on the property. Beginning in 2009, O'Reilly, Talbot and Okun conducted an environmental site assessment of the six-acre strip along Route 9, while Molly Hale evaluated the entire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



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

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

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

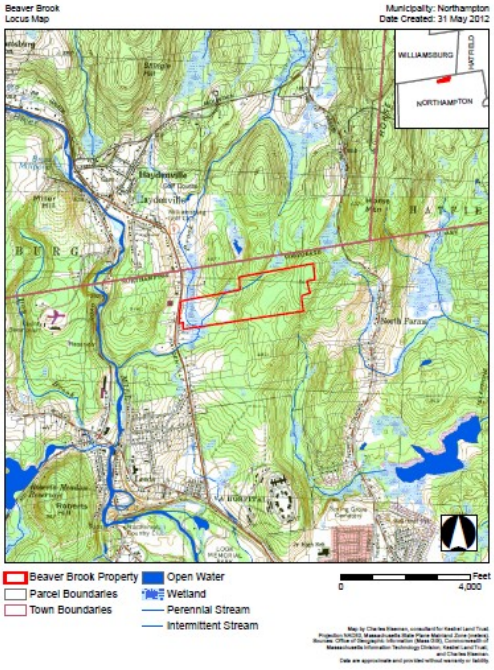


The locations of potential vernal pools on the property.

Using the recommendations of the BBC, Mike Mauri, and Kestrel Trust, the Conservation Commission has so far:

- marked most the property's boundaries;
- installed a sign along Route 9 (although it is set back and difficult to see);
- hired Baystate Forestry to treat the invasive species in the western part of the property (2013);
- brush-hogged the vegetation along Route 9 at the former home sites (2013).

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



Map Courtesy of Kestrel Trust baseline documentation report, 2012.

Overview

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

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

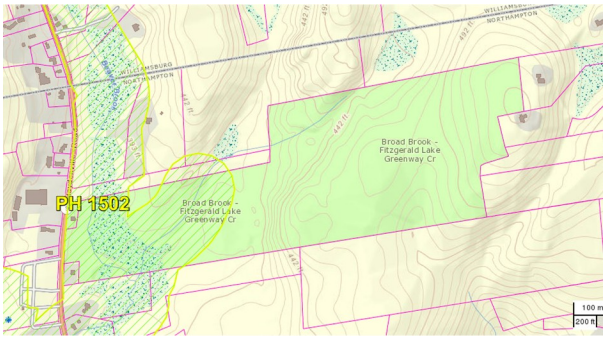
The property, outlined in yellow, shown in context to other forested land and its surroundings (Fitzgerald Lake, Connecticut River, Route 91, downtown Northampton).

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

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

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

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



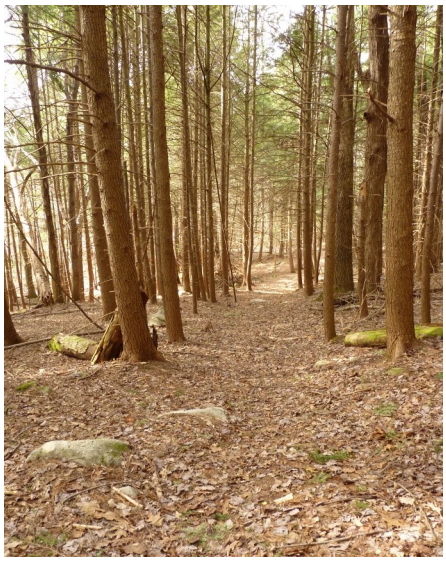
The wetlands and waterways within the conservation area all fall within a Priority Habitat for Rare Wildlife, as designated by MA NHESP. *From MA GIS.*

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

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

Human History

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

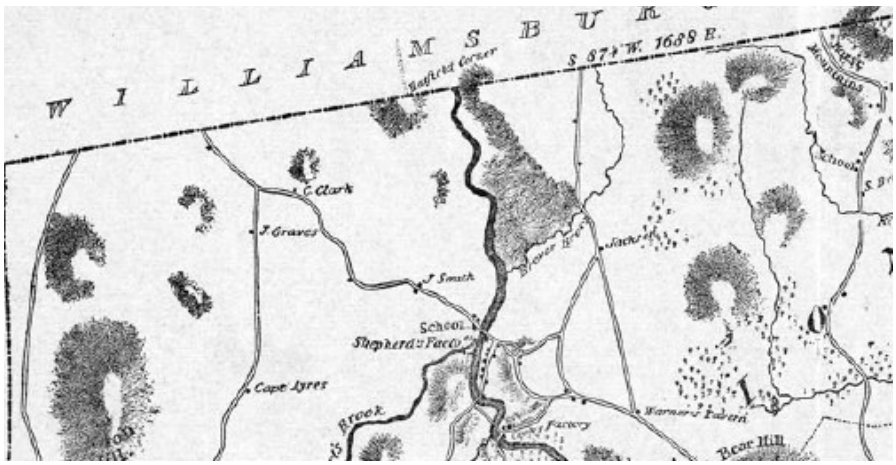


A small stretch of the snowmobile trail maintained by the Burgy Bullets crosses the property and along a slope dominated by hemlock, all of it dying. Scattered across the slope are several large black locust. The presence of this species demonstrates that the hillside was cleared in the past.

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

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

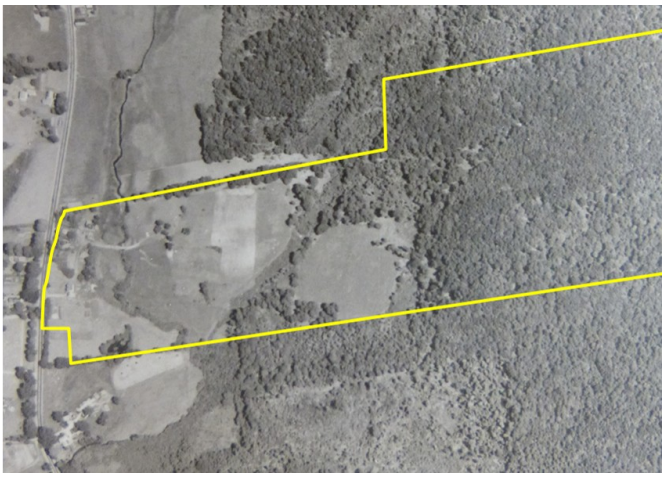
Based on stonewalls, barbed wire, and the presence of large black locust, all of the upland areas were evidently cleared and used for pasture during the 1800s. In contrast, the more level, low-lying areas along Beaver Brook and its small tributary were kept open as hayfields. Mike Mauri estimates that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



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

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

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



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

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

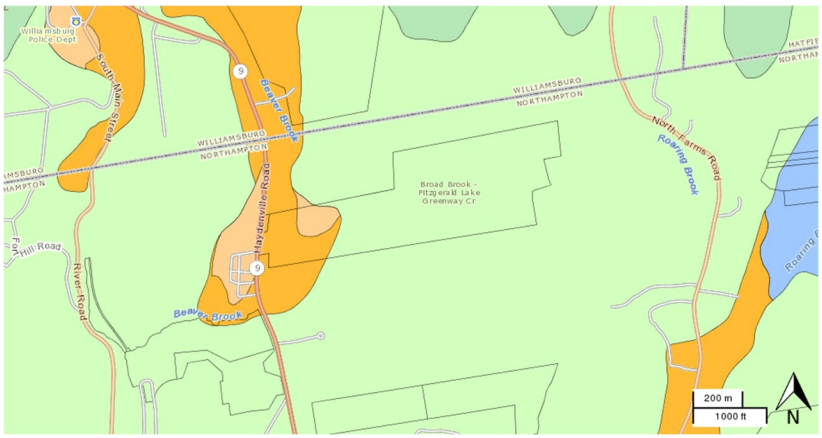
In this photo from the 1950s, it is easy to see the Starkus home and the other activities taking place on the land near Route 9.

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

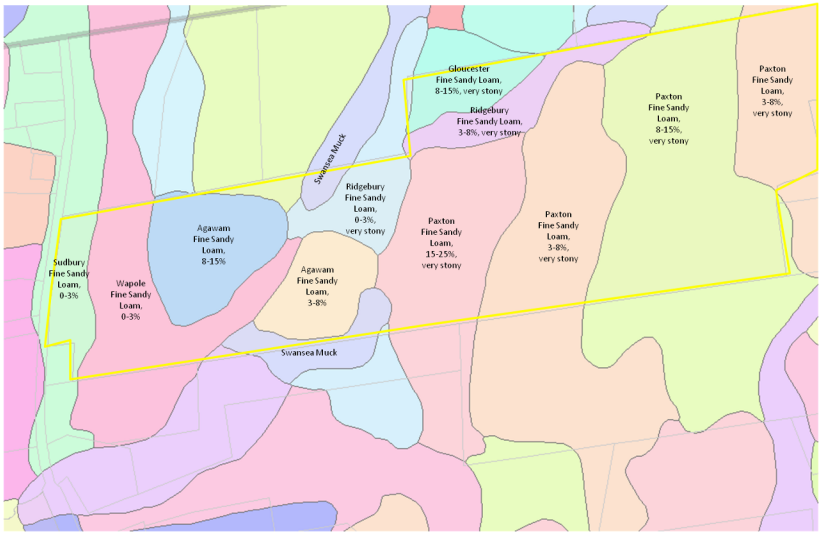
Today the remnants of the foundations can still be found, along with the scattered rusty equipment left behind by John and Gertrude Starkus. Their living legacy, however, are the plantings, which include a grove of black walnuts, a thick row of Japanese yews, and come spring time, swaths of snowdrops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

Geology

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

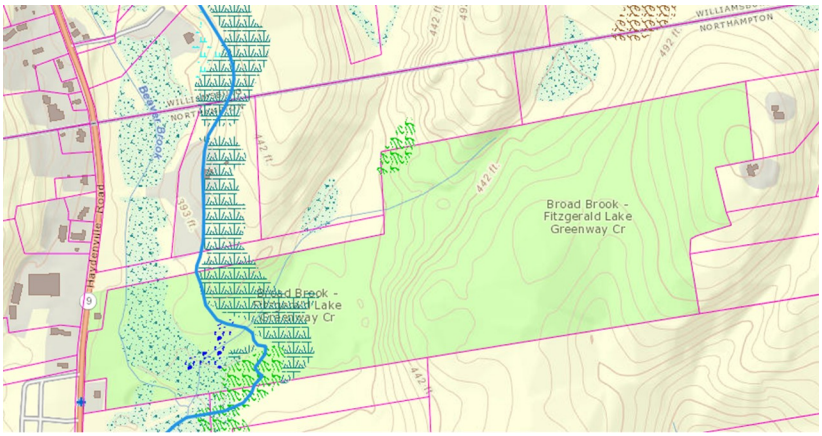


This graphic shows the surficial geology, with most of the conservation area covered with a thin lens of till. The land along Beaver Brook includes both stratified outwash sediments (dark orange) and more recent, post-glacial sandy river terraces (lighter orange.



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

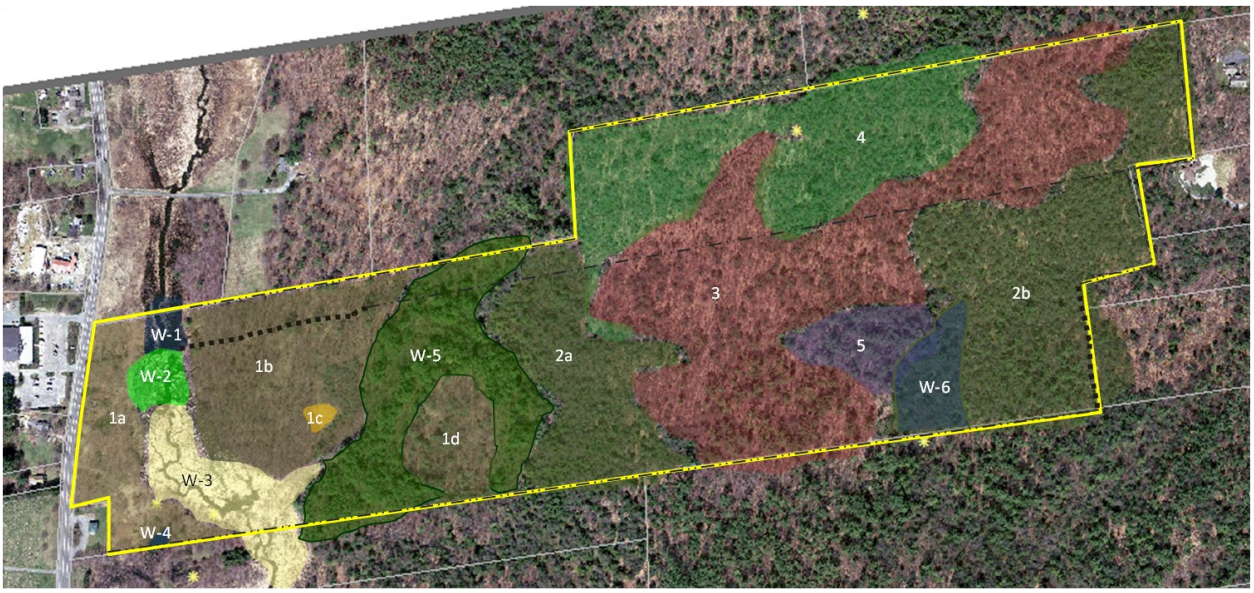
Topography



This conservation property is long and linear. From the frontage on Route 9, the property dips gently to Beaver Brook and its wetlands and then rises very gradually to the east. About half a mile east of Route 9, there is a short and steep hemlock-dominated slope and then the land flattens out again, before gradually and steadily climbing to the east. All told, the elevation changes about 160 feet, from 383 to 544 feet above sea level. In the upland areas, rocks regularly appear at the surface.

Vegetation Patterns

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



Uplands

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

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

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

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

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

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

1b: Slightly higher in elevation, this area is a former hayfield and is now dominated by black locust, with red maple and black cherry as lesser components. Baystate Forestry's efforts to kill the invasives were mostly successful, but the weakened plants are rebounding. Asiatic bittersweet, Morrow's honeysuckle, privet and glossy buckthorn are all common here. In addition, I found a small patch of swallowwort.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Wetlands & Beaver Brook

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

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

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

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

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

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

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

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

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

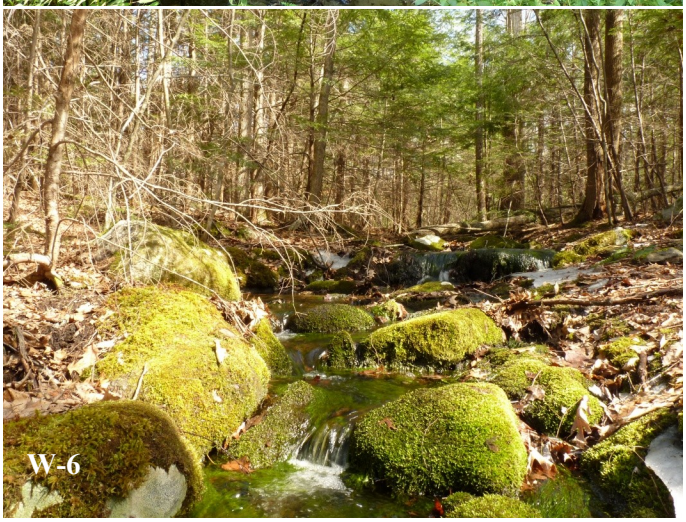
W-2: A shrub marsh dominated by silky dogwood, with reed canary grass, scattered willows, meadowsweet, northern arrowwood, and occasional Morrow's honeysuckle and glossy buckthorn. Other plants include Joe Pye Weed, spotted touch me not, blue vervain, water horehound, swamp milkweed, tearthumb, virgin's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

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

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

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

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



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

Recommendations

1. Work with BBC, Leeds Civic Association, National Grid and other local organizations and businesses to clean-up the upland strip along Route 9, construct a small (5-6 cars) parking lot, brush-hog this area and keep it more open, create a picnic area, and build a loop trail to access the beaver pond. The trail should be six feet across; this area has a lot of deer ticks.

2. Install a kiosk explaining the site's geological, cultural and natural history.

3. Build an elevated wildlife blind (similar to the one in Cooke's Pasture) near the edge of the upper beaver pond.

4. Consider installing a handicapped-accessible boardwalk to access the marsh as well as the land on the other side of Beaver Brook.

5. Consider using a brontosaurus to clear the former fields on the eastern side of Beaver Brook.

6. Spot control invasives along Route 9. Control glossy buckthorn and Morrow's honeysuckle in the marsh, and continue periodic control of other non-native plant species.

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

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

Photographs © Laurie Sanders.

Changes in the Land: Then & Now