A Natural History of the Barrett Street Marsh

Prepared by Laurie Sanders, M.S.
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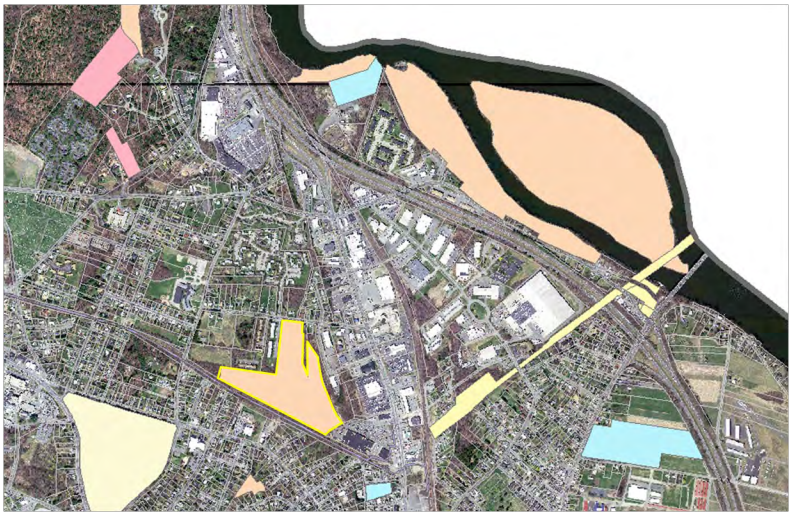
Barrett Street Marsh

Barrett Street Marsh Conservation Area

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



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

Beavers were first observed in the Barrett Street Marsh sometime around 2004, and although the state's beaver populations had soared after the 1996 ban on trapping, their arrival in the marsh was hardly expected. Not only is the marsh surrounded by roads and development, but to get to it, an enterprising beaver has to travel more than half a mile from the Connecticut River, much of it on foot and through culverts and pipes. Specifically, a beaver would have to head up a short stretch of Slough Brook, then climb into a buried pipe and trudge several hundred feet in total darkness, before reemerging briefly into the daylight, and then make its way through two more pipes, one of which is roughly 600 feet long! From that point, the last ¼ mile to the marsh is via an open drainage ditch and would be the easiest part of the journey.

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

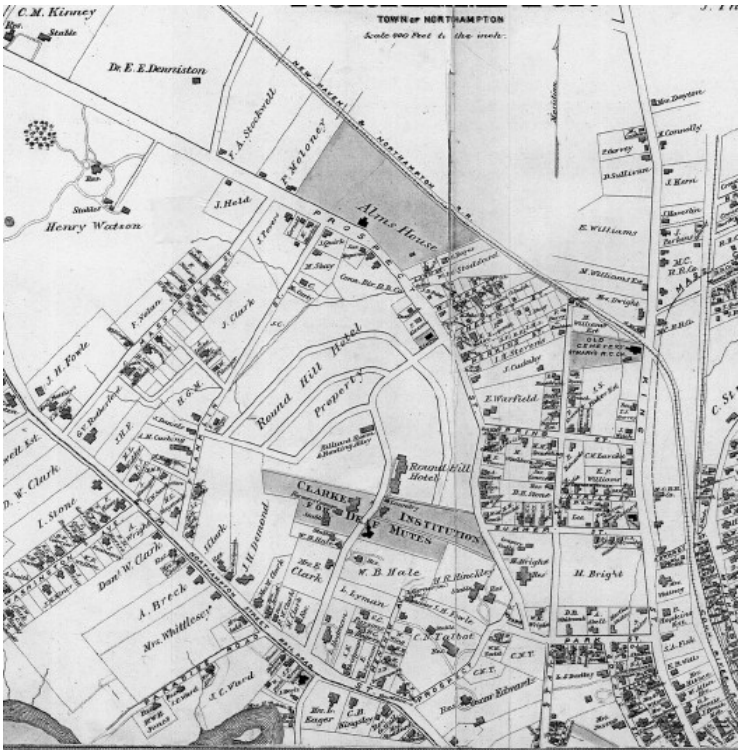
As complicated as that trek might sound, by 2005, not one, but several beavers had made the journey and were living in the marsh. That year, they built a dam just upstream from the box culvert that goes under Barrett Street and the water level in the marsh rose an estimated four feet (Daily Hampshire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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

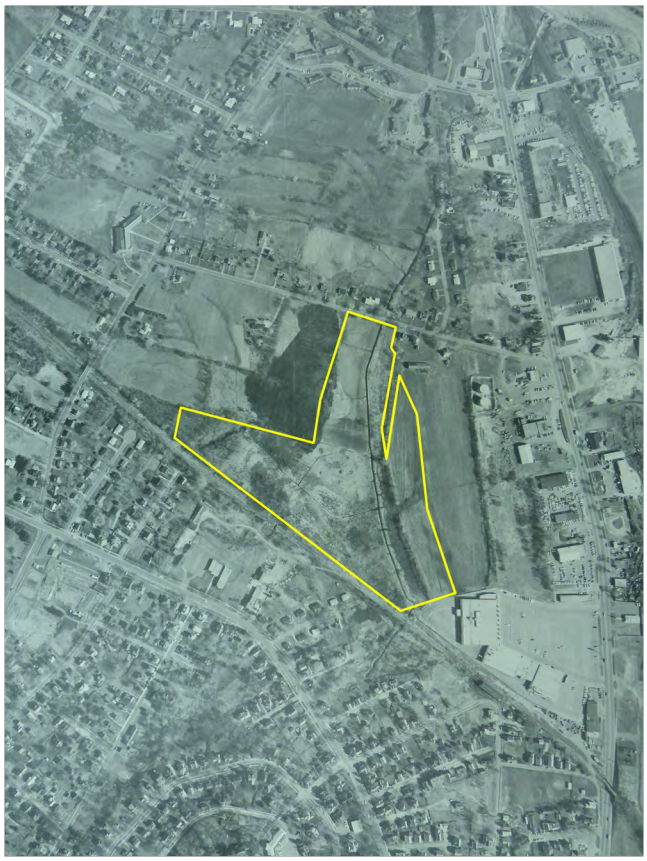
By the early 1970s, the main ditch, side channels and some of the culverts were partially blocked with sediments and rotting plant materials and the water began to back up behind the Barrett Street culvert. By 1973, parts of the former farmland had transitioned to marsh, and the Conservation Commission,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

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

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

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

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



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

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

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

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

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

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

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

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

Vegetation Patterns

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

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

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

Barrett Street Marsh
Major Vegetation Patterns
2
1d
2
1c
2
1b
2
4
5
1a
Drainage
footpath
boardwalk
3
6
2
1e
2

Vegetation Map Legend

Red Maple Dominated Forest
Five patches of red maple-dominated woods are found within the conservation area:

1a: This long stretch of red maple along the bike path can be divided in two subsections, east and west.
The eastern portion is located along the steeper slopes of the bike path and consists of an even-aged stand (~ 50 years old) growing on fill and altered soils. The canopy is almost exclusively red maple, but red oak, elm, and black cherry are also present; black locust is frequent along the bike trail. The understory varies, but Morrow's honeysuckle and privet are now common in the shrub layer; while native shrubs include choke cherry and high-bush blueberry. Herbaceous plants in the understory include spotted touch-me-not, cinnamon fern, sensitive fern, interrupted fern, royal fern, New York fern, lady fern, Virginia creeper, poison ivy, goldenrod, garlic mustard, and true solomon's seal. Sheep laurel and leatherleaf, which is not common in Northampton, are along the margin of the marsh. Asiatic bittersweet is here too.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Wildlife

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

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

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

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

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

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

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

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

Recommendations

This conservation area has great potential, but is currently underappreciated and overlooked. It is easily accessible and probably has the highest concentration of animal life found in any conservation area in the city. And yet, the existing boardwalk is falling apart and it has never been well-marked. It also doesn't go to anything—not a view or other path. I would strongly recommend renovating the old boardwalk and connecting it to a new one that loops back to the bike path and includes a wildlife platform. In addition, if a dozen red maples were cut down along the bike trail, the view of the marsh would be terrific.

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

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

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

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Sources

Baystate Environmental Consultants. 2000. Functional Analysis of the Hydrology of the Barrett Street Marsh. http://city.northampton.ma.us:8080/WebLink8/DocView.aspx?id=78720

Berkshire Design Group. 1997. King Street Brook. Drainage Analysis. 294 pp. http://city.northampton.ma.us:8080/weblink8/0/doc/491248/Electronic.aspx

City Reports 1871, 1882, 1905.

Daily Hampshire Gazette, various dates.

Huntley, Almer. 1984. Report on King Street Brook Drainage. Prepared for Stop & Shop. 51 pp. http://city.northampton.ma.us:8080/weblink8/0/doc/491247/Electronic.aspx

All photographs by Laurie Sanders.