The Natural History of the Sawmill Hills/Roberts Hill Complex

Prepared by Laurie Sanders, M.S.
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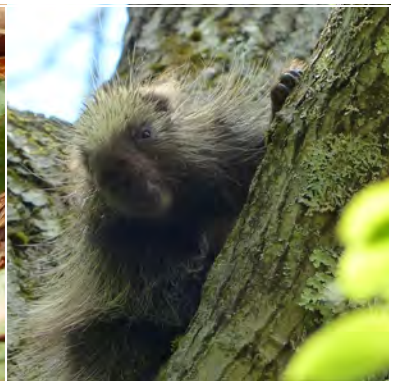

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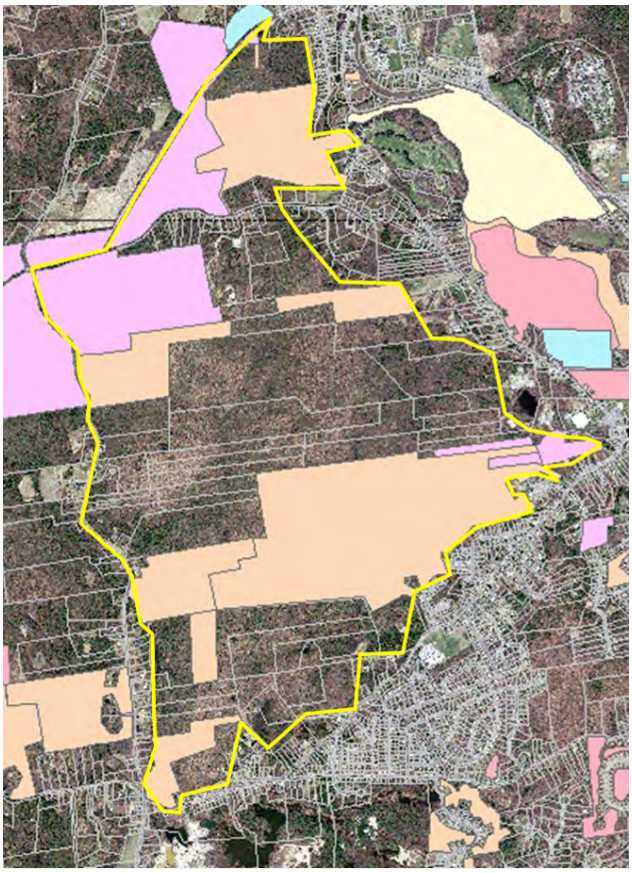
An Overview of the Sawmill Hills/Roberts Hill Complex

The Sawmill Hills/Roberts Hill Complex encompasses roughly 2,200 acres and extends north-south from Roberts Hill to Ryan Road and east-west from Spring Street to Sylvester Road. It is one of the City's largest road-less areas, a status due largely to its rough and rugged terrain, which includes cliffs, countless rock outcrops, steep slopes, and thin, acidic soils. These physical conditions have hindered most activities, except, as its local place name reveals, logging. In fact, with the exception of two new homes and the now abandoned telephone and telegraph line, all of the other development that has taken place during the last 360 years is located around the base of the hills where glacial deposits—either thicker tills or sandy outwash sediments—have made it much easier to build homes, dig wells or mine gravel.

When the surrounding homes and a few hundred acres on the north side of Chesterfield Road are excluded (dashed outline), the remaining interior core of the Sawmill Hills forms one of the largest remaining road-less areas in Northampton, spanning 2 ½ miles north to south and 2 miles east to west. And all of it is within a 15-minute drive from downtown Northampton.

In addition to being a large, undeveloped parcel, the Sawmill Hills/Roberts Hill Complex stands out for several other reasons. The area boasts an elaborate network of trails, supports nearly twenty different kinds of natural communities, and offers spectacular views. It also plays an important role in providing and safeguarding the City's drinking water supplies, with public wells near Spring Street and watershed land along Chesterfield Road.

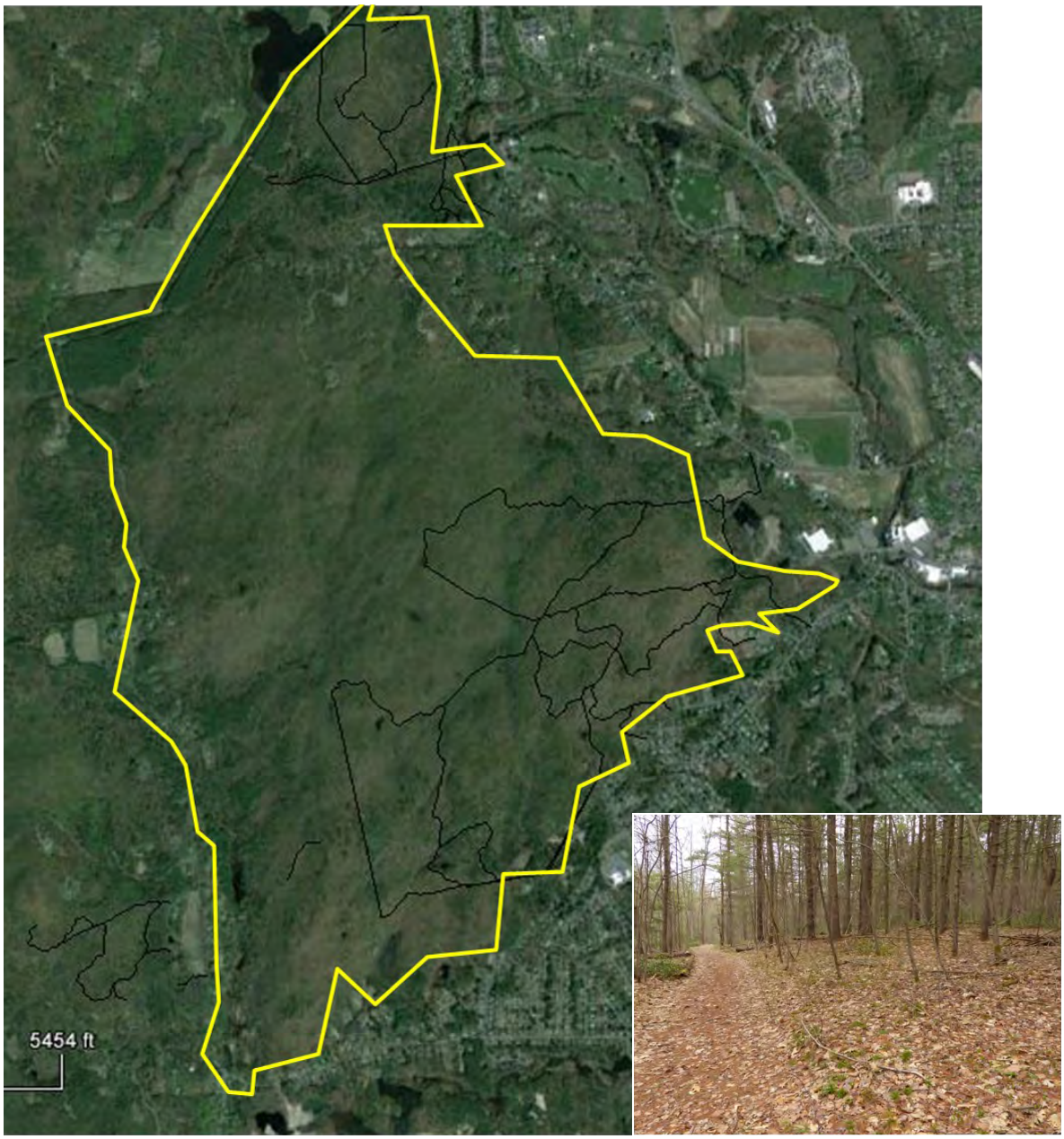


The parcels within the Sawmill Hills, which are outlined in yellow, form a 50-piece jigsaw puzzle, a third of which are protected, either as watershed land or for conservation purposes. In this map, the pink is watershed land, the orange is conservation land, and the blue parcels are recreation.

What's also extraordinary about this large block of land is that more than 40% has been protected by the City, much of it since 1995. Currently some 235 acres are protected as watershed land (27 acres near the Spring Street wells and 208 acres within the Roberts Meadow Reservoir holdings) and another 696 acres have been set aside for conservation purposes.

And here's a final category where this property distinguishes itself. From a management and stewardship perspective, these 2,200 acres are in superior condition: the trail network is extensive and mostly in very good shape, trash or dumping problems are virtually non-existent and most notable of all, much of this landscape is entirely free of invasive plant species. The only places where non-native plants do occur are in predictable locations: along the roadside edges, in areas of historic disturbance and within its stream corridors and wetlands.

The remainder of this report provides short summaries of this area's important qualities, its geology and history, followed by more detailed descriptions of the natural history of the properties that have been set aside as conservation land.



Recreation Value

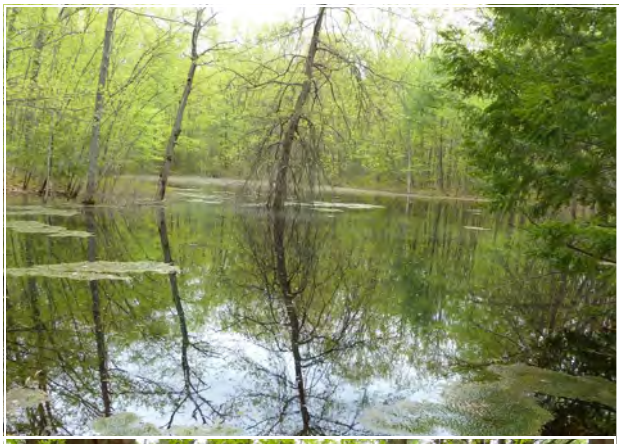
Although unknown to many Northampton residents, the Saw Mill Hills/Roberts Hill Complex includes one of the most elaborate trail networks in all of Northampton. In fact, the trails are so extensive that on a single day you could take more than a seven mile trek: beginning on Spring Street, you could head to Sylvester Road, then cut back to Ryan Road/Avis Circle, then loop north to the "Jeep Eater" Conservation Area, where via an informal trail through the City's watershed land, you could reach Chesterfield Road where you could pick up the trails that crisscross Roberts Hill. Eventually you could end up on either Water Street or Dimock Street. You'd be tired, but during your entire outing, you would have crossed only one road and you would have passed by (or through) all of the different habitats found within this large block of land, including rocky cobbles, vernal pools, quiet streams, swamp forests, pine knobs, sheer cliffs, sand plains, and extensive stretches of dry oak woods.

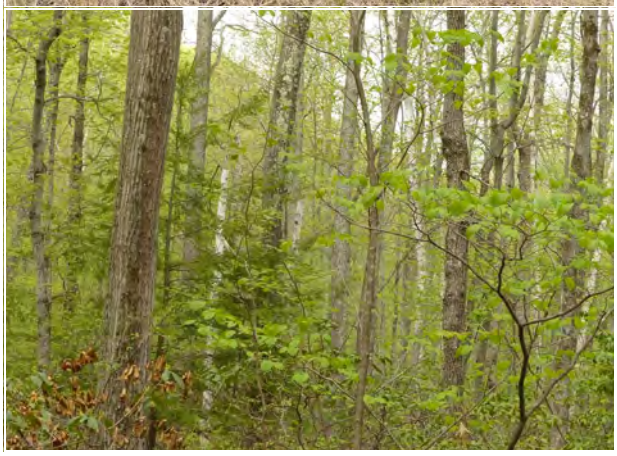
The only potentially troublesome part of this plan is that there is no complete map of the trails. This map shows only a portion of the trails (black squiggles) that are actually there. Another problem is that, at least for now, all of the trails are unmarked, so unless you've been there before, you could get turned around. The trails, however, are fairly wide and in mostly good condition, with only a few places with muddy wetland crossings or eroding slopes that are in need of maintenance.

The final hurdle is that parking is limited. There are currently only a few locations and none of them are well-marked either.

Aesthetic Value

This property is beautiful, with up and down terrain, cascading brooks, bedrock outcrops, fairly open woodlands and impressive views from the higher elevations and cliffs. It is also located in one of the quietest areas in Northampton. Quite often, the only sounds you hear are natural ones.





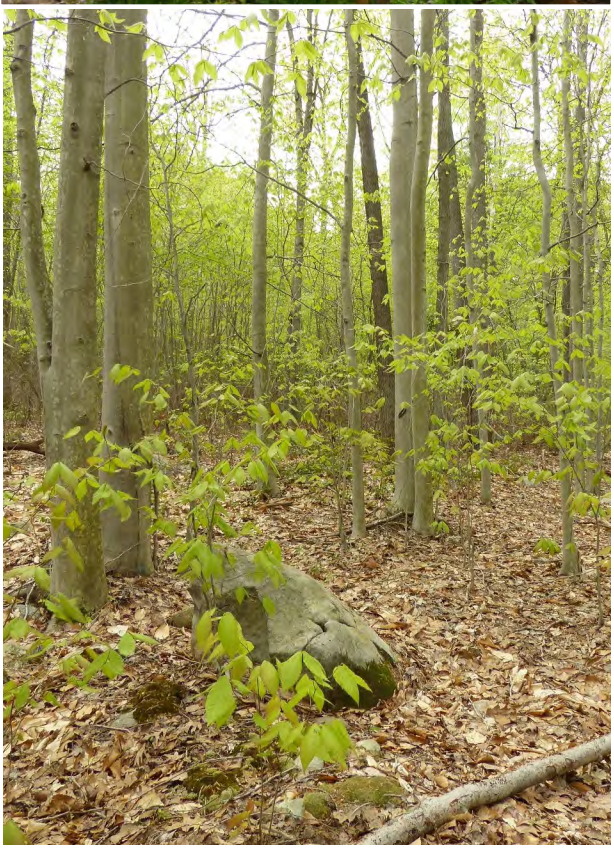
Ecological Value

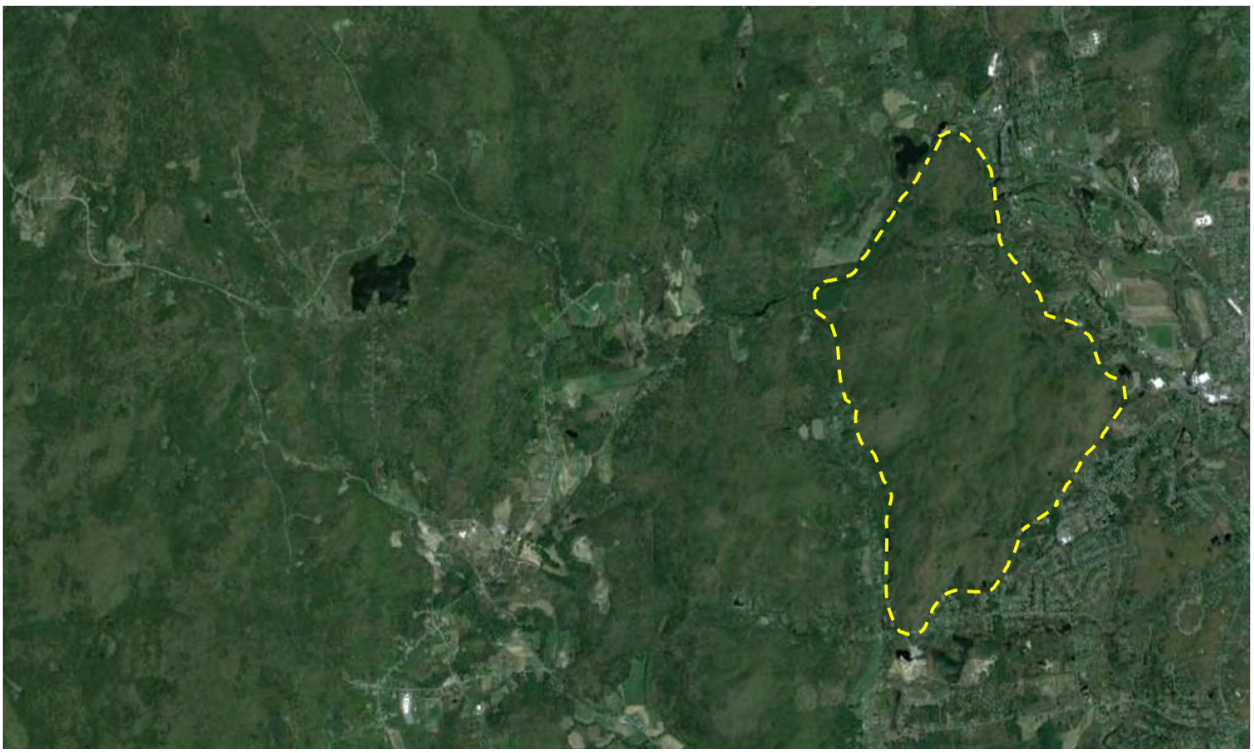
Underlain by 400 million year old gneiss, the varied topography of the Sawmill Hills supports a mix of habitat types—a sampling of which are profiled here and on the following page. All told, nearly twenty different natural communities were identified here, and although nearly all of them are common and widespread in our region, what is noteworthy is their high integrity, meaning that they show little to no sign of human disturbance and few invasive species problems.

Natural Communities in the Sawmill Hills/Roberts Hill Complex*

1. Acidic Rocky Summit/Rock Outcrop
2. Circumneutral Rocky Summit/Rock Outcrop
3. Acidic Rocky Cliff
4. Sandplain Grassland (cultural)
5. Acidic Talus Forest/Woodland
6. Pitch Pine-Oak Forest
7. White Pine-Oak Forest
8. Oak-Hemlock-White Pine
9. Successional White Pine Forest
10. Hemlock Ravine
11. Mixed Oak Forest
12. Ridgetop Chestnut Oak Forest
13. Dry, Rich Acidic Oak Forest
14. Forest Seep Community
15. Red Maple Swamp
16. Black Gum Swamp
17. Shallow Emergent Marsh
18. Low Energy Riverbank

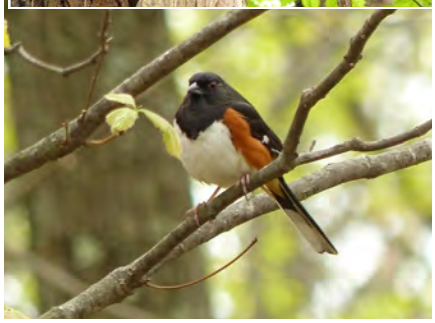
* Follows MA NHESP Classification of Natural Communities





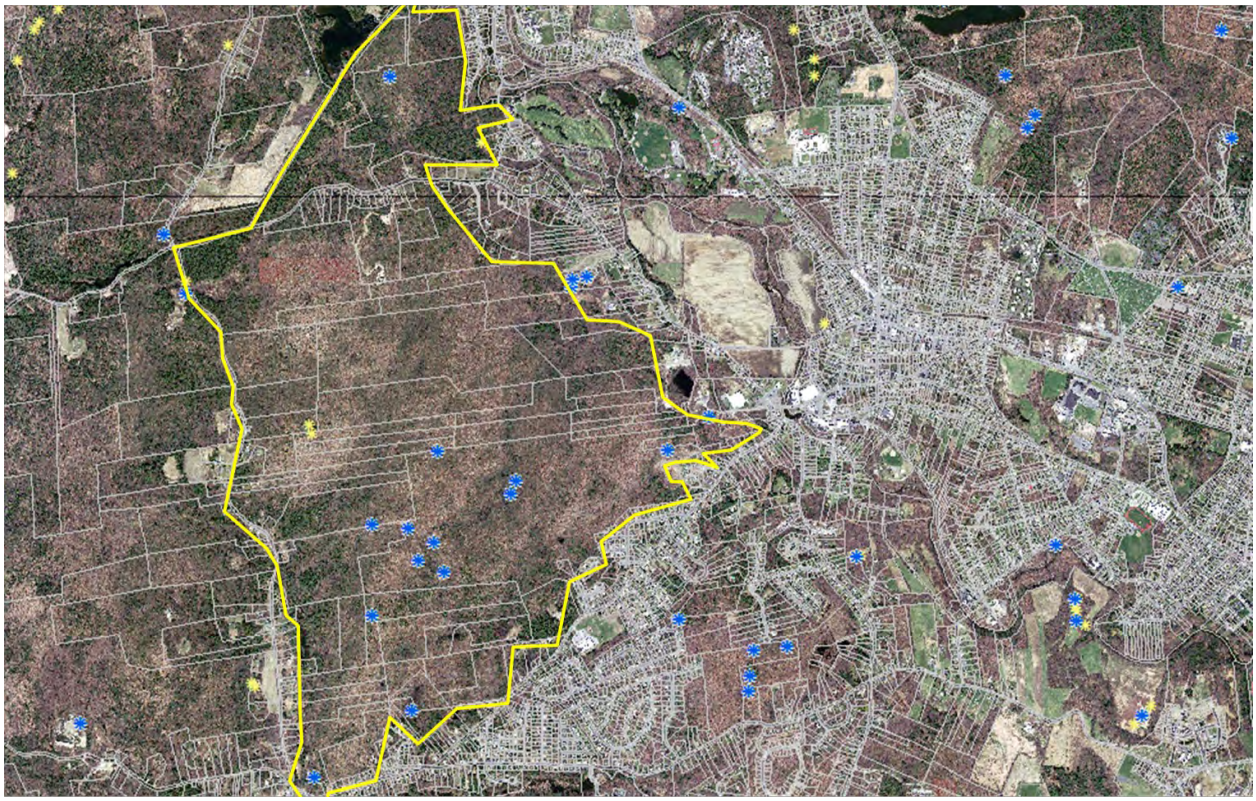
Wildlife Value

Because the Sawmill Hills form a large block of unfragmented forest and are adjacent to even larger forested areas to the west and north (*see above*) it provides excellent habitat for those animals that depend on large, uninterrupted tracts of forest. Furthermore, because of the mix of wetland and upland habitats, thousands of different animal species depend on this area, either transitionally or permanently.



Porcupines are common in the rockier areas of the Sawmill Hills, and coyotes, which first arrived in Massachusetts in the 1940s, now breed here too. This litter of six pups was found in May 2014.

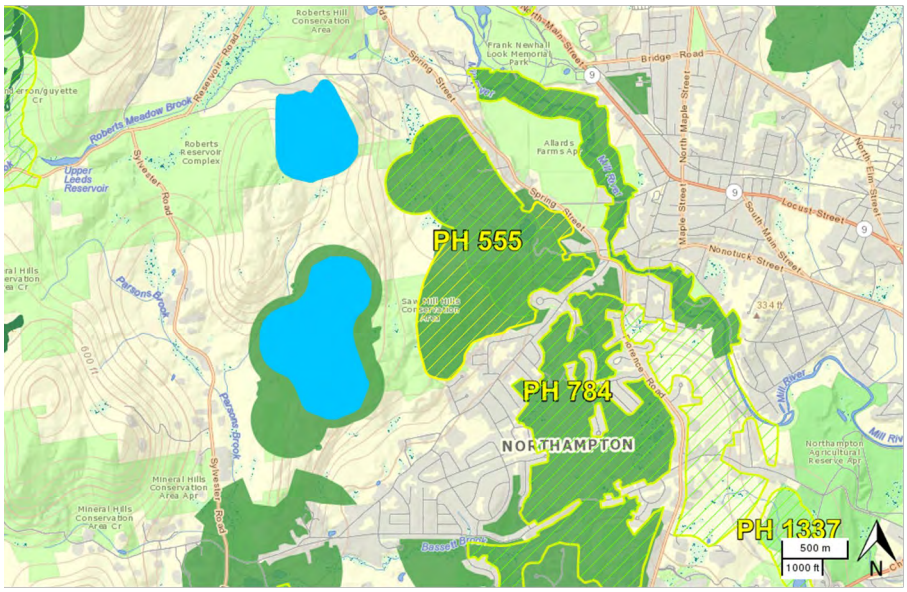
Rufous-sided towhees (*right*), a species in decline, are also common in the shrubbier, upland areas.



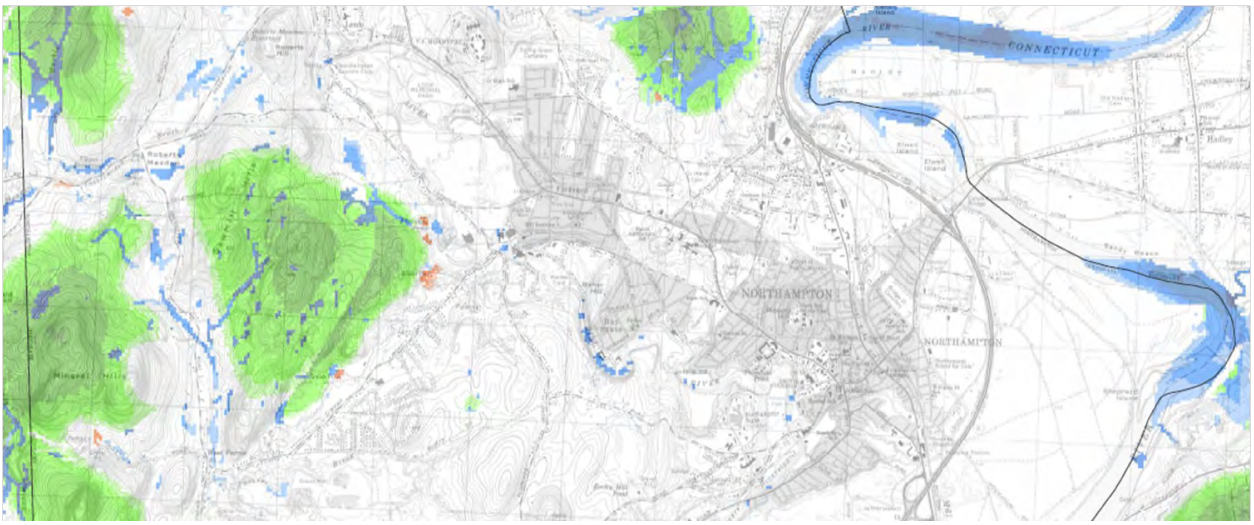
Vernal Pool & Rare Species Habitat

Of the 99 certified vernal pools in Northampton, 17 are found within the Sawmill Hills/Roberts Hill Complex and at least five others—including two that do not appear on this map— are "potential vernal pools." About half of the certified pools occur in shallow, bedrock depressions, while the rest are located along the margins of the hills. The latter are kettleholes, which formed when blocks of glacial ice were stranded and then buried in water-sorted glacial outwash.

In addition to having an abundance of vernal pools, some of the pools are known to support rare amphibians, including Jefferson's salamanders and marbled salamanders. The presence of these rare species is one reason why two areas within the Sawmill Hills have been designated by MA NHESP as "vernal pool core habitat" (*bright blue on map below*). The other is because this area includes two concentrated clusters of vernal pools, which from a conservation biology perspective, makes them more valuable than a single, large pool The nearby pools help ensure the core habitat's long-term viability and the resiliency of its populations. How? If, for example, a drought caused all of the larval salamanders or tadpoles in one vernal pool to die, this vernal pool would gradually be re-colonized by the offspring and adult creatures (salamanders, frogs, insects, etc.) from the other nearby ponds and would thus continue to function as vernal pool habitat and a breeding site.



The Sawmill Hills also includes priority habitat (PH555) for two other state-listed species—oak hairstreak butterfly and Eastern box turtle, both of which are listed as Special Concern. The area also is recognized as BioMap Core Habitat (*dark green*). These ecologically valuable areas occur on city-owned land as well as on private property.

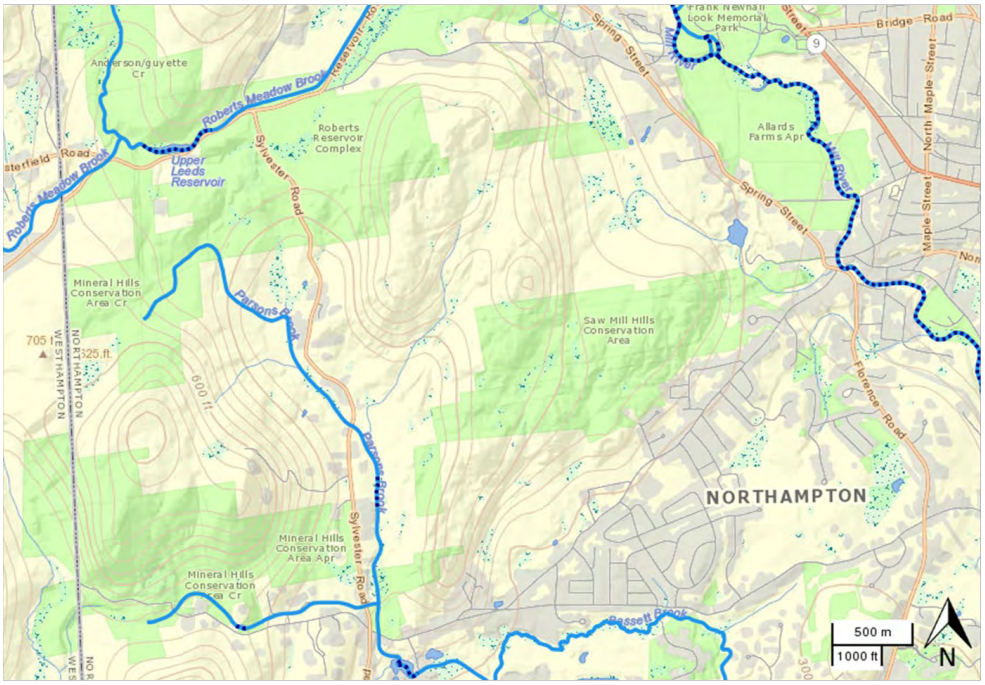


UMASS Conservation Assessment Prioritization System (CAPS)
Researchers at UMASS have developed computer software (CAPS) that analyzes the landscape and prioritizes land based on its ecological integrity and long term sustainability. Based on this analysis, the Sawmill Hills are one of the few areas within Northampton that rank high in terms of its ability to sustain ecosystem processes and maintain biodiversity over the long-term. CAPS is another way of measuring this area's value and provides support for the continued acquisition and protection of properties within this area. In this image, the colored areas are better than average based on CAPS analysis, with blue representing aquatic habitats, red is shrub and grassland, and green shading is forest. White areas are below average based on CAPS.

(A) Marbled salamanders, listed as threatened species in Massachusetts, are known to inhabit the Sawmill Hills.

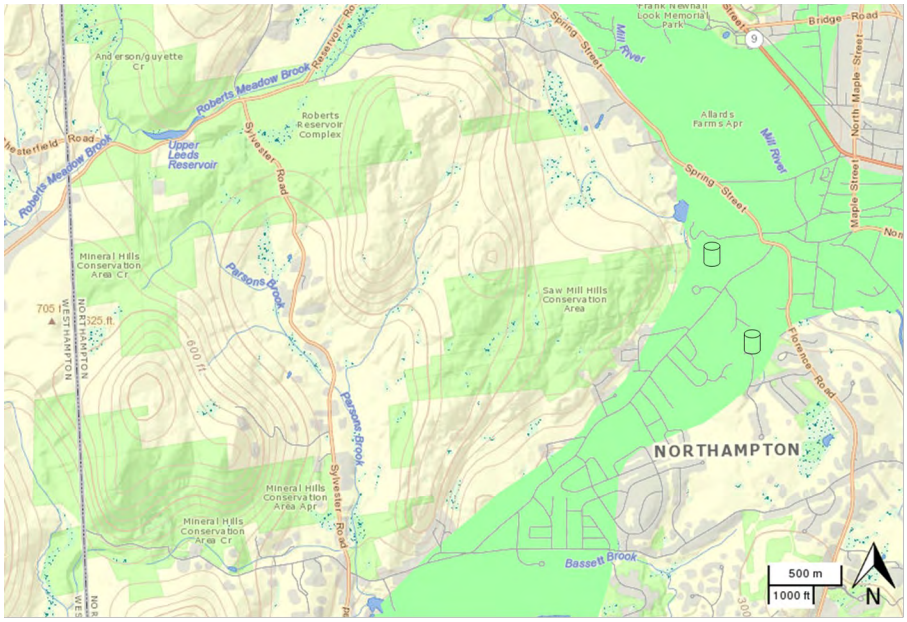
(B) A remnant of a grassland/pitch pine barren, a habitat that is estimated to have covered about 10% of the Northampton landscape when the English first arrived. It now accounts for less than 1% of the City. It is a rare habitat in the entire Connecticut River Watershed.

(C) Large Whorled Pogonia, a watch-listed orchid in Massachusetts, occurs in low numbers on the Sawmill Hills. This individual has a fruiting pod.



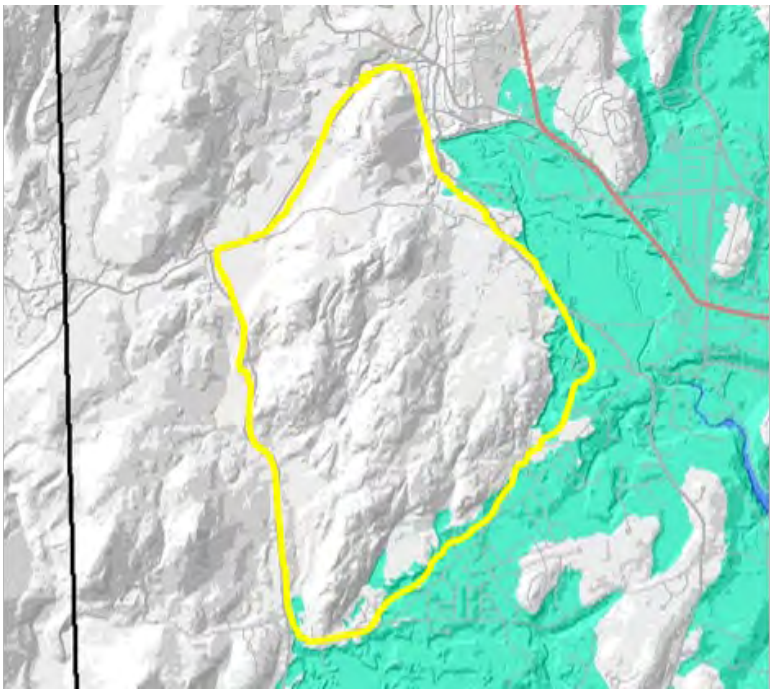
Cold Water Fishery

The wetlands and small streams in the Sawmill Hills/Roberts Hill Complex drain into two different waterways, the Mill River and Parson's Brook, both of which are designated as Coldwater Fisheries. About 80% of the Sawmill Hills/Roberts Hill complex feeds the Mill River, with the remainder (~475 acres) feeding Parson's Brook (and ultimately the Manhan River). By protecting upland and wetland areas in the Sawmill Hills, these fisheries interests are supported. Protecting places like this will be increasingly important as our local climate warms and annual precipitation patterns change. Those changes will affect groundwater supplies, as well as impact wildlife, plants and the City's public drinking water supplies.

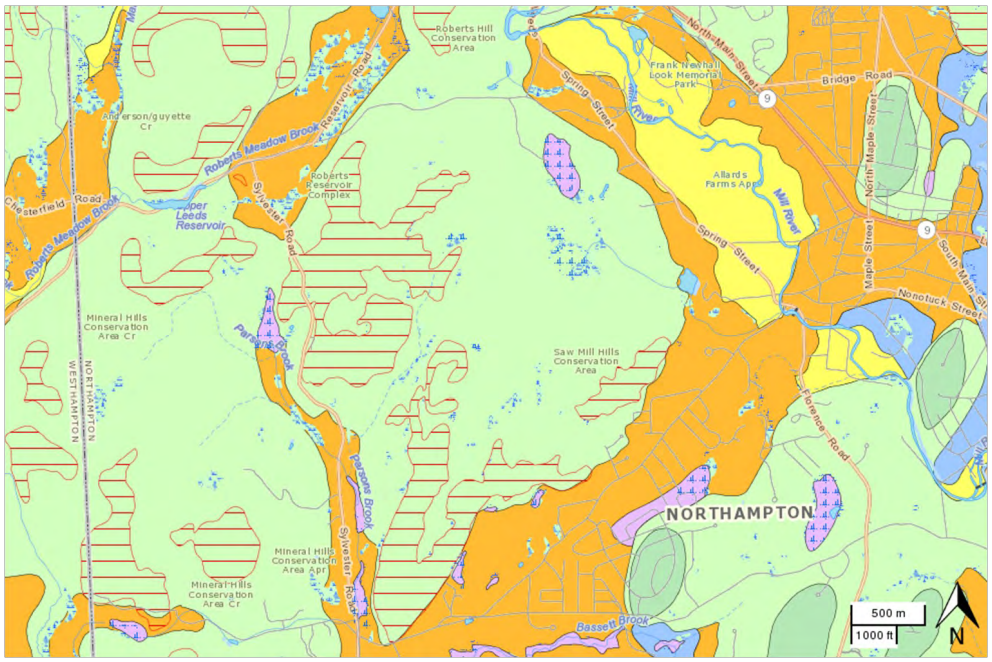


Medium Yield Aquifer, Zone II, Water Supply Protection and Wells

The Sawmill Hills are important to the City's water supplies. In the north, watershed lands help buffer and protect the quality of the Roberts Meadow Reservoir, which now functions as a back-up emergency water supply. In the east, city wells ( ), which were installed in the early 1950s, provide drinking water to supplement Northampton's main surface water supplies in Whately, MA. In addition, the band of sand and gravel along Ryan Road (glacial outwash plain) and Spring Street (glacial delta) is designated as a medium yield aquifer by MA DEP; the aquifer is show in lime green. The area along Ryan Road plus the land bordering Parson's Brook is part of a Zone II.



Glacial Lake Hitchcock
For about 3,000 years (from 15,000-12,000 years ago) the waters of Glacial Lake Hitchcock lapped up against the eastern edge of the Sawmill Hills/Roberts Hill Complex, outlined in yellow. Had we been where Spring Street or Ryan Road are now located, we would have been standing on the beach. It was lake shore property! White areas are above the lake level and are either islands or uplands; roads are shown to help for orientation.



Surficial Geology
Underlain by ancient metamorphic rocks, the core of the Sawmill Hills/Roberts Hill Complex is characterized by abundant rock outcrops (*red hatching*) and a thin layer of glacial till (*light green*). Surrounding nearly all of this unit are outwash sands and deltaic sediments (*orange*), which were deposited 15,000-12,000 years ago during the era of Glacial Lake Hitchcock. Post-glacial swamp deposits are shown in pink and more recent alluvium along the Mill River appears in yellow. Other colors in this map represent drumlins (*olive green*) and glacial lake silts and clays (*light blue*). The small streams and wetlands in the Sawmill Hills are also shown in light blue.

History

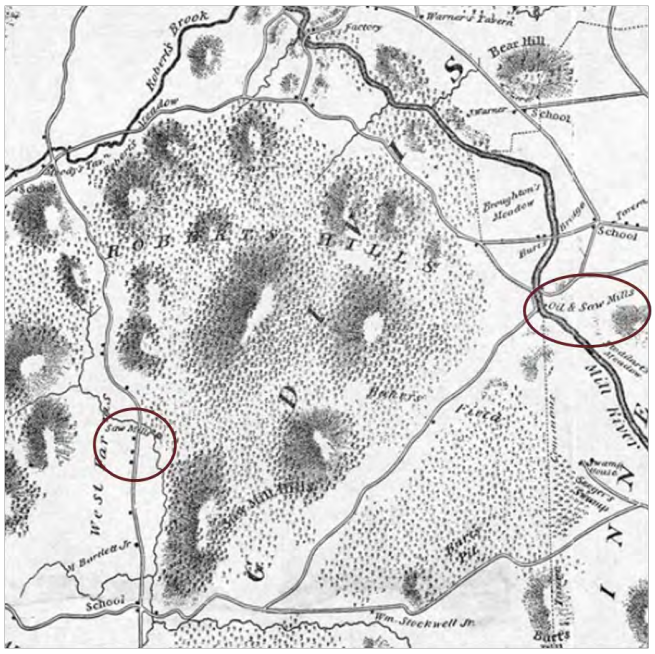
The Sawmill Hills/Roberts Hill Complex now includes more than fifty parcels, but in spite of all that different ownership, its history is remarkably unified. Quite simply, most of this land, as its place name indicates, was logged—and other than logging, not much else happened. In fact, the rugged topography and shallow soils made for such poor pasture that when the land was divvied up in the late 1600s, it was divided into long, narrow lots that were laid out specifically because their intended use was as woodlots to meet the firewood and timber needs of individual families.

When the English first settled Northampton, the Sawmill Hills/Roberts Hill Complex was located within the "Long Division," shown on this map by a north-south running line. Initially, the land to the west of the line was held in common. But by the 1670s, the Long Division lands were sold to individual buyers. Within the Sawmill Hills, the new lots were long and skinny, as this 1754 map from Sheffield's *History of Florence* shows (above). The properties were used for woodlots and although many of the lots have been consolidated into single parcels, some of the original lot lines are still valid, as the current parcel data shows.

More commercial style logging began by the 1830s (and probably earlier), and by 1831, there were two sawmills also harvesting trees in the Sawmill Hills, one on the west side, which was owned by the Bartletts, and another on the east side near Pine Street/Spring Street. According to a Gazette article (9/21/1880), Bartlett's Sawmill gave this range of ridges its place name.

Workers at Bartlett's Sawmill in the 1880s. *Photo copied from Images of Northampton by James M. Parsons.*

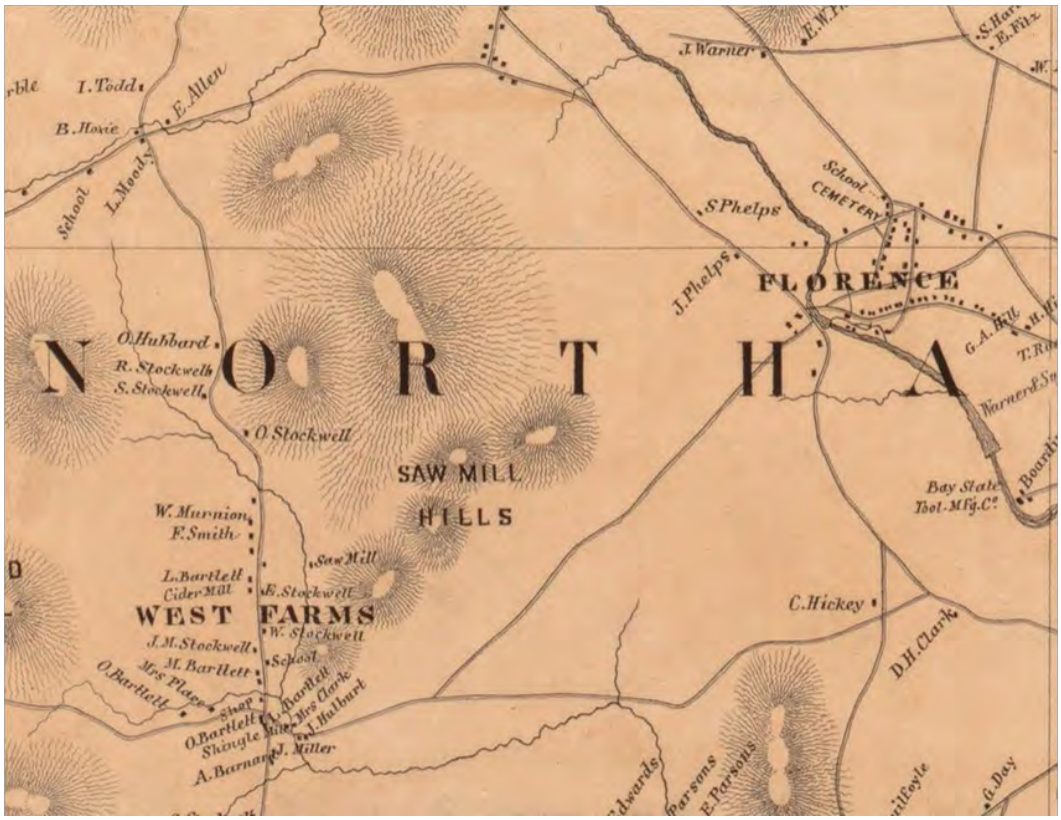
As the 19th century wore on, logging (and possibly fires) in the Sawmill Hills continued intensively so that by 1880, "a large fraction of it [was] young growth" (*Daily Hampshire Gazette*). But by then, the need for firewood had diminished. Coal had begun replacing wood in Northampton since the 1850s (*Northampton Courier, 1/5/1858*) and as the 20th century began, oil and electricity were other alternatives. As the demand for firewood waned, the slopes in the Sawmill Hills began to grow back.



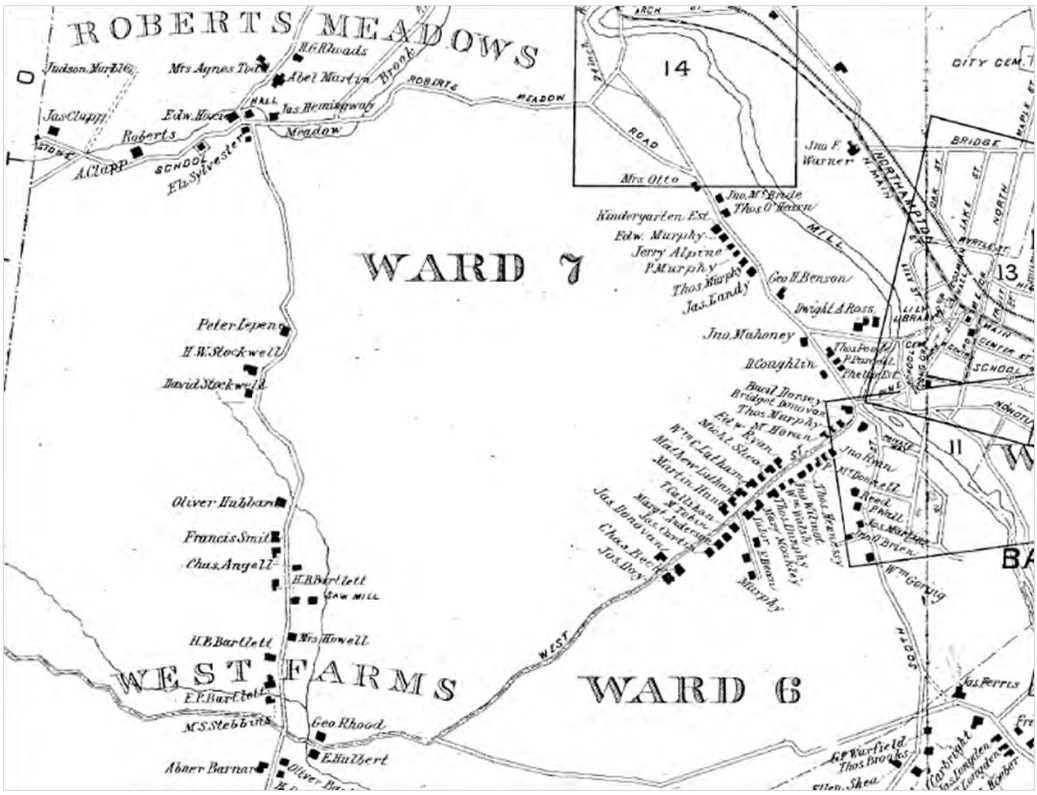
Over the last century, some of the lower slopes were logged again, but most of the upland areas were not. That lack of logging in the rocky uplands is partly a function of access, but even more relevant is the size of the trees. Because the soils in the upland areas are thin and acidic, the trees grow very slowly. Plus, in 1911, a massive fire burned 400-600 acres, destroying the new growth. In fact, even today, most of the trees on the ridges are so small that they would only be used for firewood.

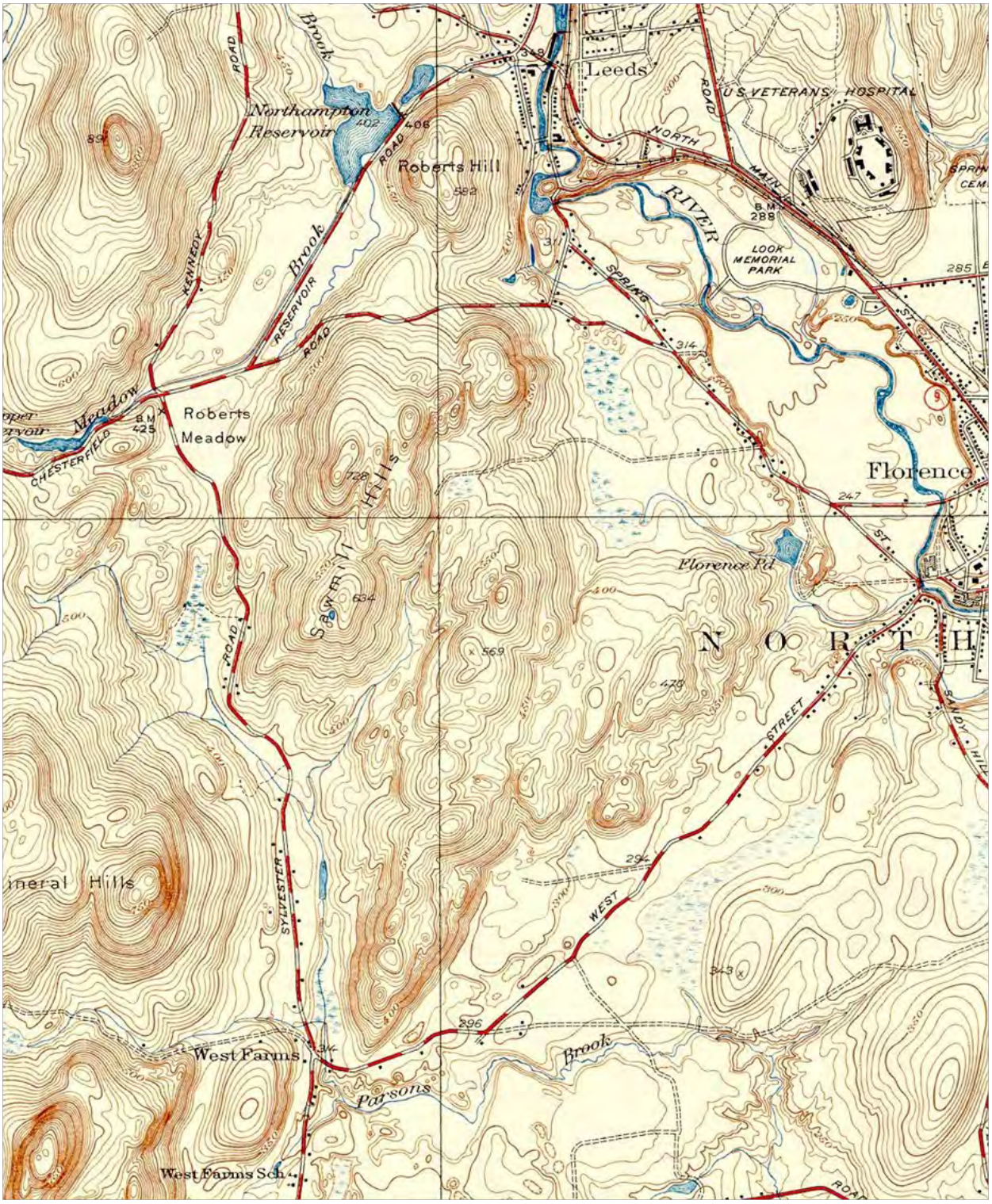
Aside from logging, the flanks of the Sawmill Hills have supported a handful of farms and there were also a few small rock quarries here and there. In 1895 (or so), the New England Telephone and Telegraph Company built many more lines in western Massachusetts, including a new line to Westhampton across the north end of the Sawmill Hills.

This image, taken in 1895 from the top of the original Florence Grammar School, shows a northwest view, with Ryan Road (then known as West Street) on the other side of the Mill River and its mill pond. The hillsides of the Sawmill Hills are mostly cleared, with only a scattering of pine. Based on the patches of snow, the photo was probably taken in March or late April. *Photo copied from Images of Northampton by James M. Parsons.*



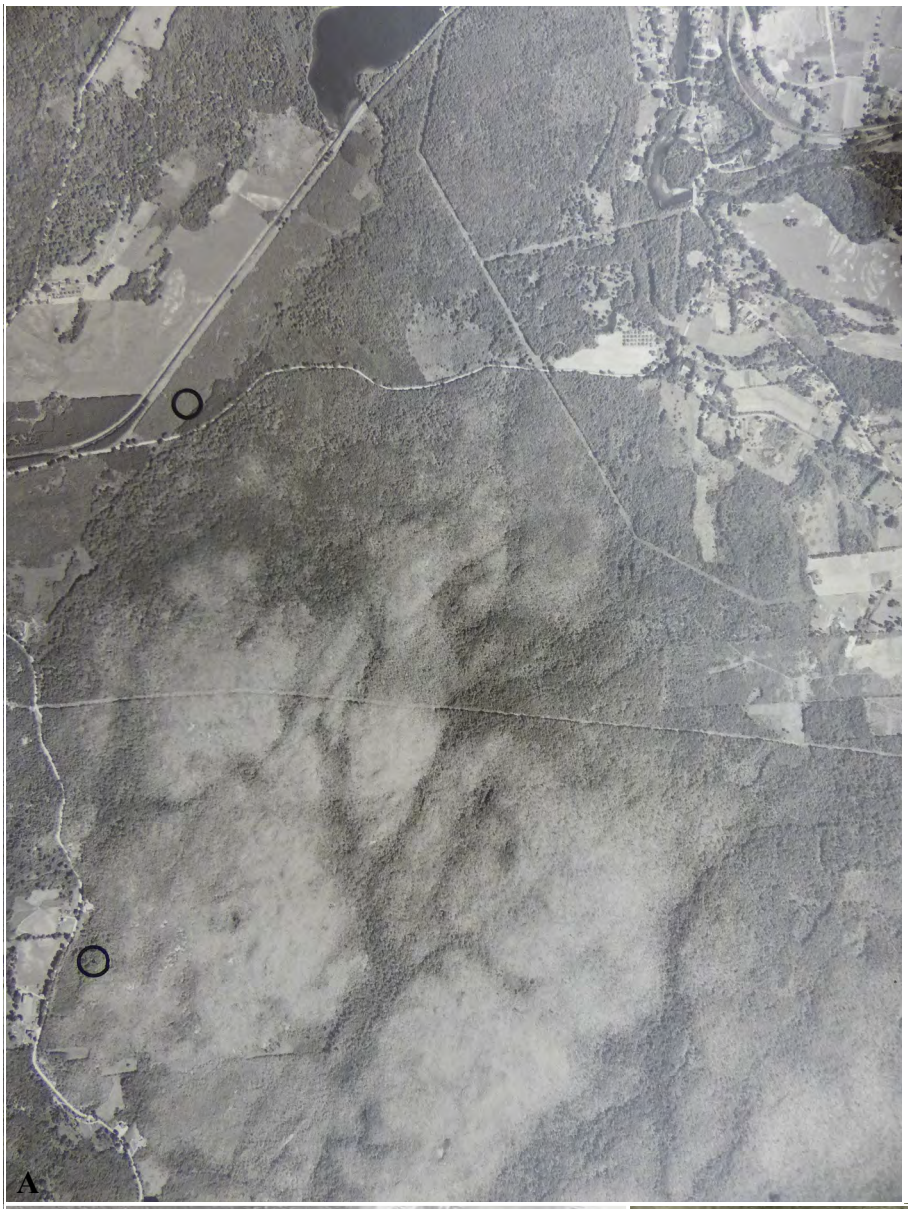
Maps from 1856 (*above*) and 1895 (*below*) show that there were no significant changes in the interior of Sawmill Hills during the 19th century. Rather, all of the new activity occurred around the edges, including more than two dozen new homes along Spring Street and Ryan Road (then West Street). In 1895 Bartlett's Sawmill still appears on the map.





By the time this topographic map was made in 1939, Bartlett's Sawmill no longer appears on the map, but a new road that leads to (and past) what is now the National Guard building had been built. In addition, the road to the ice pond/sand and gravel operations and another dirt road off West Street show up. Other than those roads, however, the interior of the Sawmill Hills and Roberts Hill still remained completely unoccupied.

Aerial Views from the 1950s & 1960s



(A) This view shows the intersection of Reservoir Road and Chesterfield Road, with the linear telephone and telegraph line cutting east-west through the forest of the Sawmill Hills and another telephone line angling northwest through what is now conservation land near the National Guard and within the Roberts Hill Conservation Area. Note how uniform in age the upland oak forest is versus a patchwork of cutting history. Sylvester Road is visible along the western boundary.

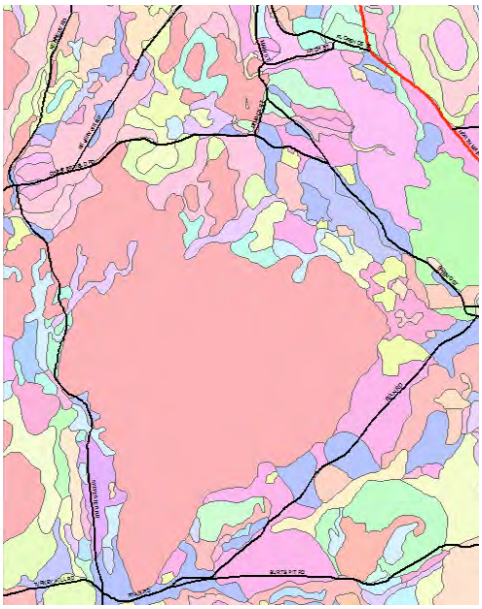
(B) The intersection of Ryan Road and Spring Street, with the ice pond near the top of the image. Sand and gravel mining operations have begun in and around the ice pond, and so has the first subdivision. A.T. Lilly's productive field (now a parking lot) at the intersection of Pine and Spring Street is still under cultivation.

(C) A slightly broader view of the Spring Street/Ryan Road area, but now a decade later. The ice pond is visible near the top of the image, and the sand and gravel operations off Ryan Road are now much larger and another new subdivision (west of the first) is being laid out.

The lack of change in the Sawmill Hills/Roberts Hill Complex is clearly shown in this map that documents land use changes in purple between 1971 and 1999. Aside from the development of new homes along the periphery, not much has changed during the last forty-five years.

During the last decade, two new homes with long driveways have been built that extend into the Sawmill Hills. Without further land acquisition, more development of this kind can be expected.

During the last century a powerline was installed along the eastern margin (~ late 1930s) and beginning in the 1940s and 50s, several sand and gravel mining operations began along Ryan Road and Spring Street. Aside from these activities and the construction of dozens of new homes (many of them on the former sand and gravel operations), little else has happened in the Sawmill Hills.

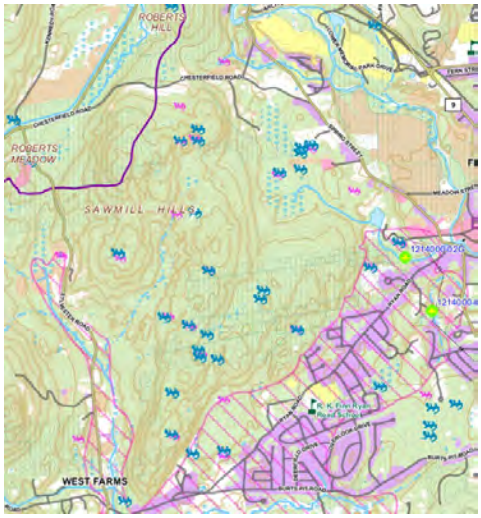


This soils map of the Sawmill Hills reveals how uniform the interior core is. This extensive area is covered with thin, acidic soils and innumerable rock outcrops, which are dominated by oak forests. The variation in the vegetation, as this map shows, occurs along the edges where changes in slope, soil type, hydrology and/or past land use.

Major Vegetation Patterns

The Sawmill Hills/Roberts Hill Complex is overwhelmingly dominated by dry, rocky uplands and thin, acidic soils. These are tough conditions for most plants and the flora in these areas is limited and predictable. On the drier hilltops, chestnut oak grows above thickets of low-bush blueberries and huckleberries. On the moister slopes, a wider mix of oaks occur, including red oak, white oak and black oak. Mountain laurel, witch hazel and maple-leaved viburnum are widespread in areas with thicker soils. White pine is widespread throughout the property, black birch is common in previously logged areas and hemlock is scattered. Wildflowers and grasses are generally sparse.

The greatest diversity of plant life in the Sawmill Hills is found in its wetlands and streams. Although these habitats make up a tiny percentage of the landscape—less than 10%—their contribution to the overall diversity of the Sawmill Hills is significant. In fact, forested wetlands, vernal ponds and stream corridors support many more plant and animal species than all of the upland areas, demonstrating that, like wetlands everywhere, these areas play a disproportionately large role in terms of biodiversity.



This map shows wetlands (*blue*), vernal pools (*salamander profile*), homes (*lavender*) and the boundaries of the Zone II (*pink hatching*). City-owned land is shown with green hatch-

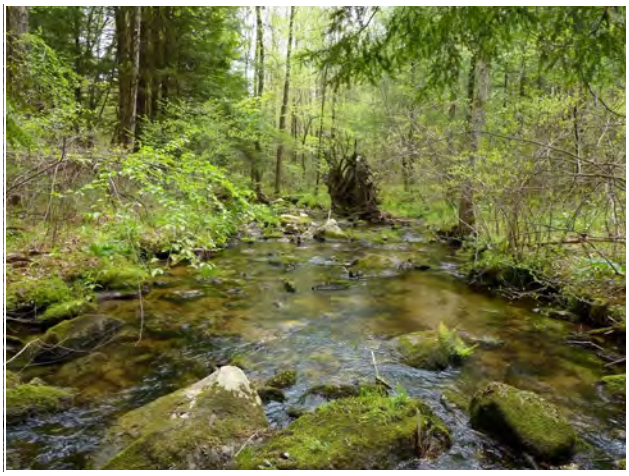
Six of the most common vegetation patterns in the Sawmill Hills/Roberts Hill Complex are:

Red, black and white oak forests, with chestnut oak on the highest, driest ridges. Where chestnut oak dominates, the understory vegetation is sparse to absent.

Mixed hardwoods, with an abundance of red oak, in terrain with deeper, richer soils and abundant outcrops. Mountain laurel, witch hazel and maple-leaved viburnum is abundant.

There are hundreds of acres where mountain laurel thickets dominate the shrub layer below the slow-growing oaks.

White pine dominates areas that were once cleared for pastures or because of past logging operations.

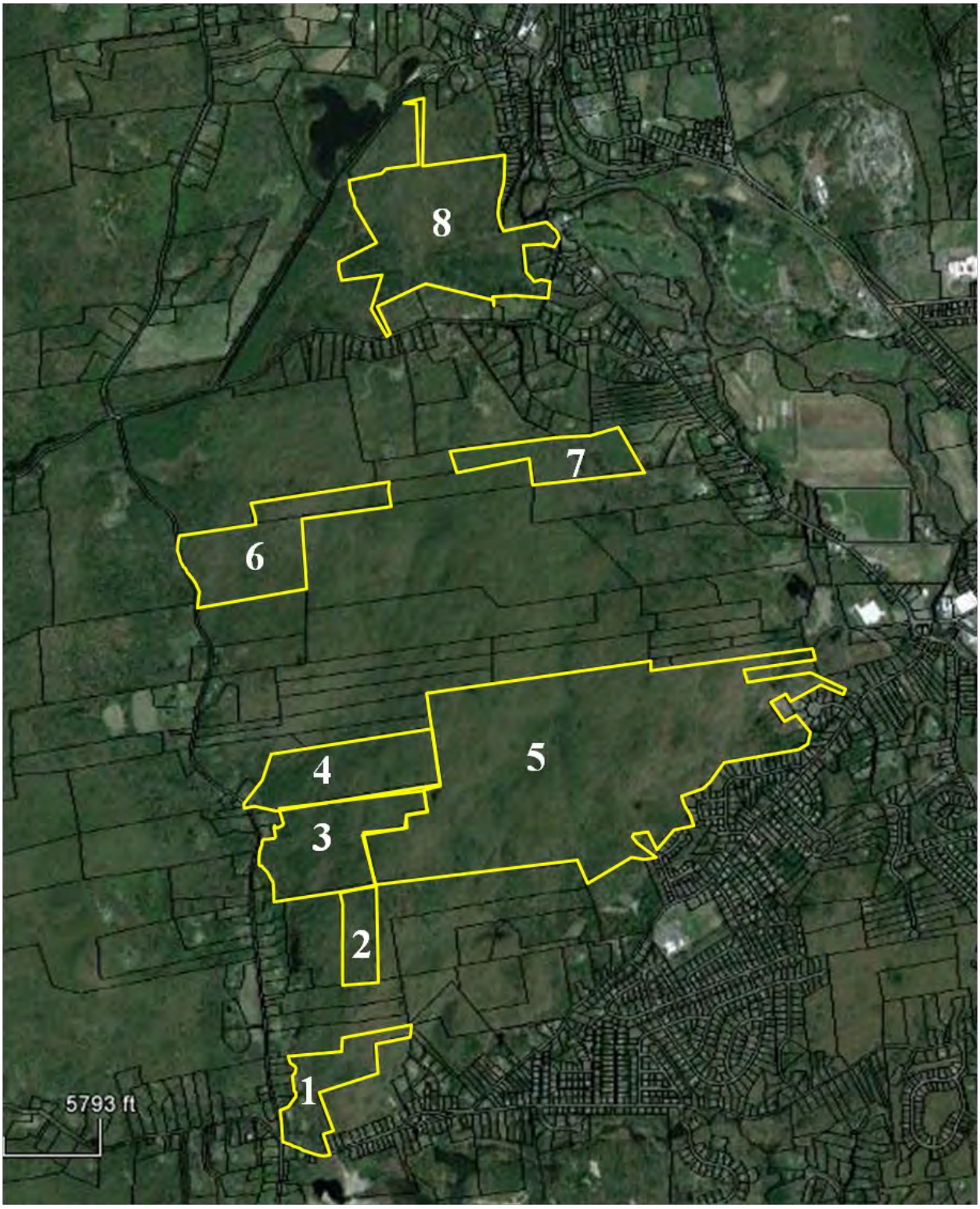


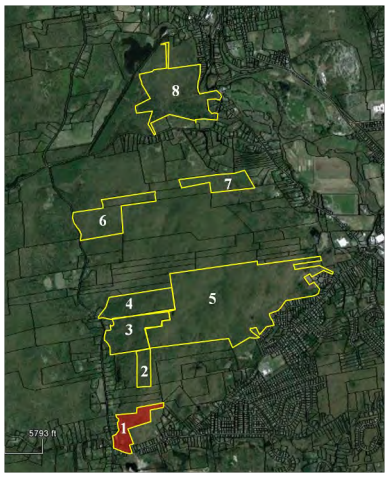
Except for the Mill River, all of the other streams in the Sawmill Hills are smaller than Parson's Brook (above) and most are intermittent. Plant diversity spikes along its borders.

Wetlands, both small pockets as well as more extensive swamps, occur with some frequency in the Sawmill Hills. Some of them also function as vernal pools.

The remainder of this report will provide more detailed descriptions of the city's conservation areas, from south to north.

# # #



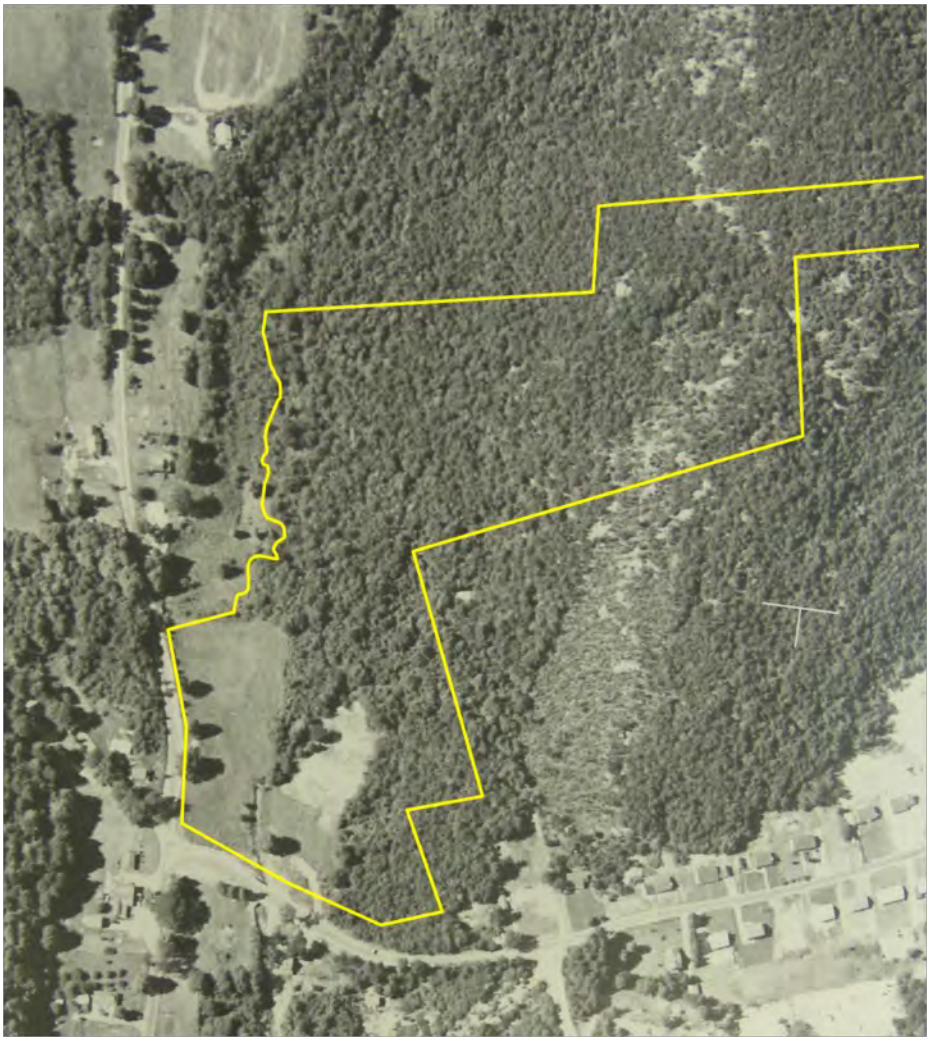


Conservation Parcel 1: Turkey Hill/Ryan Road/Sylvester Road

This 32-acre property supports eleven different plant communities, including an interesting beaver pond, a good-sized vernal pool, 1500 feet along Parson's Brook, small grassy clearings, oak-pine forest and impressive rock summits. It is also within easy walking distance of dozens of homes and with some modest improvements, it has the potential to become a much more popular conservation area—not only for picnicking and nature observation, but also, if a trail were created, a place to hike and connect to the elaborate trail network in the Sawmill Hills.

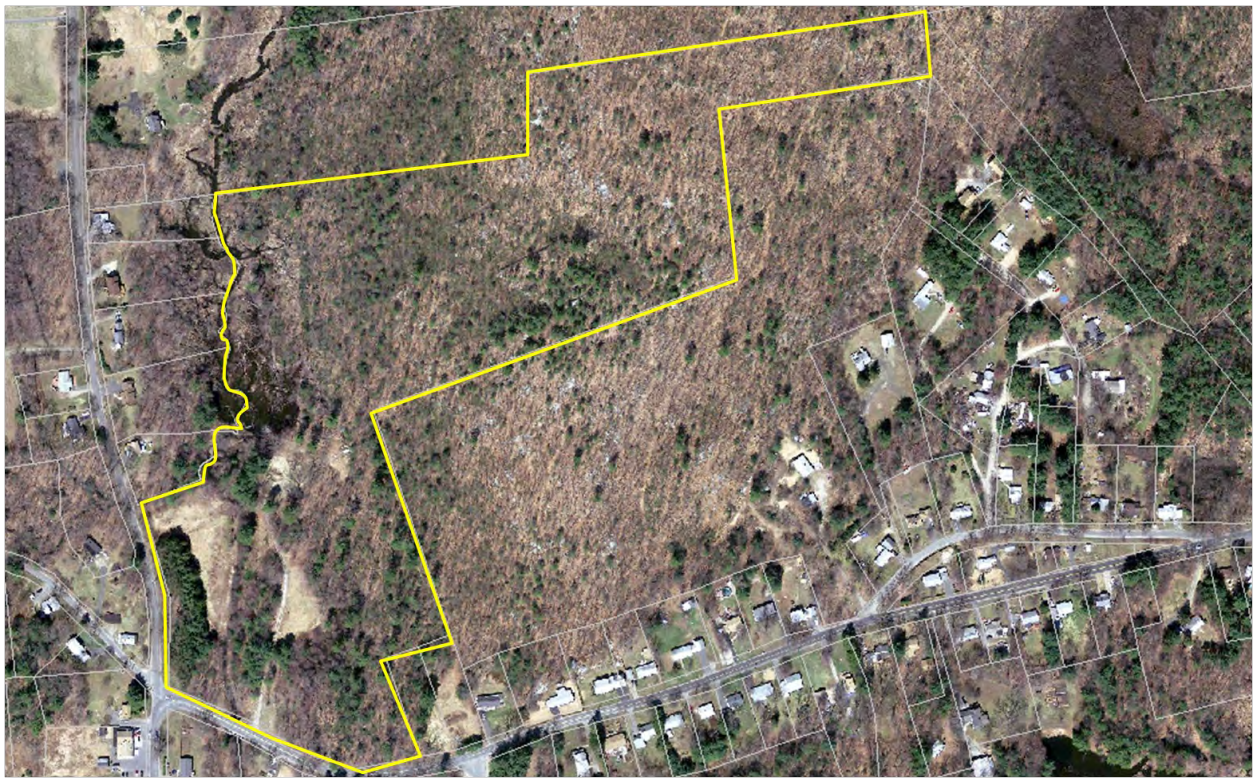
History

For many years, the level land along Parson's Brook was cleared and open (*see 1965 photo right*). There was also a small house not far from what is now the beaver pond, but prior to the City's purchase of the land, the house was torn down and where the foundation was located, there is now a good-sized and slightly dangerous hole.



This 1965 aerial shows the mix of open and forested land, along with the property's approximate boundaries.

The vegetation in the vicinity of the former house is surprisingly natural, with only a



As the old fields have grown in, the property, seen here in 2013, has become more forested. Meanwhile, the amount of open water, courtesy of the activity of beavers, is also much more extensive than it was fifty years ago.

small amount of myrtle and no lawn. The former owners, however, did keep a small flower garden, the remnants of which can still be found on the other side of Parson's Brook and along the edge of the old field. From the house, the little garden area was reached by a wooden footbridge, which is now gone. To mow the field, the owners used what is now a small wood road off Ryan Road.

Invasive Plants

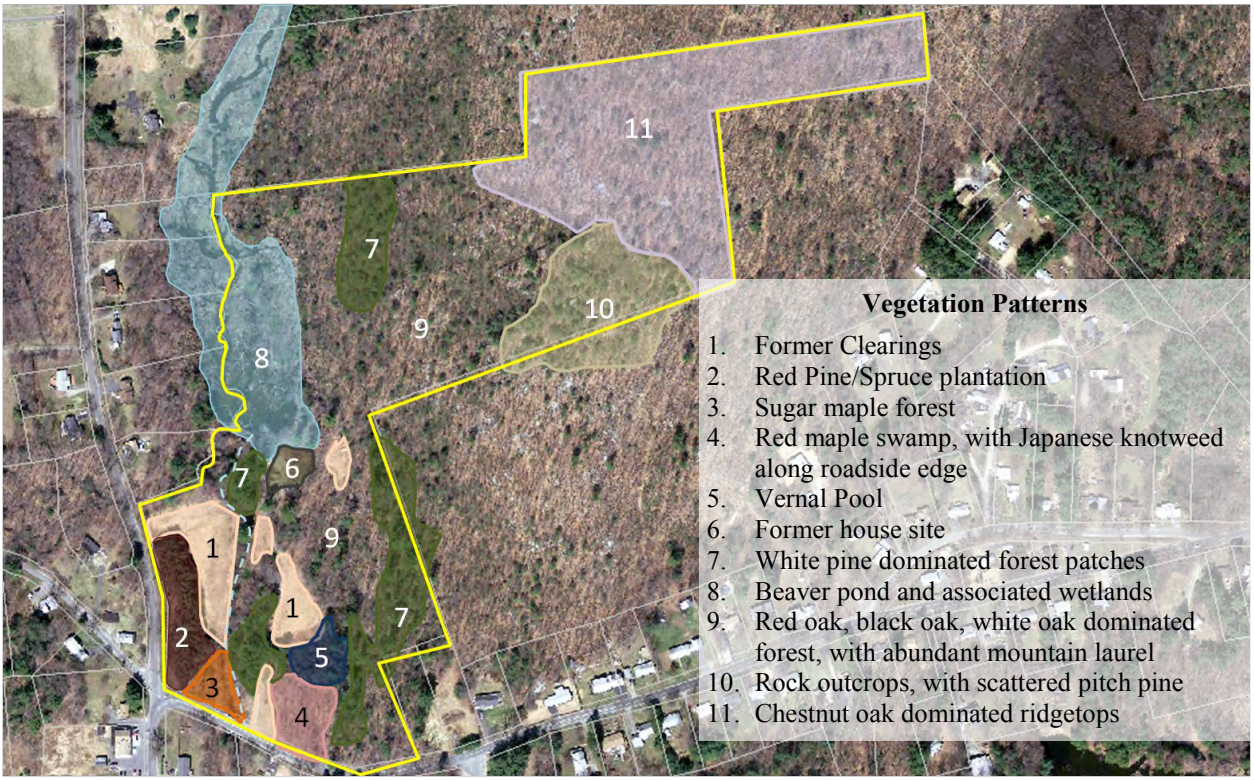
Like much of the Sawmill Hills, invasive plants are not yet a serious problem at this property. They do occur, however, and without any control efforts, they will continue to increase and spread. Most are them are found along the roadside edges, in and around the old fields, and a few (multiflora rose especially) are scattered in the wetlands. As elsewhere in the Sawmill Hills, the forested uplands and rocky summits are—at least for now-- entirely free of invasive plants.

Japanese knotweed forms a border along one of the field edges. Without control, it will further spread into the field and forest.

The most problematic invasive plants at this site are, in order of importance:

- Japanese knotweed, which is found along the edge of Ryan Road and on the borders of the old fields;
- Asiatic bittersweet, which is scattered in and around the field edges, in particular, in the red pine/spruce plantation and along the old stonewall boundary;
- Multiflora rose, which is scattered along the edges of the wetland and Parson's Brook;
- Morrow's honeysuckle and some good-sized winged euonymus, which are also found in and around the old clearings, especially on the west side of the brook in the area where sugar maple is common. Garlic mustard is also present here, especially along the edge of the road.

A small patch of lesser celandine was found along the brook (not far from the old flower garden) and a single autumn olive was found growing on the margin of the beaver pond wetland.



This map shows rough boundaries of the major plant communities, as well as Parson's Brook (dashed line) which flows south out of the property. A large glacial kettlehole is located off the property and in the northeastern corner of the image; it is bordered by steep cliffs on the western edge. High-bush blueberries and false loosestrife (*Decodon verticillata*), a native species, dominate this shrub swamp/wetland pocket.

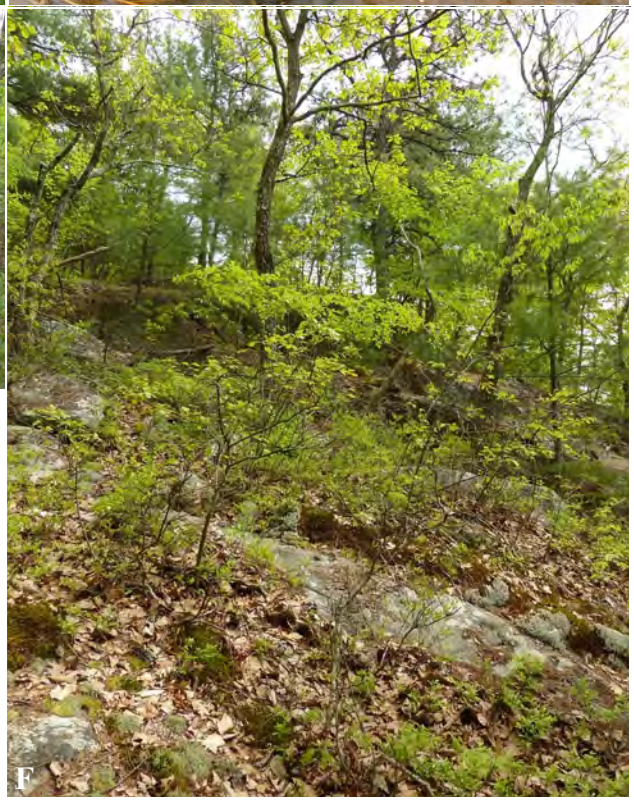
This conservation area falls within MA NHESP's BioMap Core Habitat.

(A) The field on the western side of Parson's Brook is mostly goldenrod, but also includes an abundance of sensitive fern, touch -me-not and many young saplings. Meadowsweet, meadow rue, grape and blackberries are also common. Non-native plants include scattered multiflora rose, Morrow's honeysuckle, bittersweet and a single autumn olive. At the far end of this field is the former flower bed (iris, daffodils, flowering quince, hyacinth). The clearings near the access road (east side) are drier and support more grasses, such as little bluestem. These clearings are underlain by sandier soils. (B) A meander along Parson's Brook and the remnants of an old beaver dam.

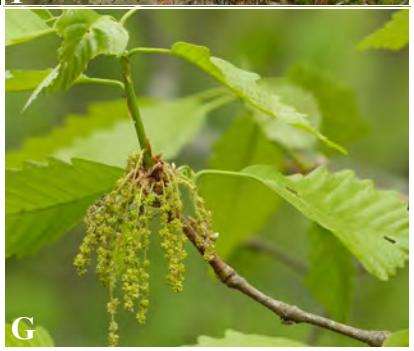
(C & D) During the last twenty (or so) years, beavers have reinvaded and dammed Parson's Brook just above the former house site. Here are two views at different times of year. The beaver pond is a hotspot for wildlife.

(E) The view from the edge of the beaver pond, looking back to the clearing where the cabin/house once stood. (F) A layer of ice covers the certified vernal pool, which is dominated by highbush blueberry and red maple. Buttonbush and meadowsweet are also common here.

(A) Red pine stand in the southwestern corner of the property; (B) Spruce and white pine plantation in the southwestern corner with abundant hayscented fern in the understory. Sugar maple is abundant here, as is bittersweet, Virginia creeper, a variety of young saplings, plus many other herbaceous plants (star flower, Canada mayflower, bracken, touch-me-not). (C & D) Shallow wetlands along the flooded margins of the beaver pond provide breeding habitat for spotted salamanders. (E) Along the slopes, red oak dominates the canopy, while mountain laurel is abundant in the shrub layer. (F) Closer to the summit there is a mix of bare rock, white pine, chestnut oak and occasionally pitch pine. Polytrichum moss, lichen, cowwheat, huckleberries and lowbush blueberries grow in the understory.



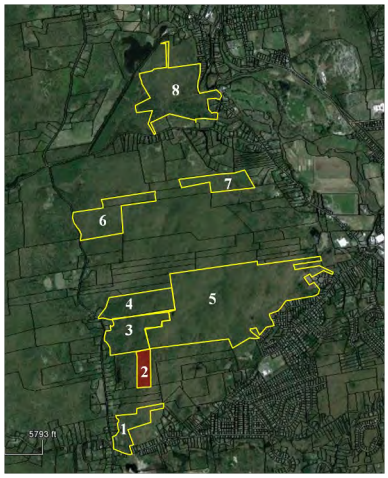
(A) The summit of the property is mostly open and dominated by chestnut oak. These trees, although small in diameter, may be more than a century in age.
(B) Two of the eight pitch pine found on the property.
(C) Bedrock balds have almost no soil and support only lichen.
(D) Foliose lichens and moss cover a prominent rock outcropping. The Mineral Hills can be seen in the distance to the west.
(E) From the top of the hill you can catch a glimpse of the Holyoke Range.
(F) Rock outcrops abound and come in many different sizes and shapes.
(G) Chestnut oak in flower in May.



Recommendations

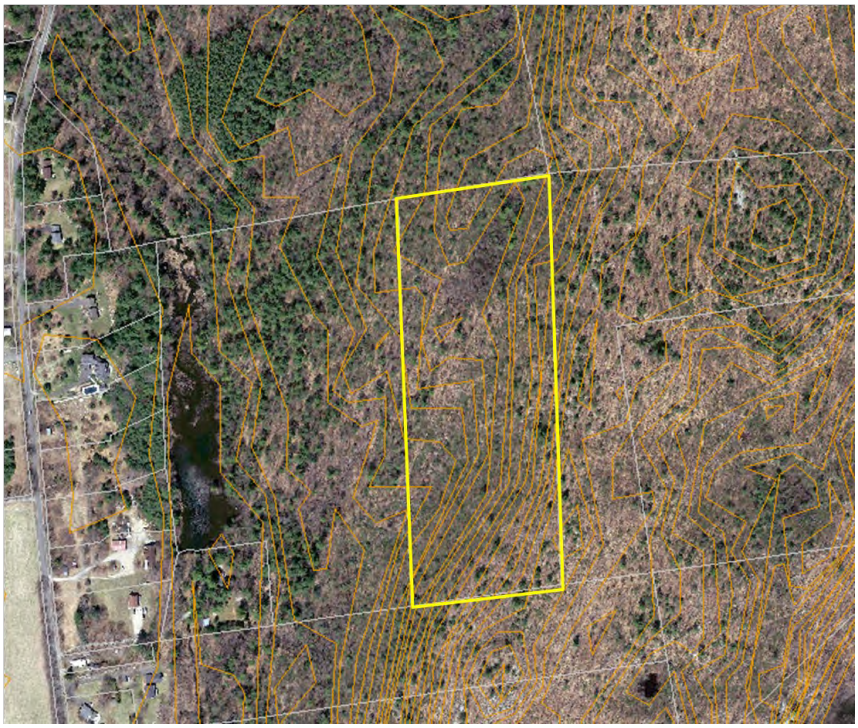
- Although a sign to indicate the property's conservation status was recently installed along Ryan Road, it would also be helpful to create a small parking lot next to it (~3-5 cars). A kiosk could also be installed here that shows a map of the property's boundaries.
- The area of the former house clearing would make an attractive picnic area, but the scattered junk should be cleaned up and the hole of the former house site should be filled in and leveled.
- Working with the abutter to the east, it would be great to create a trail that leads to the summit and to another trail, which is connected to the elaborate network of trails in the Sawmill Hills.
- Place a bench and/or small blind discreetly along the edge of the beaver pond to encourage wildlife viewing
- Control Japanese knotweed and other non-native plants using volunteers and a licensed applicator.
- Mow the fields and clearings to maintain wildlife openings; work with neighbors to mow a path through the western clearing and build a footbridge to connect the two areas that are divided by the brook.
- Offer a natural history walk here and foster neighborhood involvement in the property's maintenance and stewardship.

Deer ticks were fairly common at this site, so that existing trails should be maintained and future paths should be wide enough for people to avoid brushing against the vegetation.



Conservation Parcel 2: Formerly West & McGowan

Acquired by the City in 2009 from Justin West and Eileen McGowan, this 18 acre conservation area includes a mix of swamp forest, oak slopes and steep, rocky cliffs with a jumble of rocks below. A trail passes though the property and joins another trail at the top of the hill. The wetland is full of hummocks and shallow to knee-deep pools, which drain to Parson's Brook.



Located not far from the original Bartlett Sawmill, this 18-acre property has been wooded for years and includes a mix of uplands and wetlands. The topographic lines on this image reveal just how steep the eastern slope is. The swamp forest is located in the northeast corner of the property. It is fed by groundwater and acts as a vernal pool (*images below*).

In May 2014 I found a few spotted salamander and wood frog egg masses in the deeper water areas, and the sphagnum-covered hummocks look like potential nesting habitat for four-toed salamanders, an uncommon species in Massachusetts and so far, unknown from the Sawmill Hills. The wetland hummocks supported a mix of species, with the most common shrubs being winterberry, high-bush blueberry, and mountain laurel and the most common herbaceous plants being cinnamon fern, royal fern, goldthread and Canada

(A & B) The perched wetland sits in a bedrock basin. Sloshing through the water, with the steep rocky cliffs to the east, it feels like you are in a wild, remote place and yet you're just 15 minutes from downtown Northampton.
(C & D) Large rock cliffs and outcrops form the property's eastern boundary.
(E) At the summit is a well-used trail, which connects to more than 5 miles of other trails.
(F) From the summit, you can occasionally catch a glimpse of the Mineral Hills to the west. A few judicious tree removals would create a year-round vista.

mayflower. The wetland overstory was almost entirely red maple, with a few scattered white pine and hemlock.

The slopes to the east include a rocky jumble and cliffs. The forest here is dominated by oaks, principally red oak and chestnut oak, but red maple was also abundant. Mountain laurel is thick and forms almost impenetrable thickets.

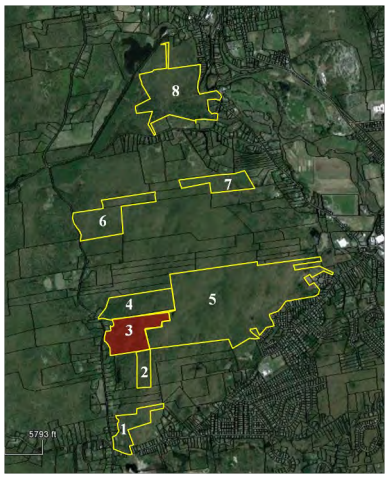
And here's some cause for celebration: no invasive plant species were found in this area!

Recommendations

- Map all the trails and gain permission to access this area from Sylvester Road.
- Cut a few trees at the summit trail, which is just off the property, to create a view to the west.
- Return to check for Jefferson's salamanders and four-toed salamanders.

Conservation Parcel 3: Formerly Symanski

Acquired in 2013, this 58.22 acre parcel is a key piece in the jigsaw puzzle of protected land and includes several different habitats, including a beautiful stretch of Parson's Brook, three swamp forest areas, two intermittent streams, a dense grove of hemlock, impressive white pine stands, a richer shagbark hickory forest, as well as a small portion of a vernal pool, oak-pine woods and dry, rocky uplands. Although a portion of the property near Sylvester Road was logged during the last decade, even in this area, the forest is, generally speaking, not too difficult to walk through and the obstacles are more likely to be mountain laurel thickets than slash and logging debris.

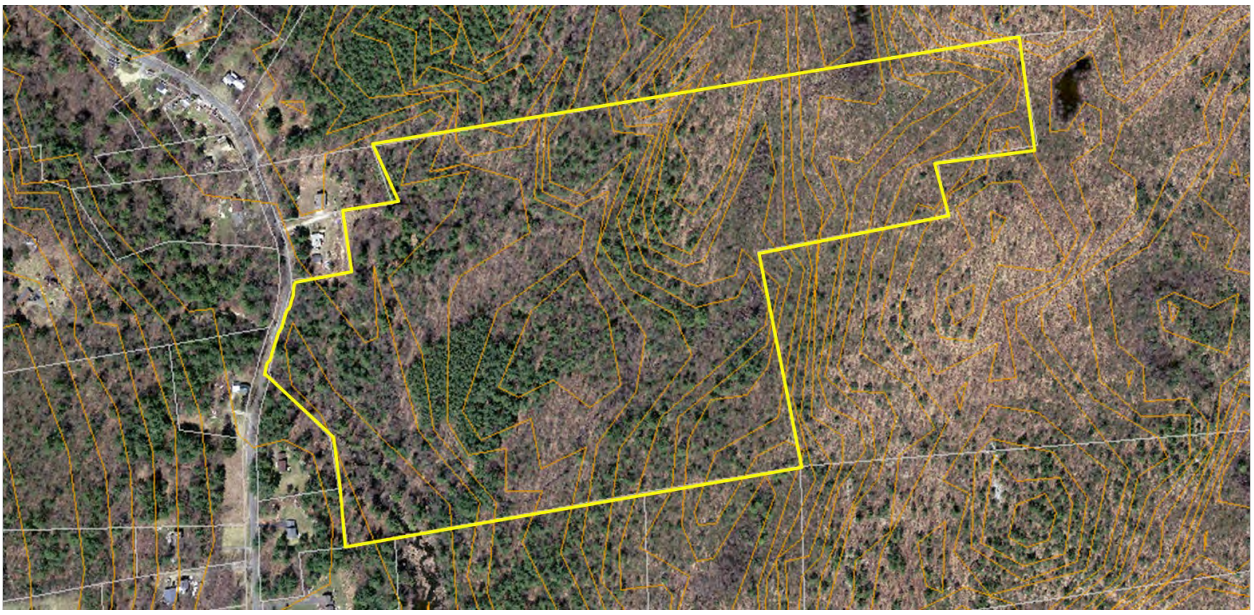


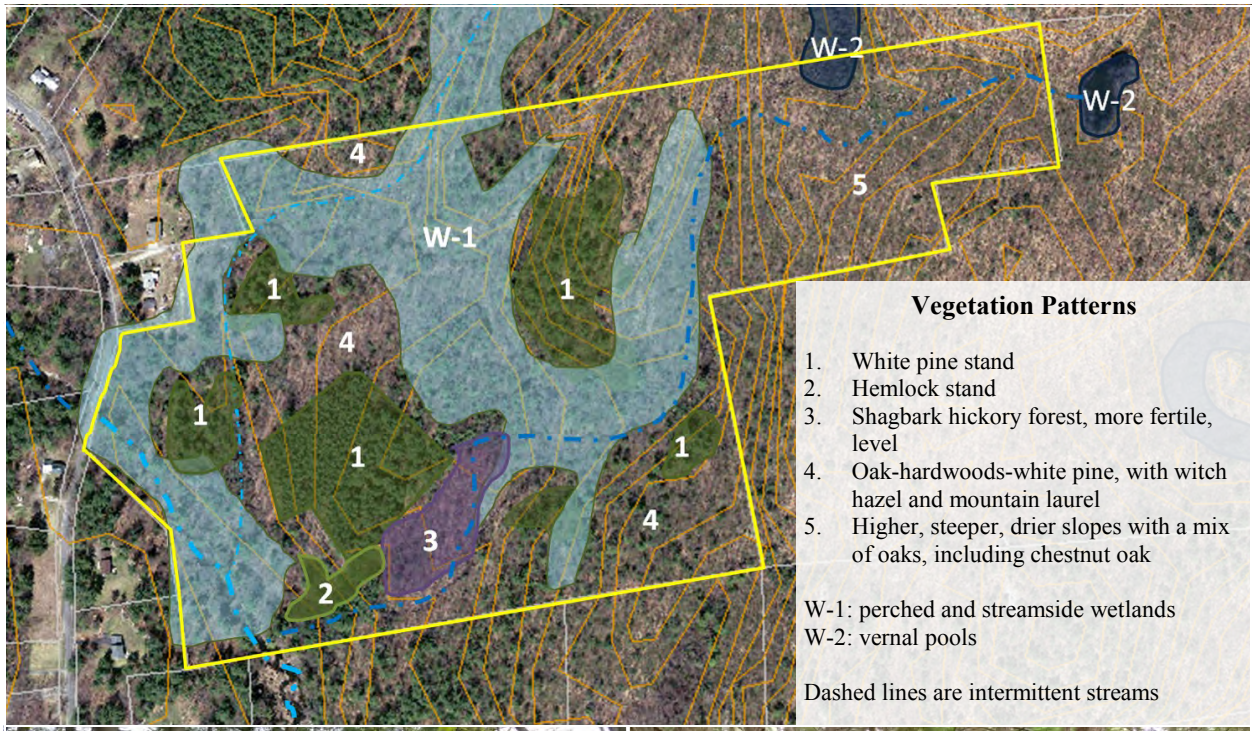
In addition to its varied habitats, what also makes this property noteworthy is that nearly all of it is free of invasive plants. Those non-native plants that do occur are found along the tributaries that are closer to Sylvester Road and along the banks of Parson's Brook. The most abundant and widespread is Japanese barberry, but these areas also include some multiflora rose, Asiatic bittersweet and Morrow's honeysuckle. In a single day in the spring, a crew could treat nearly all of these invasive plants which, without control, will spread and increase in quantity and area.

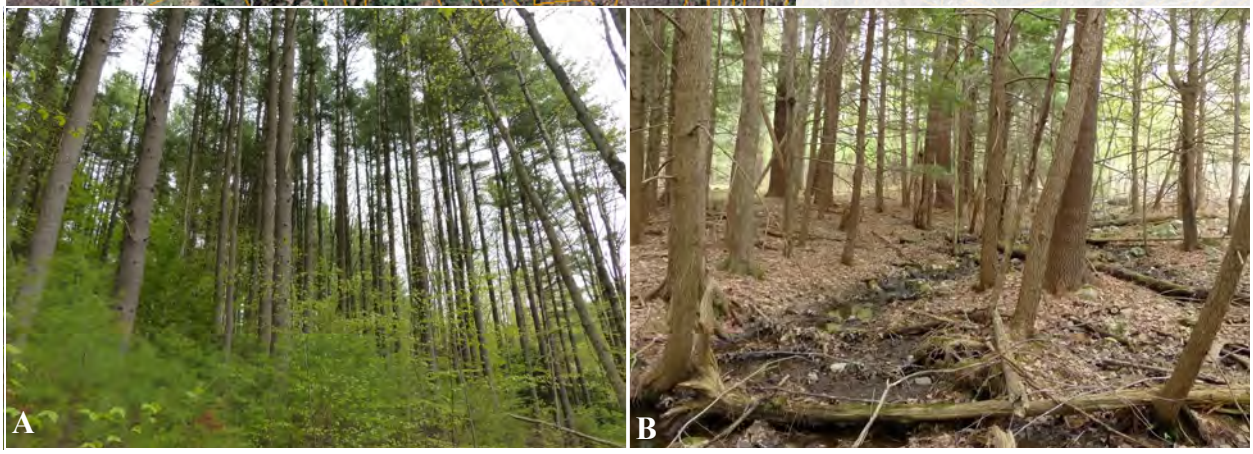
Recommendations

- Control invasive plants along Parson's Brook
- Develop additional trails

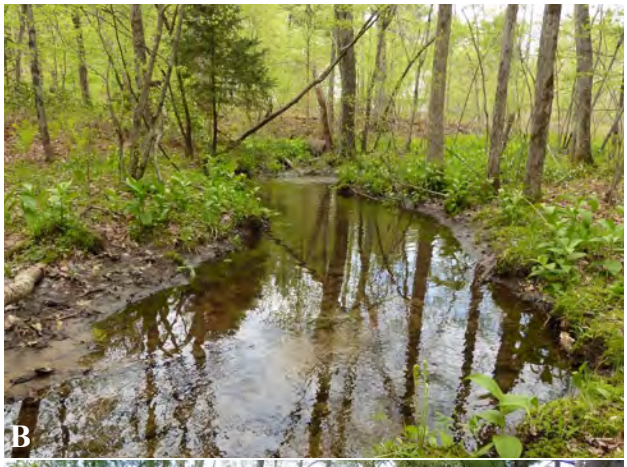
The property in 1965 (*above*) and in 2013 (*below*), with elevation contours. It is possible that Bartlett's Sawmill was located on this property. Based on the 1856 and 1895 maps, however, it appears to have been a little further downstream.

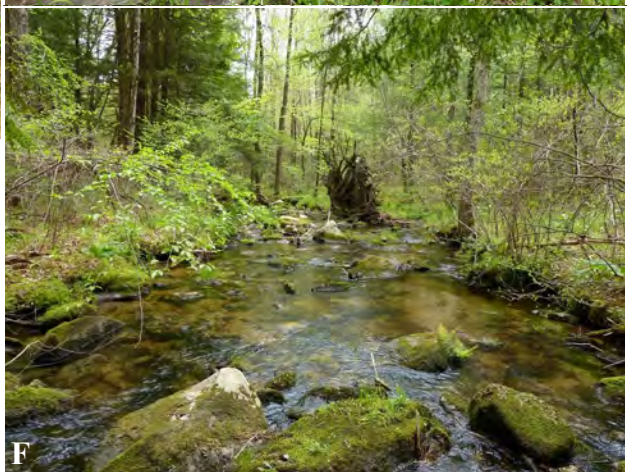






(A) The largest white pine stand (#1) on the property, with young birch and white pine saplings in the understory. (B) The hemlock grove (#2) with no vegetation below, but scattered red maple and pine. (C) The richer, more open shagbark hickory and ironwood forest with a small stream. (D) An old stone wall, not too far from Sylvester Road, in the woods. Note the pileated woodpecker hole in the dead tree in front.





(A) The swamp forest near Sylvester Road.
(B) The stream that flows from the former Reutener property (now conservation land) and enters this conservation area.
(C) The same brook a little further downstream and now significantly rockier.
(D) Parson's Brook, three times as wide and much more open than its smaller, shadier tributary.
(E & F) Parson's Brook, heading toward Sylvester Road and rockier still. This may be in the vicinity of Bartlett's Sawmill, which was initially powered by this brook and later by steam. Note the patches of barberry on the banks in Photo E.

(A) Beaver activity along Parson's Brook downstream from the conservation area has caused the water to slow down and spread out, creating marshier habitat. (B) The beginning of the true beaver pond lies just off the property. It is a place that feels remote and wild in spite of being within earshot of Sylvester Road.

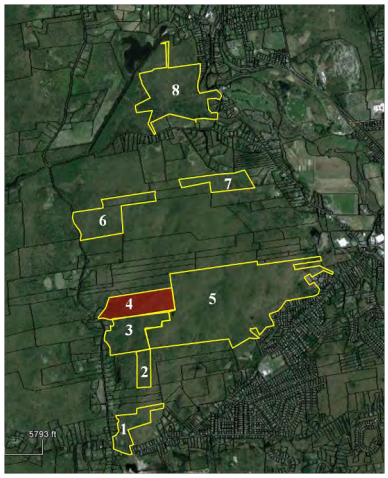
(C) Cut stumps are hard proof of a logging job done sometime during the last two decades. Above them grows a shrub layer dominated by witch hazel. (D) An old wood road and bridge over a tributary stream leads into the forest.

(E) Signs of human activity are few and far between. Here are the remains of an old camp in the midst of the largest grove of white pine. (F) Above the largest white pine stand is a perched wetland, dominated by red maple in the overstory and a mix of ferns and wildflowers below. No non-native plants were found here.

(A) The property's perched wetlands vary in their vegetation and this one, located near the eastern edge of the property, includes a braided stream below a canopy of yellow birch, red maple, and ash. The hummocks are covered with mosses as well as cinnamon fern, violets, gold thread, golden alexanders, sensitive fern, golden ragwort, and partridgeberry. (B) A vernal pool occurs above this wet seep. Curiously, in addition to oaks and other hardwoods, there are several tulip trees in this area.

(C and D) Beyond the wetlands the forest change is swift and dramatic, transitioning to woods that are dominated by hardwoods, especially oaks. The thin, acidic soils support relatively few species of understory plants, giving the forest and open park-like quality.

Although the dry uplands do not support as many species as the wetlands, you can find still find a variety of animals here, including common garter snakes.



Conservation Parcel 4: Formerly Reutener

Acquired in 2014, the 52-acre Reutener property connects with 435-acres of conservation land (Parcels 2, 3, & 5) and from the perspective of conservation planning, it was one of the most exceptional acquisitions within the Sawmill Hills. In addition to its size and location, it is recreationally, aesthetically and ecologically one of the most important properties within the Sawmill Hills region. The following information is drawn from an ecological inventory that I prepared for the City in May 2014.

Recreational Value

The Reutener property includes its own network of well-maintained trails, which begin near the parking area and the family's Sugar House on Sylvester Road. These trails pass through or near most of the property's different habitats and just as significantly, they connect to a much larger, interconnecting trail system that spans the Sawmill Hills.

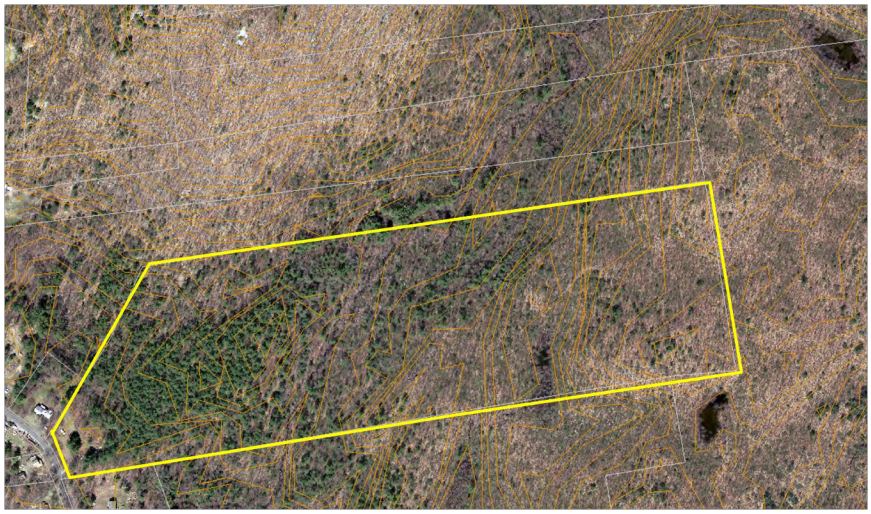
The trail that begins near the sugar house is wide and mostly level, making it accessible to many people.

Aesthetics

Like many areas in the Sawmill Hills, the property is beautiful, with up and down terrain, a cascading brook, bedrock outcrops, fairly open woodlands and impressive views from the higher elevations and cliffs.

Ecological Diversity

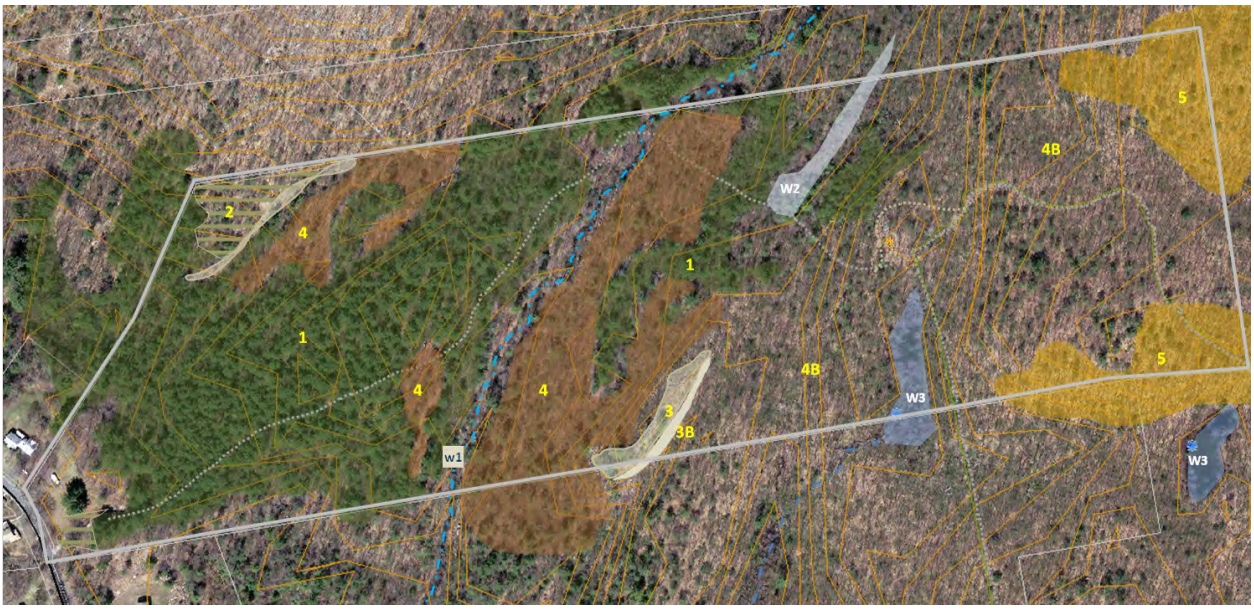
Underlain by 400 million year old gneiss and a relatively thin veneer of glacial till, the Reutener property is topographically varied and supports ten different kinds of natural communities. Although nearly all of them are common and wide-



spread in our region, they are of high quality and show little to no sign of human disturbance and none have invasive species problems.

The habitats are unevenly divided between uplands and wetlands, with uplands comprising almost 90% of the property. Given the acidic, shallow soils, the flora in these areas is relatively narrow and predictable. White pine dominates a large portion of the land, while further up the slope, the composition of the woods shifts to red oak and at the highest and driest elevations, it transitions to chestnut oak. Broad swaths of mountain laurel grow below the red oak-dominated canopy, and witch hazel and maple-leaved viburnum are also extremely common in this forest type. In the chestnut oak dominated woods, these species drop out and are replaced by drought and fire tolerant species like low-bush blueberries and huckleberries.

The wetland portions of the property make up only about 5 acres, but their contribution to the site's overall diversity is significant. In fact, the stream corridor, vernal pond and small drainages actually support more plant and animal species than all of the upland areas on the property.



Natural Communities and Trail Map

Wetland Natural Communities

W1: Low energy streamside forest
W2: Red maple swamp
W3: Vernal Pool

Upland Natural Communities

1: Succession White Pine, transitioning to White Pine-Oak
2: Red Oak-Sugar Maple Forest
3: Acidic Rocky Summit/Rock Outcrop & Acidic Rock Talus
3B: Acidic Rock Cliff
4: White Pine-Oak Forest
4B: Mixed Oak Forest with Mountain Laurel
5: Ridgetop Chestnut Oak

White Pine Successional (1) grows on a large part of the property. In some areas, it has grown up in places that were once former fields, but in others, the historical reason for its presence is unclear. In the latter areas, the land may have been opened up by logging, fire, or hurricane damage .

Although white pine is the dominant canopy tree, a few scattered hardwoods are also typically mixed in with these stands, including white oak, red maple, big-toothed aspen, and hemlock. Usually, the vegetation in the understory is scant, with occasional small patches of mountain laurel, or if bedrock is close to the surface or exposed, there are swaths of *Polytrichum* moss and a mix of low bush blueberries and huckleberry. When present, the herb layer includes Canada mayflower, wintergreen, partridgeberry, starflower, and in drier, more open sites, cow-wheat, bracken fern and Pennsylvania sedge. Patches of running clubmoss and ground pine are also fairly common.

Red Oak-Sugar Maple Forest (2) is very limited on the property and occurs near the sugar house and also in its southwest corner. Ironwood , big-toothed aspen, shagbark hickory, red maple and occasional hemlock are also present in this forest type, and while the understory is largely free of vegetation, Canada mayflower, trout lily, and true solomon's seal are common near the Sugar House.

Acidic Rocky Summits and Rock Outcrops (3) are found throughout much of the property, and two of the larger ridges are highlighted on the Natural Communities map. In moister settings, marginal shield fern, Christmas fern and polypody fern and mosses are common, while at drier sites, lichens dominate. Pine, black birch, red oak and chestnut oak are all commonly associated with these barren knobs, and huckleberry and low-bush blueberries are also widespread.

Acid Rock Talus (3b) is found below the larger outcrops and ridges and includes a mix of red oak, black birch and infrequently, sugar maple, hop hornbeam and basswood. False honeysuckle and common sarsaparilla are common in the understory, but in general, these areas are very tough places for plants to grow. Porcupines regularly den in these jumbled rock piles, and in May 2014, a litter of six young pups (p. 38) were found at the base of the talus slope in this photo.

Acidic Rock Cliff (3B) is festooned with large liverworts and mosses, but few vascular plants.

White Pine/Oak and Mixed Oak with Mountain Laurel (4 and 4B) cover nearly 50% of the upland areas. As the soils get drier, the species shift from white-pine and red oak to an increasing amount of red oak and mountain laurel. White oak, red maple, black birch and hemlock are scattered throughout this mix. Witch hazel is also extremely common in the understory and maple-leaved viburnum is common. The herb layer is scant.

Ridgetop Chestnut Oak (5) is found in the driest, rockiest areas and mostly at the highest elevations. The forest here is open and almost entirely dominated by chestnut oak. Black oak, red oak, and white oak are also present, and black birch and red maple are occasional. The understory vegetation is thin, with huckleberries, low-bush and early blueberries in the shrub layer. The herb layer is almost entirely absent, but cow-wheat, sedges, and bracken fern occur.

Low-energy Streamside Wetlands and the Stream (w1) on the property are one its most beautiful features. This cascading stream meanders through the central part of the conservation area and is narrowly bordered by rich wetland vegetation. The bordering rocks are covered with mosses and liverworts and in the spring, the wetland edges are defined by the bright green leaves of false hellebore. Other common wildflowers include golden ragwort, Canada mayflower and less frequently dwarf ginseng, wood anemone, goldthread, marsh marigold, violets and turtle head. Ferns include cinnamon fern, hayscented fern, New York fern. The shrub layer is mostly absent, but witch hazel and mountain laurel inhabit the drier margins, while winterberry and spicebush can be found in the wetter areas. The nearby trees include red maple, big-toothed aspen, shagbark hickory, yellow birch, black cherry, ironwood and ash.

A small **Red Maple Swamp (w2)** fed by groundwater, overland runoff and precipitation is perched in the eastern half of the property. In spite of its small size, it provides a disproportionately large contribution in terms of plant diversity. Common species here include marsh marigold, skunk cabbage, watercress, golden saxifrage, cinnamon fern, sensitive fern and hummocks covered with sphagnum. In addition to red maple, the overstory also includes black ash and yellow birch, while winterberry, high-bush blueberry, young pine and mountain laurel are common in the shrub layer.

A single **Vernal Pool (w3)** is located on the property and is one of its most ecologically important habitats. Located in a shallow, bedrock depression in the bedrock, it is fed by groundwater, overland runoff and precipitation, it measures about half an acre in size. About 2/3 of the pool is shallow and characterized by mossy hummocks with high bush blueberry and winterberry, while the remainder is deeper and supports a small patch of buttonbush. Red maple rims the margins.

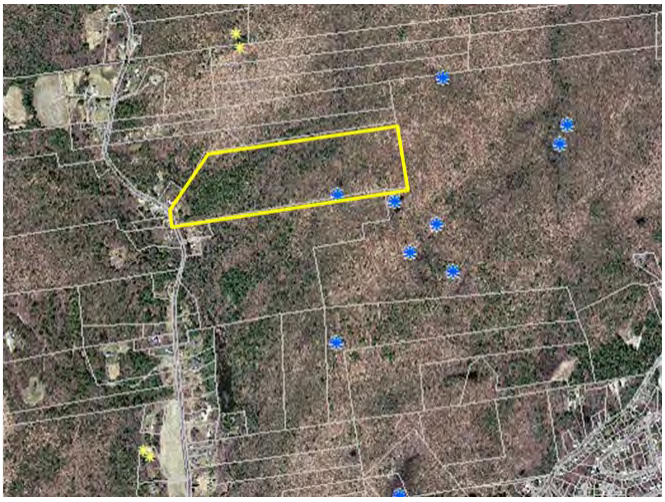
Recommendations

1. Organize a volunteer day to cut or handpull multiflora rose within the wetland corridor and monitor for Asiatic bittersweet and Morrow's honeysuckle throughout the property. Aggressively control the patches of swallowwort, which are located on Sylvester Road in the vicinity of the parking area.

2. Install a small kiosk (at the entrance to the woods and beyond the sugar house) and sign for parking along the roadside edge.

3. Install bridges across the wetland and stream crossings

4. Organize a field walk to showcase this new acquisition.

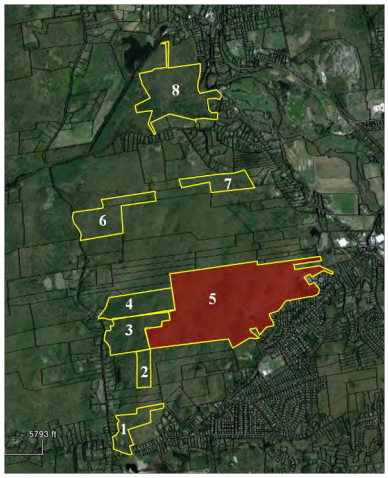


The vernal pool on this property is more valuable, ecologically speaking, because of its proximity to other vernal pools. All of these have been certified and are shown as blue asterisks. The yellow asterisks to the north are potential vernal pools.

My daughter, with binoculars, watching coyote pups in the mountain laurel thicket in May 2014. Now that this land is publicly-owned, more people should be exposed to this area.

5. Monitor the erosion along the trail (steep slope) near the eastern edge of the property.

6. Remove old barrels and other rusty junk along the trail.



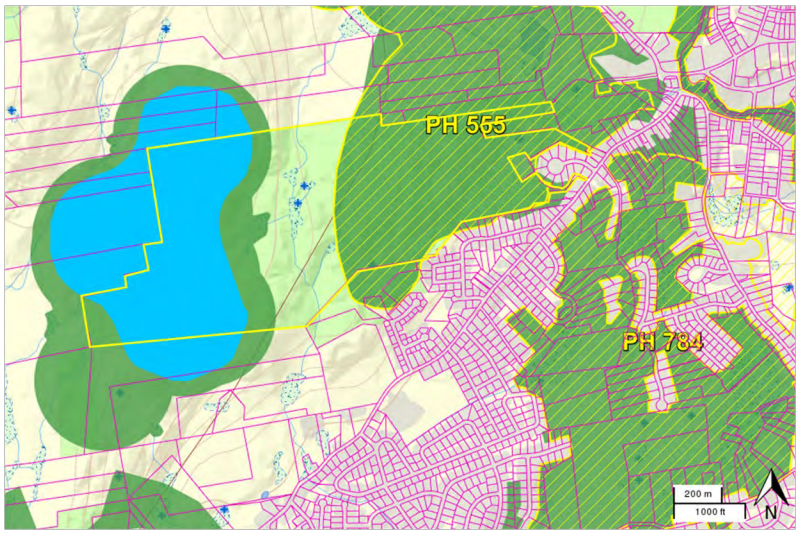
Conservation Area 5: Sawmill Hills Core Area (multiple acquisitions)

Composed of several adjoining parcels, this 331-acre block of conservation land forms the core of the Sawmill Hills Conservation Area and includes some of the most ecologically significant areas within the Sawmill Hills/Roberts Hill Complex. What's more, given the focus of this report, nearly 90% of this giant area is free of invasive plants.

A common scene in the Sawmill hills—rocks at the surface, a thick leaf litter and a surrounding overstory dominated by oaks.

Vegetation Patterns

Like most of the Sawmill Hills, this area is dominated by rugged, rocky uplands. Wetlands and streams account for only 3% of the total—a mere ten acres! Nevertheless, in terms of their contribution to the property's overall biodiversity, wetlands play a large role. In fact, because of the property's vernal pools, swamp forests and streams, most of this land has been mapped by MA NHESP as BioMap Core Habitat, BioMap Vernal Pool Core Habitat, and Priority Habitat for Rare Wildlife.



This image shows rare species habitat (yellow hatching), vernal pool core (blue) and BioMap Core habitat (green). The configuration of this large chunk of conservation land is outlined in yellow.

<u>Uplands</u>

Of the 97% of this property that is upland, the majority is up and down terrain, with an impressive and confusing number of bedrock

The impressive cliffs, talus slopes and bedrock balds found in the Sawmill Hills are numerous and fascinating places. Aside from their aesthetic appeal, they provide important denning sites for raccoons, porcupines, coyotes, and other mammals. Not many plants grow in these areas, but on top of the rocky balds you can regularly find low-bush blueberry (right) and American chestnut saplings are common. A century ago, chestnut would have been a major component in the canopy and an important source of food for wildlife.

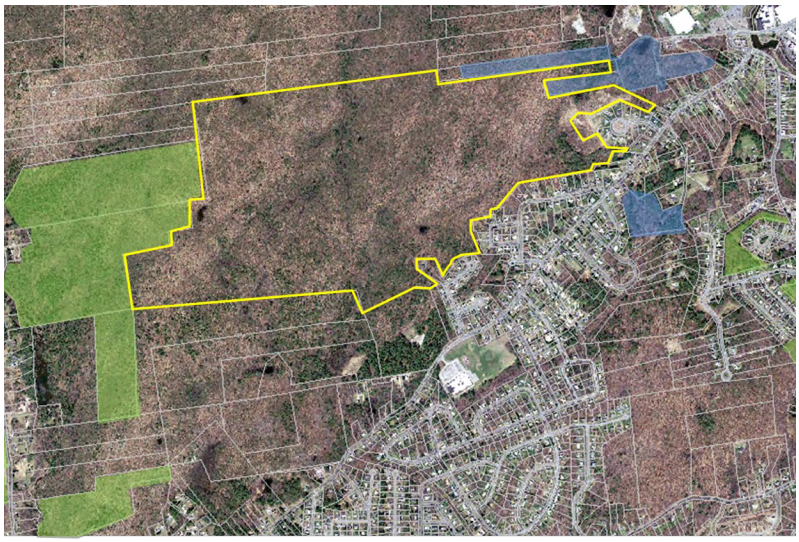
outcrops. As the Gazette's editor wrote in 1880, the Sawmill Hills "is a lonesome, desolate region, broken up into a multitude of steep inclines, bluffs and precipices, and whoever ventures to attempt its explorations of [sic] a cloud day is very like to mix up the points of the compass and get lost."

Getting lost may be even easier today. In the 1880s the landscape was almost entirely cleared, so at least then you had the chance of occasionally catching a clear view and perhaps spotting the church steeple in Florence or a nearby farm to help orient you and regain your bearings .

In addition to hardwoods, white pine is common in these woods and hemlock is also common along the edges of the swamp forests. This image also shows one of the many trails that pass through the Sawmill Hills and go for miles.

Today these hills are entirely forested and there are almost no views—east, north, south, or west. Still, although it is hard to see from the property's hilltops, these areas generally have fairly open understories, which makes them easy to walk through. Based on MA NHESP's natural communities classification system, these drier plateaus and summits can be categorized as "ridgetop chestnut oak forests," with chestnut oak dominating the canopy, a mix of huckleberries, chokeberries and low-bush blueberries in the shrub layer and a few herbs (wintergreen, partridgeberry, Pennsylvania sedge and poverty grass) growing below. Downslope from these ridges, on the side slopes and wherever the soils are slightly deeper and moister, chestnut oak is replaced by "mixed oak forest," which includes several kinds of oak (mostly red, but also white , black and even some scarlet) as well as white pine, red maple, and a mix of other hardwoods (hickories, sassafras, big-toothed aspen and black birch). In these

settings, the shrub layer is often thick with witch hazel and/or acres and acres of almost impenetrable thickets of mountain laurel. Wild-flowers and grasses, however are uncommon. Instead, most of the ground is covered with a brittle layer of oak leaves.

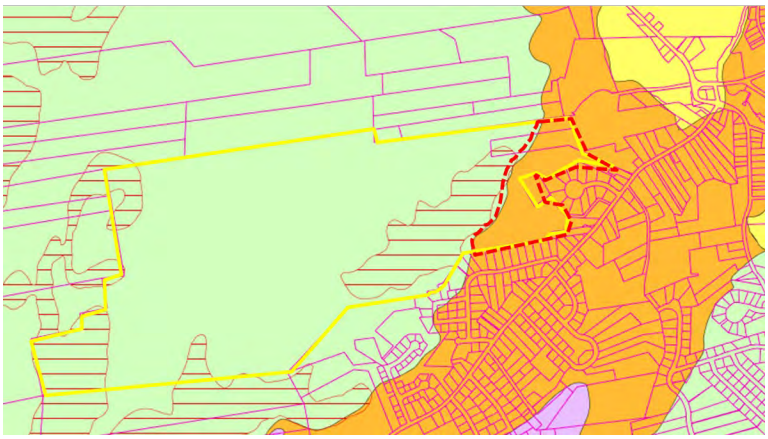


Beginning in 1992 with an acquisition of less than 2 1/2 acres, the City has been able to acquire more and more land in the Sawmill Hills, particularly in this area. Although none of acquisitions has been larger than 80 acres, this jigsaw-puzzle of protected conservation land (outlined in yellow) now encompasses 330 acres. The areas in blue are city-owned watershed land, while the parcels in green are more recently acquired conservation holdings, which were previously discussed.

Regardless of where you are in these uplands, what's truly remarkable is that there are almost no invasive plants. None. Zero. Even along most of the trails! Rather than an absence of seeds, it probably has more to do with the acidic, dry conditions and carpet of leaves.

Sand Barrens

In contrast to the essentially invasive-free rocky uplands, the remaining non-wetland acreage has been highly compromised by invasive plants and its future as one of the City's few remnant grasslands is threatened by their continued spread.



This surficial geology map shows the different kinds of deposits in and around the conservation area. Glacial till (*light green*) covers most of the property, while bedrock outcrops (*red lined units*) are also abundant. On the southern and eastern margin a tongue of glacial outwash (*orange*) underlies most of the Ryan Road neighborhood. The area outlined with red dashes is the 25 acres within the conservation area that includes old gravel pits, white pine woods and a remnant patch of pitch pine/sand plains.

Located along the flanks of the Saw-mill Hills, this area encompasses about 25 acres and is underlain by water-sorted, glacial outwash, laid down during the era of Glacial Lake Hitchcock. For thousands of years, generations of Nonotuck burned this nearly level outwash plain, which kept these sandy barrens open and park-like. When the first English settled here, this landscape was probably dominated by pitch pine,

blueberries, scrub oak, lupine, little bluestems and other species tolerant of fire and the site's tough growing conditions.

The remnant grassland, with an abundance of little bluestem and some young pitch pine seeding in behind.

Beginning in the 1950s, the same droughty, nutrient poor sands that had long discouraged people from growing crops here became a valuable commodity. Over the next three decades, this area became the focus of several large sand and gravel operations. After the sands were exhausted, most of the former gravel pits were converted into house lots or subdivisions, the most recent of which was Avis Circle.

Today, surrounding Avis Circle is one of the few undeveloped patches of glacial outwash sands in this area of Ryan Road. Although all of it was altered in the past (some areas much more than others) there is an acre and a half of open grassland/pitch pine barren and another similarly-sized patch of pitch pine/ white pine and oak forest nearby that is relatively untouched (probably just scraped of its topsoil). The rest of the area is much more altered and it is awash in invasives, including big patches of Japanese knotweed, thickets of Morrow's honeysuckle, swaths of knapweed, tangles of bittersweet, carpets of garlic mustard and increasingly, more and more glossy buckthorn. In some places (like the old borrow

Above, the former gravel pit areas and stormwater detention basin (with Japanese knotweed in the basin) in early spring. Below, the former borrow pit, now with Norway maple, rocks from construction jobs, tangles of bittersweet and increasingly glossy buckthorn. Ecologically, this place is a real mess.

pit), the number of invasive plants is so high that any kind of control effort is doomed to fail. Not only expensive and time consuming, in these areas the benefits are questionable. The only hope in these highly degraded areas is that a series of effective biocontrol agents are discovered.

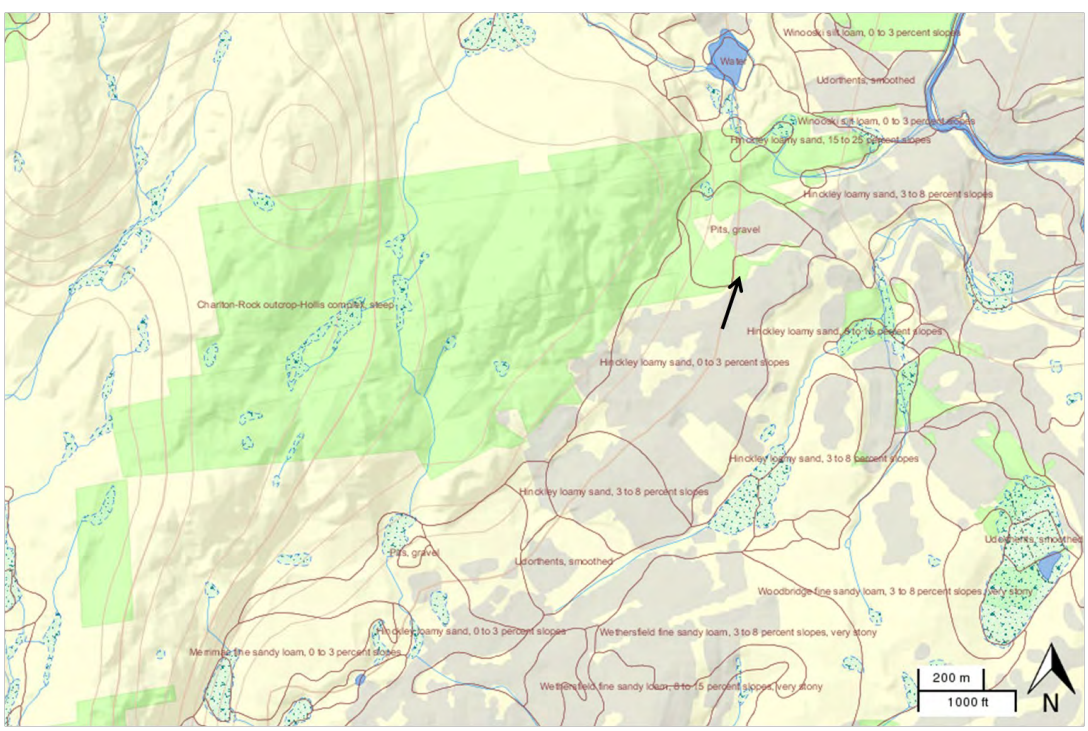
That said, invasive plants should be controlled

(A) Japanese knotweed is widespread and encroaching in the former gravel pit area. (B) In this same area, you can also see an expanding thicket of Morrow's honeysuckle, which is growing beneath black locust, pin cherry and other early colonizers. (C) Knapweed, a pretty but an aggressive invader, has established in and around the remnant grassland/pine barren.

within the three acres that support the remnant grassland/pitch pine barren. Why? Because grassland/pitch pine barrens are one of the rarest habitats in Northampton and also one of the rarest habitat types within Massachusetts and the Connecticut River watershed. In Northampton, this habitat type once covered about 10% of the landscape, but due to development (gravel mining, landfills, cemeteries, and housing, this unusual habitat now covers less than 1% of Northampton.

A number of rare animals depend on grasslands and pine barrens for their survival. Whip-poor-wills, for instance, used to nest in this area as well as in the surrounding uplands. They have not been heard here for several years (Tom Gagnon, pers. comm.). These sand barrens are also important for groundwater recharge. They abut the City's public wellfields and are within a Zone II aquifer.

This image from the 1960s shows multiple gravel operations and subdivisions along Ryan Road.

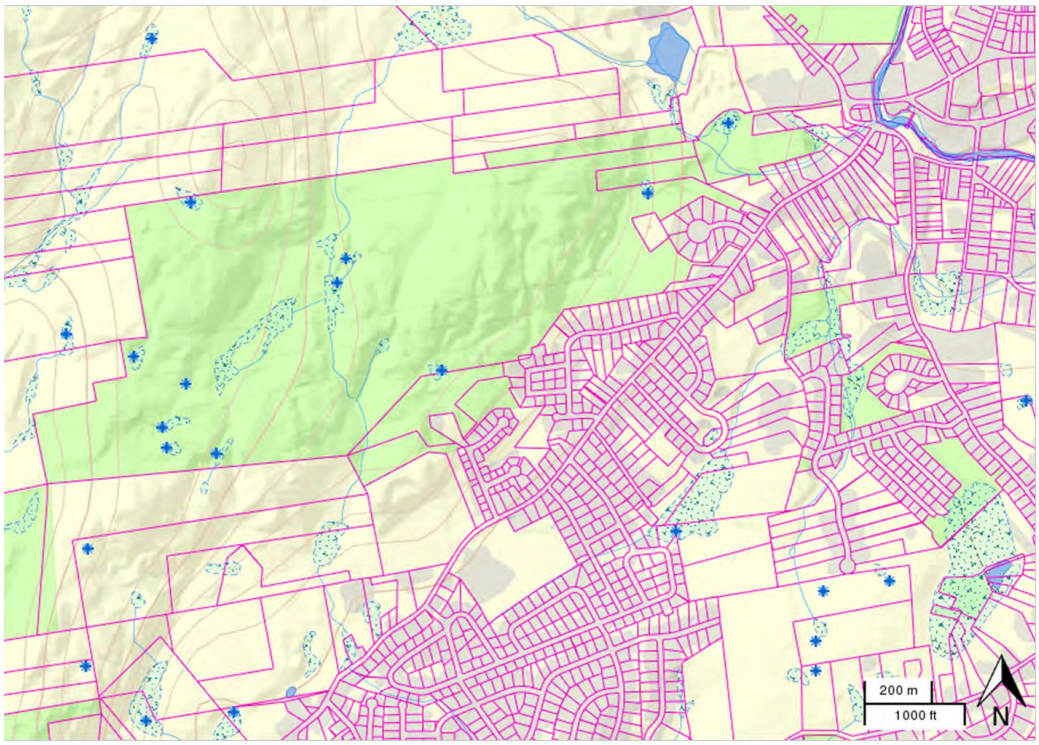


This map from MA GIS shows the outline of the different soil units. Along the flanks of the Sawmill Hills, the outwash plain has developed into Hinckley sandy loams. Gravel pits are also shown. Interestingly, the remnant piece of grassland/sand barren is shown (arrow) just beyond the outline of a gravel pit.

Wetlands

The final component of this conservation area is its wetlands and waterways. As mentioned earlier, although swamp forests, vernal pools and streams account for barely 3% of this 330-acre property, they hold most of the property's biodiversity—both for plants and animals. And here's the other good news about the wetlands: they support almost no invasive plants. There are a few multiflora rose and a few strands of Asiatic bittersweet, but otherwise, they are free of invasive plants. There are some problems with invasives in the wetlands near Spring Street owned by the City's water department and some additional invasions on private land, but on both properties, the adjacent area was disturbed historically, which appears to have made these areas more vulnerable.

A vernal pool in the uplands that is dominated by tupelo, some of which have old growth characteristics. Tupelo, or black gum, is the oldest living tree in the eastern United States.

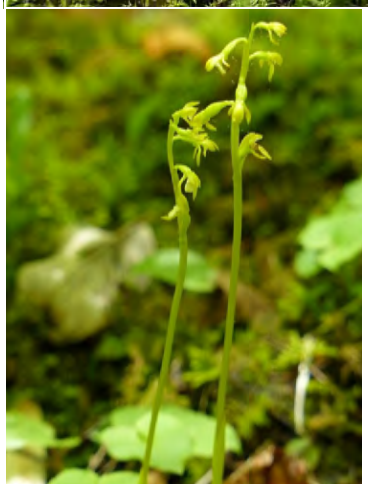


The location of wetlands, streams and vernal pools within this portion of the Sawmill Hills.

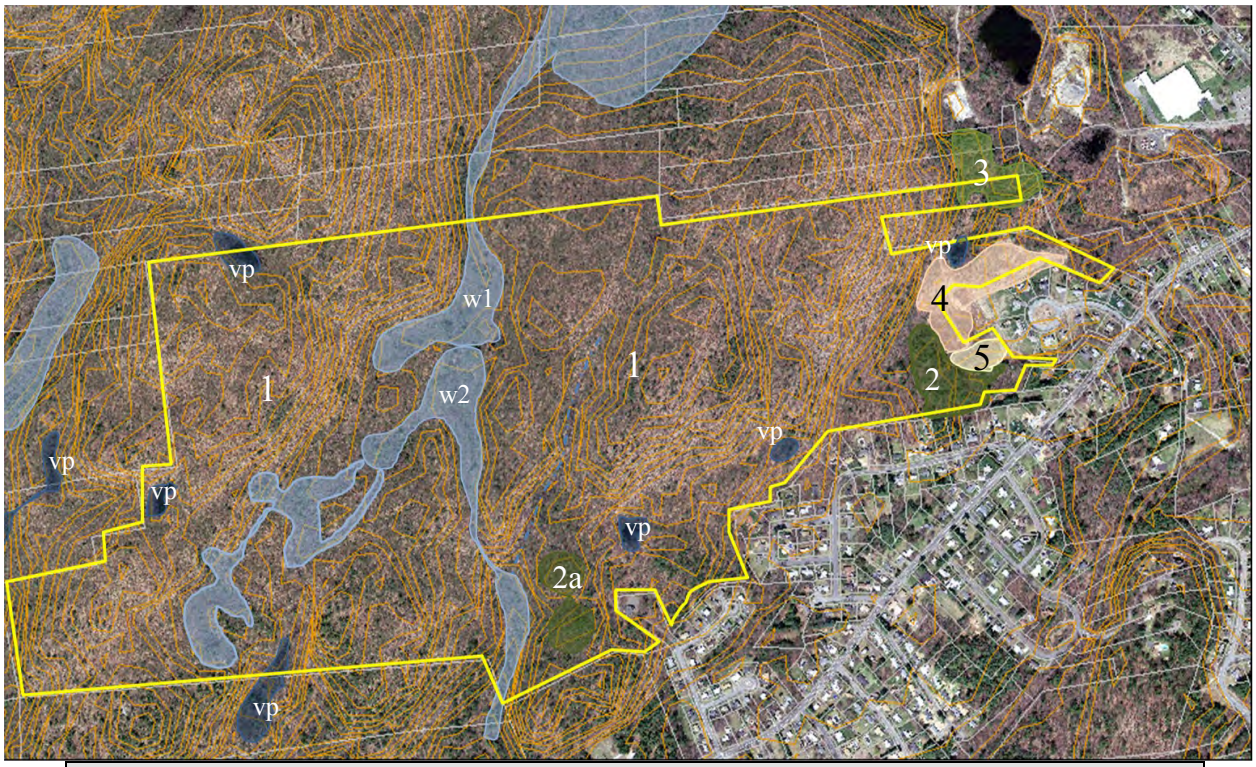
This is the largest vernal pool on the property and measures half an acre when it is full of water. By mid-summer, it is completely dry. It is located in a bedrock depression in the uplands. Note the pin oak, with its craggy branches, in the first image.

Ten vernal pools are found in this 330-acre property, ranging in size from 1/8-1/2 an acre in size. They have all been certified, many by Molly Hale. Each spring students from the RFK Finn school visit some of the pools as part of a unit on ecology.

About 200 acres in the Sawmill Hills drain to Parson's Brook, while the remainder flows into the Mill River.



Many of the vernal pools in this part of the Sawmill Hills are found within the property's swamp forest habitat, which, compared to the surrounding uplands, feels lush and diverse. Many animals, including this red eft and green frog, depend on these areas to survive. Several species of plants, including this uncommon spring coralroot orchid and an unidentified orchid (probably purple fringed) occur in these special habitats as well. The largest swamp forest within this property is only four acres in size.



Vegetation Patterns

Uplands

1: Ridgetop Chestnut Oak Forest and Mixed Oak Forest. Darker background is mountain laurel
2: White pine/pitch pine stand
2a: White pine grove
3: Hemlock-dominated stand
4: Former gravel pits, highly altered and highly compromised by invasive plants
5: Remnant sand grassland/pitch pine barren

Wetlands

w1: Perched swamp forest, with vernal pools, draining to the Mill River
w2: Perched swamp forest, with vernal pools, draining to Parson's Brook
vp: isolated vernal pools

Although most of the soils in this section of the Sawmill Hills are dry and acidic, there are a few small areas with richer, more fertile soils. Where these conditions exist, you can find leatherwood, perfoliate bellwort, wild columbine and a handful of other plant species that only grow in these settings.

Recommendations

- Control invasive plants within the sandplains/pitch pine barrens and consider a very small, controlled burn in the former grassland area, mechanical mowing...or goats?

- More clearly identify trailheads and parking areas and develop a map/ brochure that shows access points

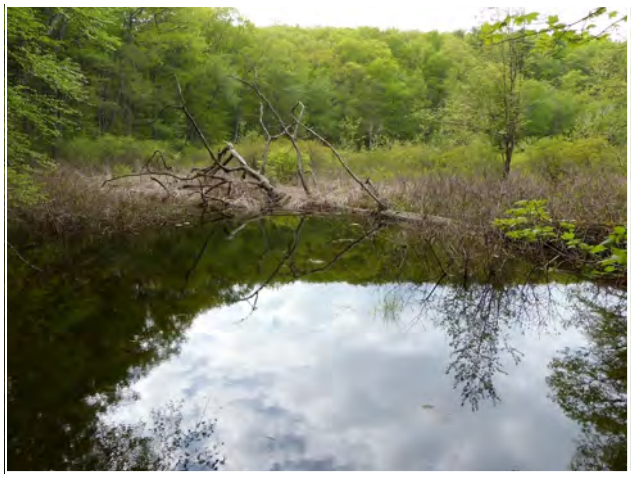
- Repair the few places where the trails are muddy or require bridges for stream crossings

- Work with neighboring groups and abutters to promote passive use of this area and prevent the dumping of yard waste

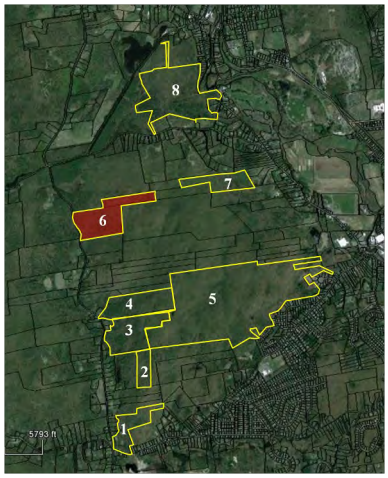
- Acquire additional land in and around this area

One of the few places where ATVs have muddied the trail.

Yard waste, courtesy of a neighbor.

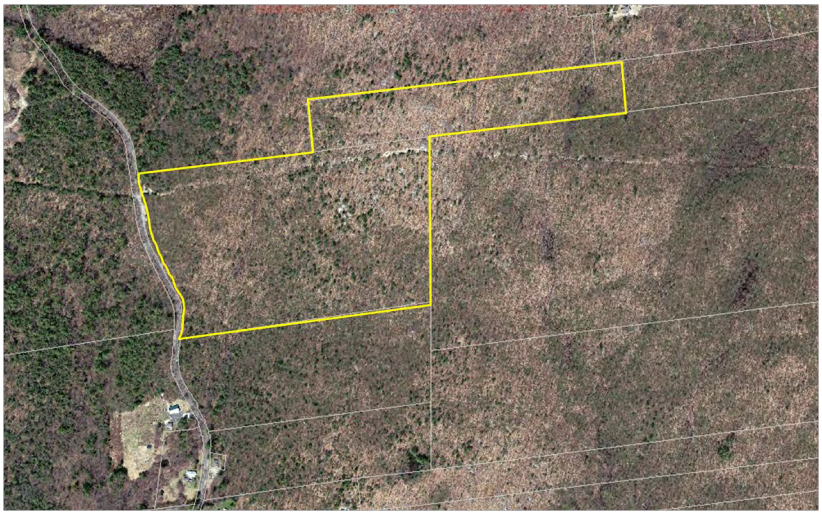


An impressive kettlehole to the west on private land and bordered on one side by impressive cliffs and boulders.



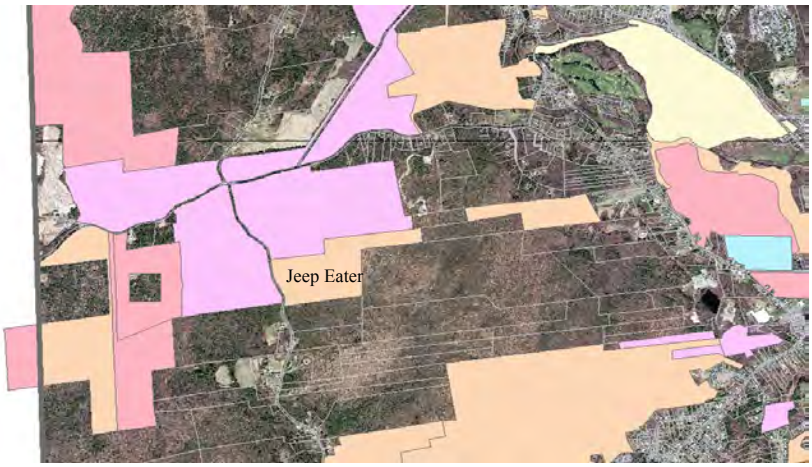
Conservation Parcel 6: "Jeep Eater Trail"

The majority of this 61-acre parcel is dominated by steep, forested slopes and rocky uplands. Mountain laurel, oaks, and bare rock are the norm, but the property also includes two small wetland areas, one of which is an uncertified vernal pool and the other is the headwaters and tributary to Parson's Brook. As a conservation property, it is a pretty place and from the highest ridge, the views to the west, especially at sunset, are impressive. But most people who visit this conservation area aren't interested in hiking or the views or nature. For them, the main attraction is the steep, rocky right-of-way that once held telephone and telegraph wires. Why? Because that rigorous route is now one of the most popular places for off-road, 4 x 4 enthusiasts to crawl up (or down).



The Jeep Eater Trail, popular with off-road vehicle enthusiasts, can be seen in this photo as a thin thread running east-west through the parcel, outlined in yellow.

The popularity of the former telephone and telegraph line as an assault challenge for off-road enthusiasts began more than twenty years ago. In fact, the trail's use was so much a part of this property's reputation that when the trail and land were proposed for conservation land in 2007, a stipulating provision was that off-road vehicles would be allowed to use the old ROW.



The Jeep Eater parcel connects to watershed land (pink) to the north and west, which connects to additional protected land, either under conservation restriction (light red) or owned outright and held as conservation land (light orange).

For many of us, off-road use may seem incompatible with conservation land, but the 4 x 4 community has taken remarkably good care of the R.O.W. and property ever since. Trash, for instance, is rarely left behind, either in the parking area on Sylvester Road or anywhere in the conservation area, and broken car parts are typically retrieved. What's more, the drivers have by and large stuck to the existing right of way and not created alternate routes through the adjacent natural area. True, some additional alteration has occurred at the summit, but this appears to be the result of accommodating multiple vehicles rather than intentionally damaging the landscape. Erosion, which you might imagine would be a serious problem, is not such a big deal—at least not any longer. With the exception of one large puddle, most of the route has been so heavily used over the years that most of it is now bare rock or gravel.

A small trail, used by walkers and mountain bikers, leads to the top of the conservation area.

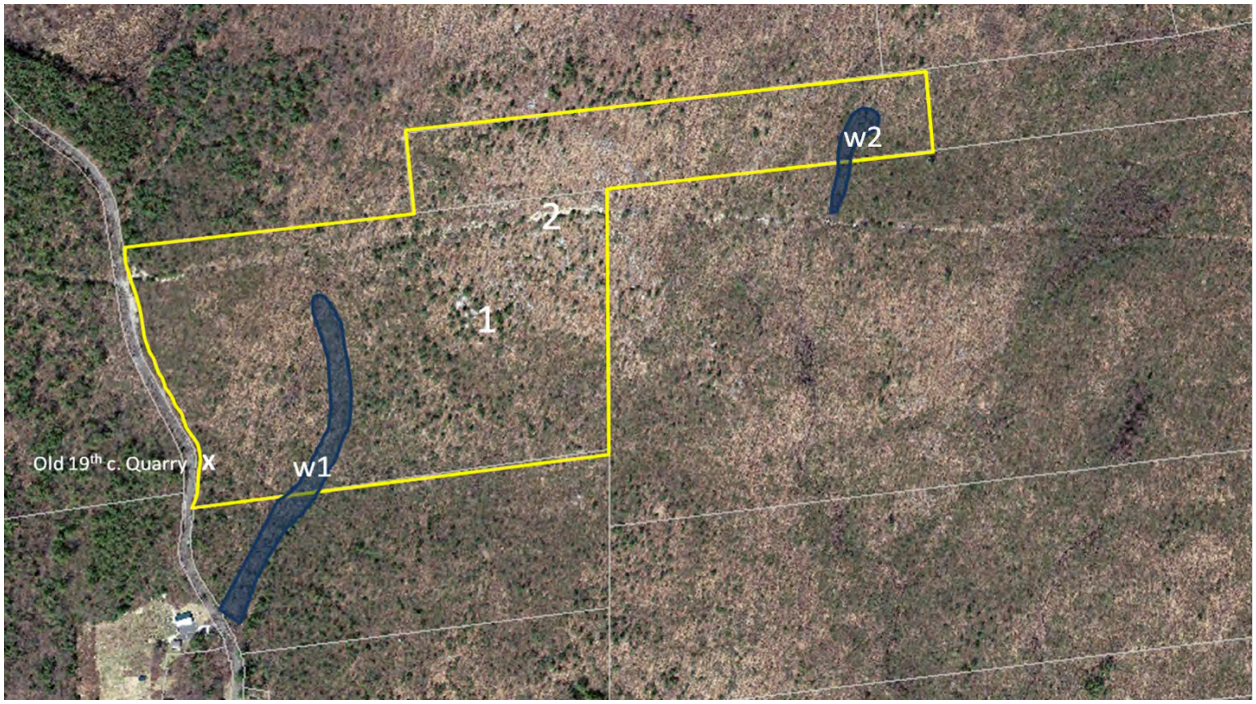
If off-roading isn't your thing, this piece of conservation land offers other opportunities. For walkers and mountain bikers, there are a few other trails besides the main ROW. Of the footpaths, one begins partway along the former telephone and telegraph line, and more-or-less parallels the ROW and leads to the summit, where two other trails can be found. One leads north and is an informal and hard-to-spot path that was made and maintained by mountain bikers; it extends into City-owned watershed land and ultimately emerges at the intersection of Chesterfield Road and Reservoir Road. The other trail heads to the south, is better defined and links up with the much more extensive network of trails that thread throughout much of the Sawmill Hills.

A large puddle in the ROW. It is sometimes used by spotted salamanders and wood frogs as a breeding pond, and for them, it is a black hole. No offspring will emerge as it dries up too quickly.

Aside from trail maintenance and upkeep, there are almost no other stewardship and maintenance issues at this site. Roadside dumping of yard waste and landscape clippings is a concern on the adjacent proper-

ties, both to the north and south along Sylvester Road. But invasive plants, which are such a problem in so many areas of Northampton are almost entirely absent. A few multiflora rose were found in the wetland swale closest to Sylvester Road, but aside from those, no other non-native, invasive plants were found within the property.

Although most of the old telephone line is now bare rock, there are areas along the margin where bare soil is exposed. This image reveals just how thin the till layer is in many areas of the Sawmill Hills.



Vegetation Patterns

1: Oak-hardwood dominated forests, with chestnut oak on the highest ridges and red oak dominating the lower slopes. The blush of gray-green that can be seen on the slopes is mountain laurel. The brighter green vegetation is white pine.

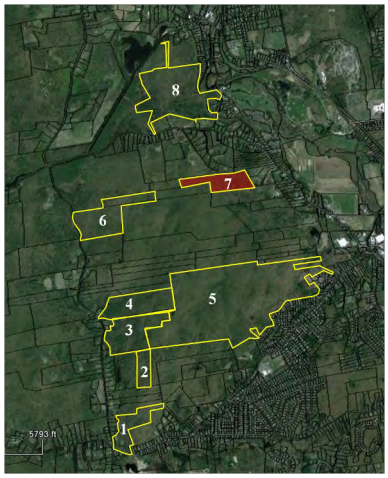
2: The old telephone/telegraph right of way. Only the portion within the conservation area is used by off-road vehicles. To the east, the grade is too steep and dangerous.

W1: A forested, headwater wetland between two higher ridges. This is the only place where a few small multiflora rose were found.

W2: A vernal pool, with breeding spotted salamanders and wood frogs.

(A) A glacial erratic perched on the edge of a rock outcrop, looking west toward Westhampton. (B) Exposures of metamorphic rock are abundant in the higher elevations . (C) Just below the summit the slopes are covered with huckleberry, low blueberry, grasses and lichens. White pine and chestnut oak dominate the canopy. (D) Where there is slightly more moisture, many of the rocks are covered with mosses. (E) This rock makes for tough living conditions for this black birch, which may be more than 100 years old. (F) Bare rock characterizes the summit. (G) An abundance of gray birch on the adjacent watershed land reveals that it had been heavily logged or burned forty (or so) years ago when these seeds of these birches were able to germinate.

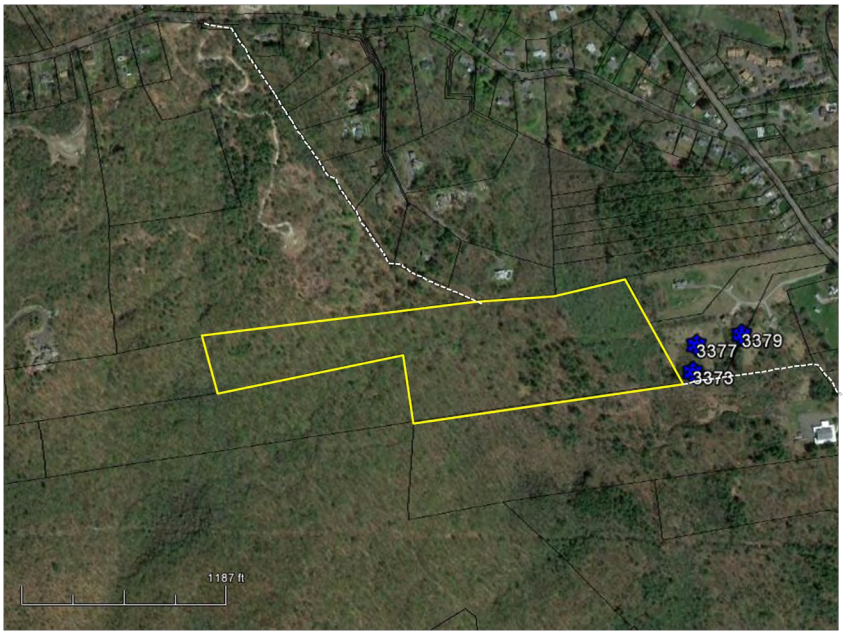
(A) A view of the forested headwater wetland near Sylvester Road.
(B) The vernal pool is surrounded by black gum, mountain laurel and witch hazel, with high bush blueberry and winterberry on the higher hummocks.
(C) A typical patch of woods within the conservation area includes mostly oak, but also white pine, red maple, black birch and scattered hemlock. Witch hazel, mountain laurel, maple-leaved viburnum, huckleberries and low blueberries are common. Herbs include wild sarsaparilla, spotted wintergreen, partridgeberry, and trailing arbutus. Bracken is common along the roadside.
(D) Low blueberries and huckleberries form an opening near the summit, which looks southwest across the Mineral Hills.
(E) A rocky jumble and den site for porcupines occurs just above the vernal pool.
(F) Although plant diversity is low overall, one of the orchids that occurs here is Rattlesnake Plantain, which is easily recognized by its patterned whorl of basal leaves.



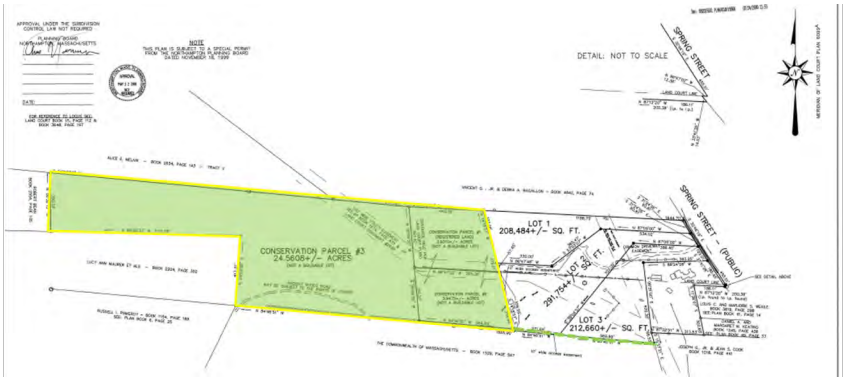
Conservation Parcel 7: Formerly Spring Meadow Subdivision

Set aside in 2000 as part of a 4-lot subdivision, these 31+/- acres include an interesting mix of uplands and wetlands, and although the land boasts an elaborate network of trails—plus connects to the broader trail system in the Sawmill Hills, it remains, fifteen years after its creation, unknown to most people. Why? Because access, parking and putting up a sign isn't simple.

A conservation area sign, for instance, isn't really an option as this entire property is essentially back land, located behind private homes and away from any public road. Similarly, the property's two access points aren't so easy to mark. One begins on Chesterfield Road and follows a now-abandoned electric line easement, but it has no real path, no easy parking, and is a half a mile away from rest of the conservation land. The other access point is easier in many respects. Not only is it closer to the conservation area, it also has a well-defined path. The trouble is that unless you find it, you'd never know about it. To get there, you have to park along the roadside edge near the end of

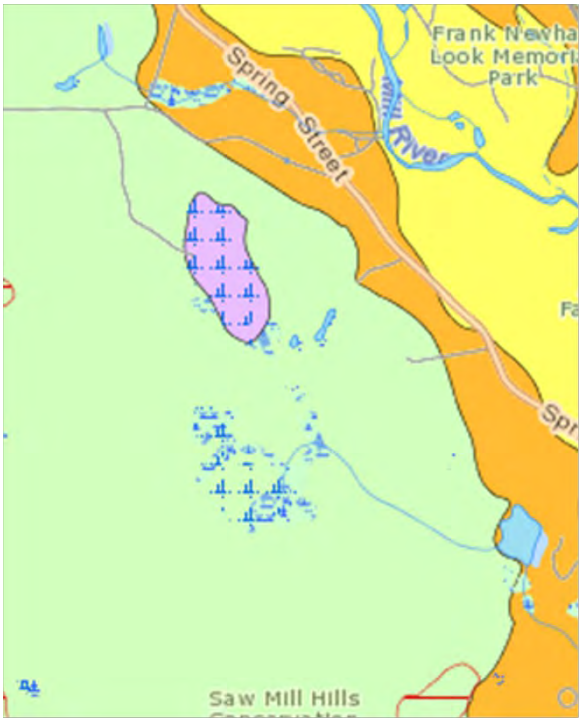


The conservation property, showing the boundary in yellow, the two access routes (white dashes) and three certified vernal pools. Note the two new homes, north and west of the property. The National Guard owns the adjacent land to the south; its building can be seen on the edge of this image.



The subdivision plan, showing the conservation land and the 10-foot access path (green line), was approved in 2000.

The approximate location of the property, in proximity to glacial Lake Hitchcock (*greenish*) and upland areas (*gray/white*).

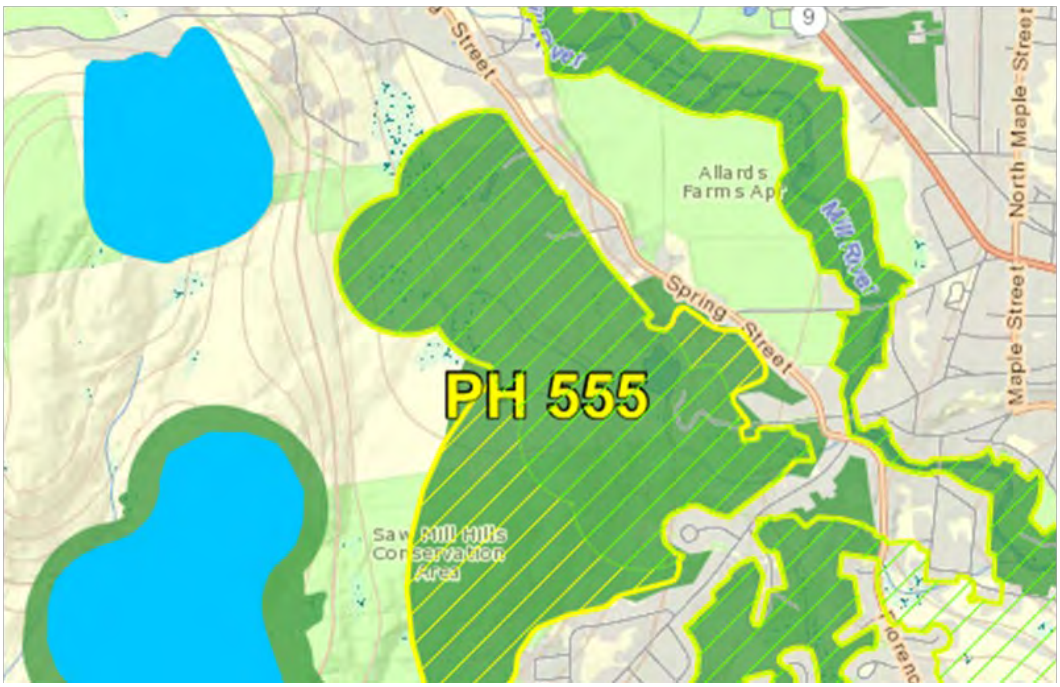


This surficial geology map shows the former bog/wetland (*pink*) surrounded by till (*light green*). To the east, the orange area along Spring Street represents water-sorted sands and gravels. Yellow along the Mill River is recent river deposits.

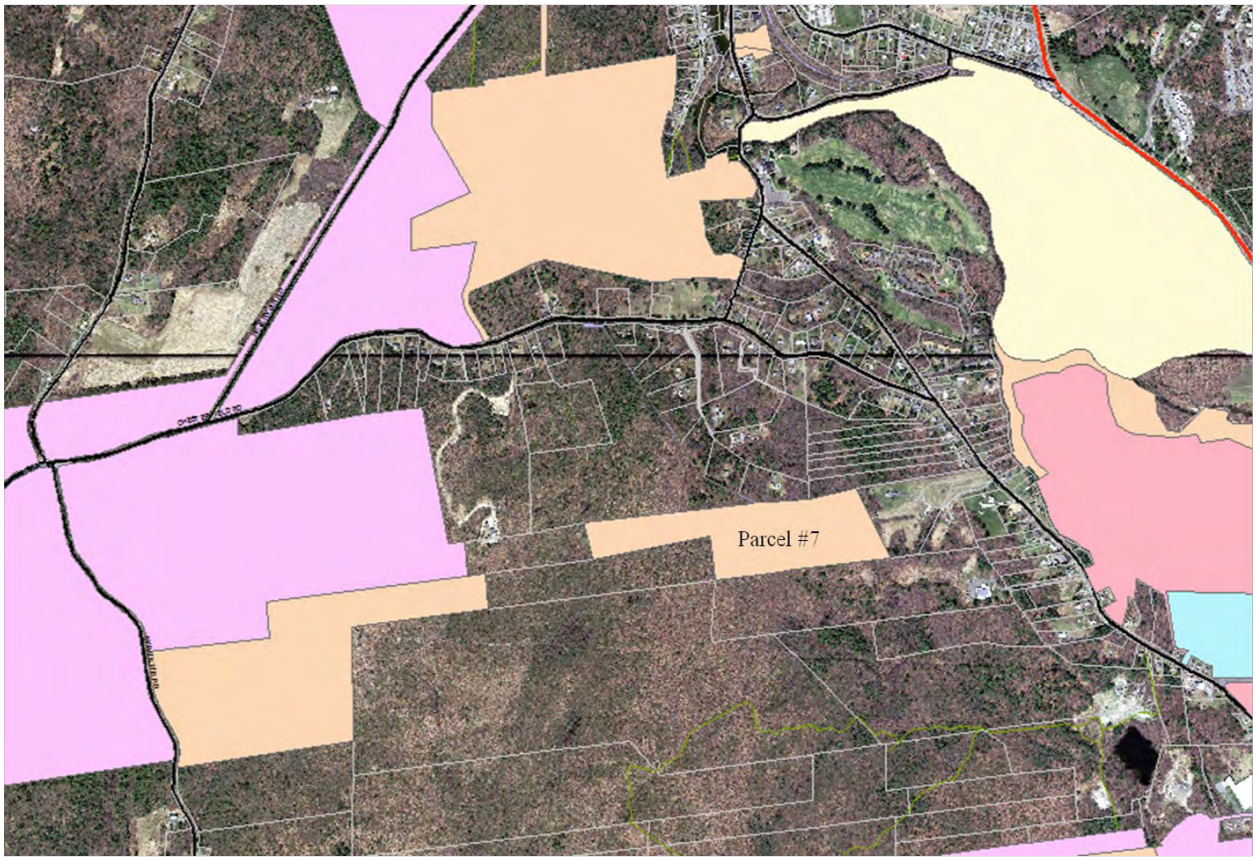
Colonel Lavallee Lane (not a dead end road that few people take) and then head north along the chain link fence line that marks the boundary of the National Guard property. At the end of the National Guard land, you cross an old farm fence and reach the southern boundary of the Spring Meadow subdivision and the beginning of a ten foot public access path. It is not marked at this point either, but the path is clearly visible.

A view of the long, large kettlehole along the trail to the conservation area. This groundwater-fed wetland is a certified vernal pool.

From this point, the level path proceeds due west along the back border of the house lots. The path passes two of the subdivision's three certified vernal pools, all of which are old kettlehole ponds that were formed when blocks of ice were stranded and then buried during the era of glacial lake



Although no rare species were found during this survey, a portion of this conservation area falls within the Priority Habitat for a rare species, according to MA NHESP.



This conservation area is currently isolated, but is linked to other properties through the vast trail network that criss-crosses the Sawmill Hills. Much of that trail system remains unmapped, a portion of it (yellow/green squiggles) is shown in this image.

The view of the property in 1965 shows the prominent electric line angling through the property. The dark blotch near the center, just north of the electric line, is the former bog, now drained. A long, linear vernal pool/kettle hole is obvious in the open field.

Hitchcock. At that time, about 15,000-12,000 years ago, this level landscape was a sandy outwash plain and beach. In this section of Florence, the shoreline of Glacial Lake Hitchcock would have been (more or less) where the upper portion of Spring Street is now.

A view of the former bog, now red maple swamp. It is possible that a few cranberries still occur in the sphagnum hummocks.

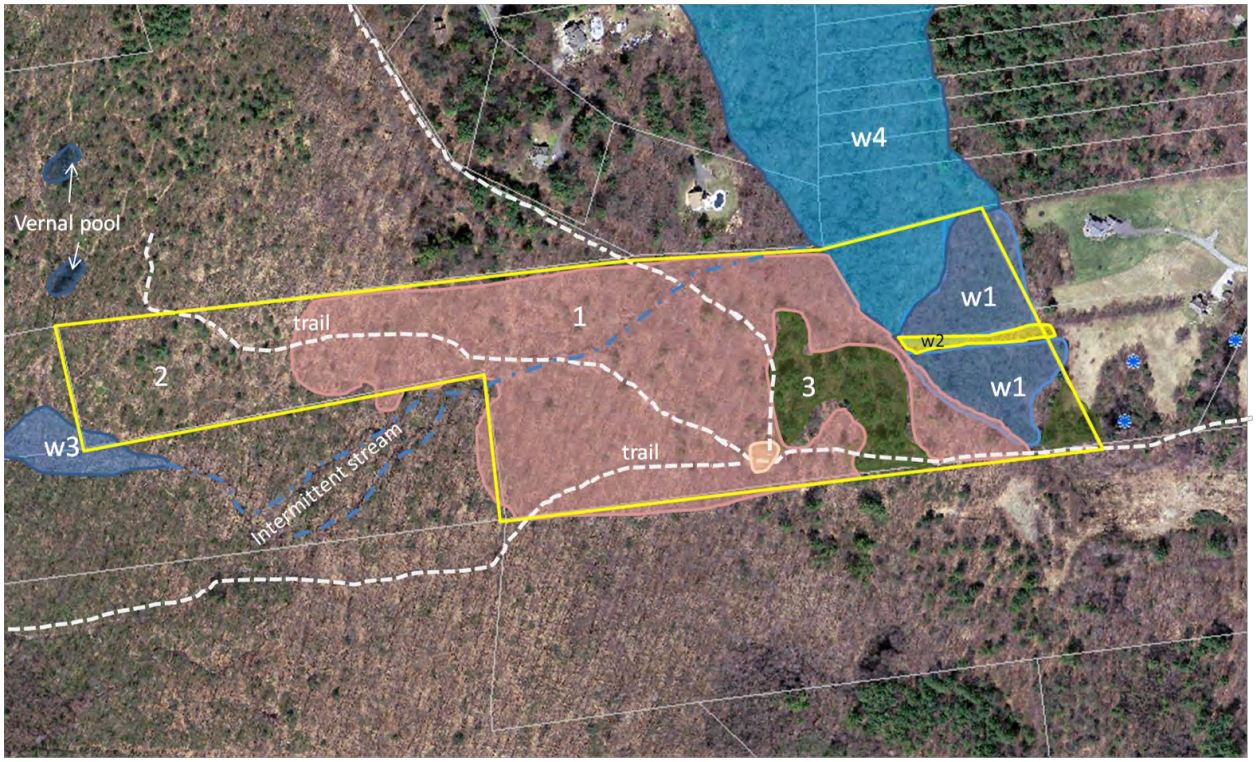
The conservation area begins ~850 feet further, and although its boundary isn't marked, it is easy to figure out because of the topographic break and the beginning of a large wetland. Although now a red maple dominated swamp, this area was historically a bog with cranberries, sphagnum moss and undoubtedly other bog species (Fred Morrison, pers. comm.). Sometime during the last 200 years, the bog was ditched, possibly to harvest "peat" and "muck," which were popular soil additives during the 19th century and probably to drain it.

West of the 5-acre wetland, the uplands begin and for about 1,500 feet, the land climbs gradually. The forest here is generally young and it is laced with a complicated and confusing network of trails, some of

(A) The eastern edge of the conservation area is 5-acre red maple swamp, with a lush understory of skunk cabbage, sensitive fern, golden saxifrage, high bush blueberry and many other species. (B) The swamp is divided by the old electric right of way, which is still open and dominated by *Carex riparius*, skunk cabbage, sensitive fern, meadowsweet and cattail.

(C) The forest on the western side of the wetland was heavily cut and is now resprouting with loads of ironwood and witch hazel. Canada mayflower is common in the understory. (D) A small clearing and an intersection point for several trails.

(E) The old electric line is now growing up into a mix of red maple, birch and other species—including tulip tree, a species that is uncommon in Northampton, but regularly observed in the Sawmill Hills (F) A cut-off utility pole in the foreground of the electric easement. First installed in 1918, it was expanded in 1937 and 1970. The current width of the easement is 100 feet.



Vegetation Patterns & Trails

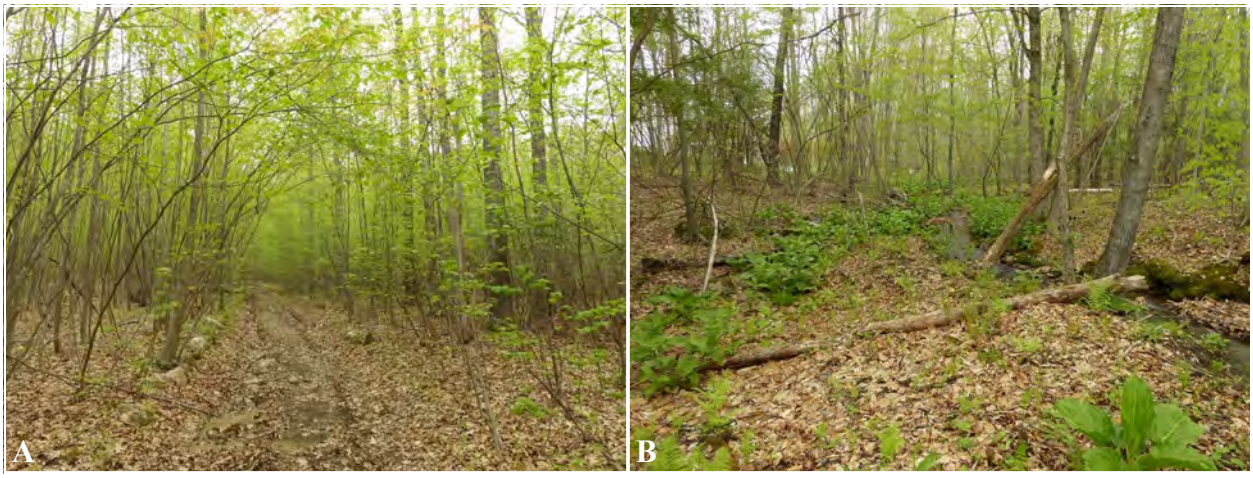
1: Cut-over forest, with red maple, ironwood, gray birch, black birch, shagbark hickory, red oaks, scattered hemlock
2: Red oak dominated canopy with an abundance of mountain laurel in the understory
3: White pine stands

W1: Red maple swamp with skunk cabbage, cinnamon fern, sensitive fern, highbush blueberry, and yellow birch
W2: Old electric easement, cleared and open. Skunk cabbage, meadowsweet, skunk cabbage, sensitive fern, sedges, grasses
W3: Swamp forest, with red maple, tulip trees, red oak, witch hazel, mountain laurel, dwarf ginseng, interrupted fern, sphagnum, winterberry, etc.
W4: Former bog, now ditched and drained. Beavers were active here in 2014.

which were created by the National Guard (which used to use the property) and others that were made during a logging job that took place sometime during the last twenty (or so) years.

The till soils in this section are slightly more fertile than in many parts of the Sawmill Hills, so that in addition to oaks in the uplands, there is an abundance of ironwood, shagbark hickory and black birch. Red maple is also common and so is white pine. Hemlocks are scattered and there is also a small but healthy stand of beech.

Two small, intermittent streams cross the property and their borders also reveal the sweeter soils. Their mossy borders support a rich mix of hellebore, common toothwort, yellow violets, dwarf ginseng, wood anemone and New York fern.



(A) A logging road through the heavily cutover and now resprouting forest. Witch hazel is very common in this part of the forest. (B) The intermittent stream drains into the former bog, but first flows behind the homes on Shepherd's Hollow Road. A mix of false hellebore, skunk cabbage, ferns and many other wildflowers grow along its banks.

(C) A clone of American beech, a relatively uncommon species in Northampton, occurs on the property. Even more unusual, it is unblemished by the non-native fungus known as beech bark disease. (D) Common toothwort, a member of the mustard family, is an indicator of richer, more fertile soils and can be found growing along the intermittent stream channels.

(E) Wood roads and trails lace this conservation area. (F) At the western edge of the property, the slopes are steep, bedrock is close to or at the surface, and the thin soils support a mix of oak, hemlock, birch and lots of mountain laurel. The elevation change within the conservation area is about 230 feet, from 340' to 570' above sea level.

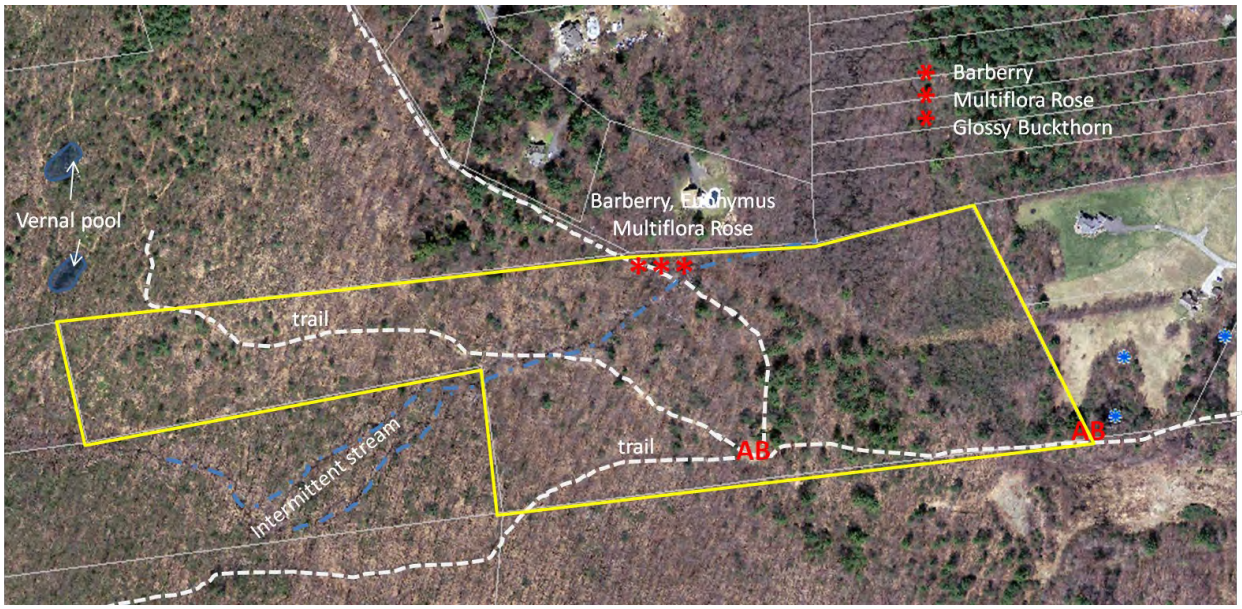
Beyond the stream, the land begins to rise more quickly and at the western end, the steepest slopes have gradients of 25-35%. In this section the forest is dominated by red oak, with extensive thickets of mountain laurel. Young chestnut oak and red maple can also be found here, along with striped maple and some impressive rocky jumbles. This is the habitat for rufous-sided towhees, wood thrushes, and scarlet tanagers.

Water sheets across the forested wetland, which includes some impressive tulip trees, including one that appears to have old growth bark characteristics.

The property's southwestern corner touches the edge of a forested wetland that forms the headwaters of the small streams that eventually cross the conservation area and empty into the former bog, now a red maple swamp.

Invasive Plants

Within this conservation area, like so much of the Sawmill Hills, invasive plants are few and far between. At present, there is a small amount of Asiatic bittersweet in two locations (see map) and a few barberry, multiflora rose and euonymus occur in an upland clearing on the old electric line, but the up-



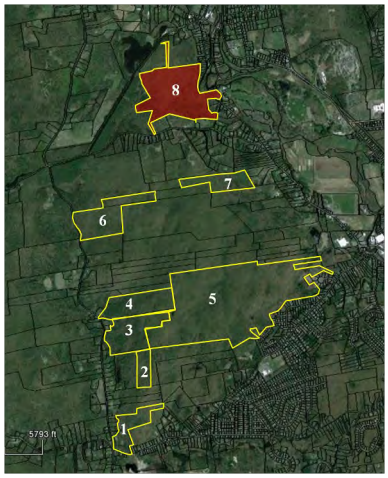
The locations of invasive plants on the property and along a drainage ditch off-site with AB representing bittersweet. Much more bittersweet occurs in the abandoned gravel pits on the National Guard property to the south.

lands are otherwise free of invasive plants—even in the areas that were logged.

More concerning is the presence of invasive plants on the surrounding properties. Young Asiatic bittersweet is fairly widespread on the National Guard land and the edges of the former bog have also been invaded by multiflora rose, Japanese barberry, and glossy buckthorn. There is also an increasing amount of Japanese knotweed on the stream that drains this wetland and crosses Chesterfield Road.

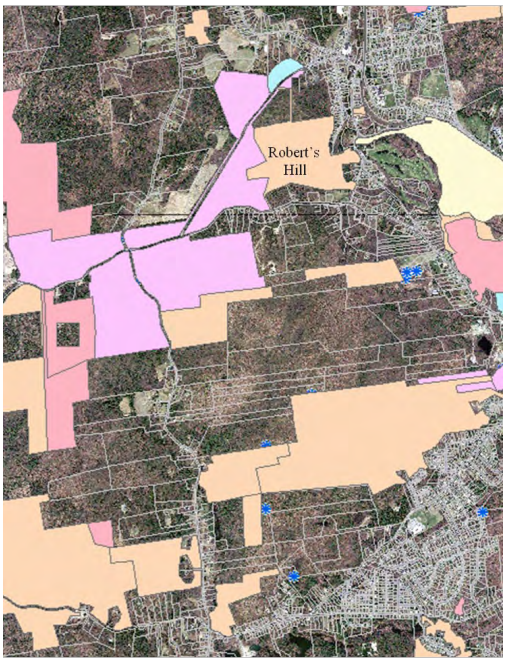
Recommendations

- Control invasive plants in the few locations, possibly by working with the Spring Meadow Homeowners Association, National Guard and/or other neighbors, and try to encourage additional control of invasives at abutting properties
- Create a trails map
- Acquire/negotiate permission for trail use of nearby properties
- Install public access signs on Colonel Lavallee Lane, Spring Meadow subdivision/National Guard fence boundary and at the beginning of conservation land
- Remove barbed wire coils (*photo*), presumably installed by the National Guard. At least two coils were found in the forest.



Conservation Parcel 8: Roberts Hill Conservation Area

When I first inventoried Roberts Hill in 1993, it was one of the largest conservation areas in Northampton, and its 104 acres represented about 13% of the City's total conservation holdings. Today, twenty-odd years later, the City conservation portfolio has grown so much that Roberts Hill now accounts for only 4% of the total. And what's more, rather than being the sole representative of the Sawmill Hills, it is now one of nearly twenty parcels that have been protected within this large block of land.



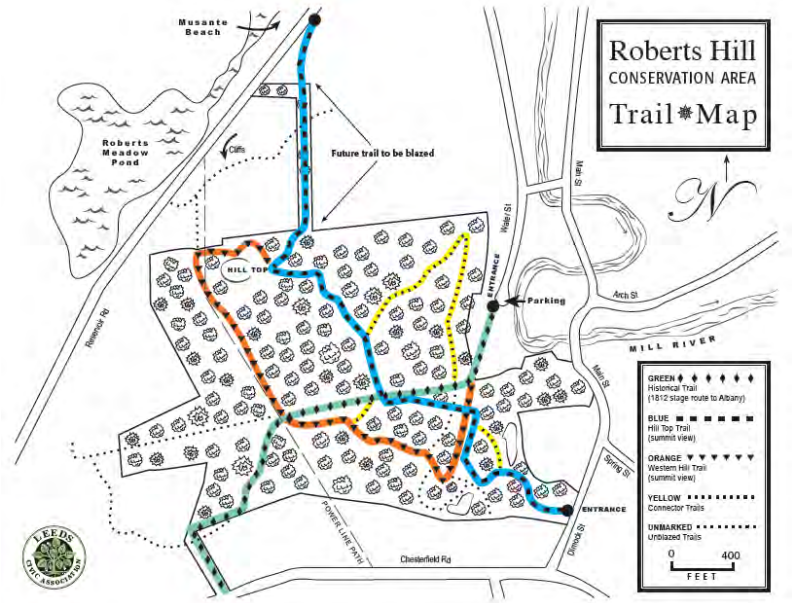
Although the Robert's Hill Conservation Area lies outside of any estimated rare species habitat, but it does play an important role for wildlife — especially for forest dependent species. Its value is enhanced by its location next to several hundred acres of City-owned watershed land and nearly a thousand acres of conservation land to the south in the Saw Mill Hills.

Those changes in its acreage ranking, however, don't diminish the value of the Roberts Hill as a conservation area. If anything, its value—especially to local residents—has probably increased during the last twenty years as more people have "discovered" this local natural area.

More visitors is just one of the important changes that have taken place at Roberts Hill. In terms of stewardship and maintenance, over the last twenty years the dam at Howard's Ice Pond was repaired, and the Leeds Civic Association continued hosting annual clean-ups and trail maintenance days. In additions, volunteers certified one of its vernal pools and opened the view from lookout on the highest knob.

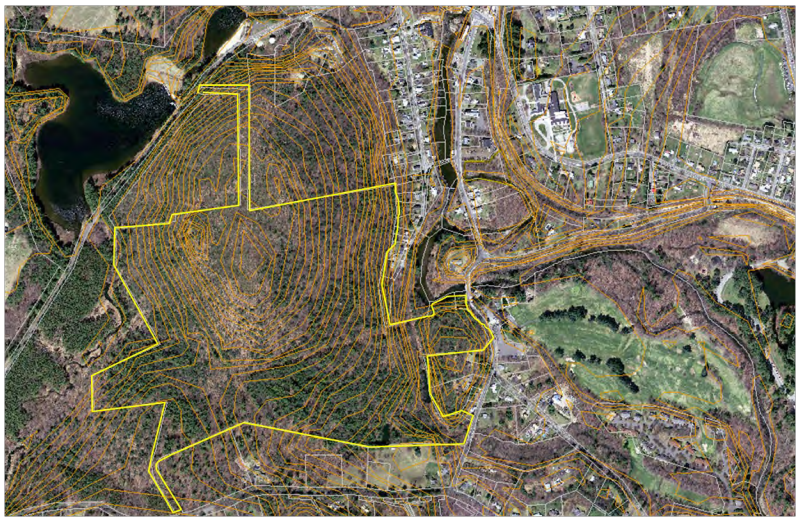
One of the city's first conservation areas, Roberts Hill boasts an elaborate trail network, access to the Mill River, an historic ice pond, a variety of habitats and this impressive view.

In terms of the ecology of Roberts Hill, one of the biggest positive changes has been demise of the gypsy moth. After nearly seven decades of gypsy moth outbreaks, the conservation area's oak-dominated forests are no longer threatened by this non-native pest, which has fallen victim to another non-native pathogen, in this case a fungus that kills only gypsy moth caterpillars. Sometime during the 1990s the fungus spread into the Connecticut River Valley and almost immediately, it almost wiped out the gypsy moth population. Today, the fungus keeps the gypsy moth's population at low numbers—at Roberts Hill and everywhere else in our region.



In 2014, thanks to the work of Leeds resident Dave Litterer, visitors to Roberts Hill will find it much easier to find their way on the trails. In collaboration with the Leeds Civic Association, Litterer blazed and color-coded the property's trails, GPS'd their locations and created this trails map, which is available at *http://www.leedscivic.org/wp-content/uploads/2014/04/Roberts-Hill-Map-Color.pdf.* This is a welcome change as the trail network was previously remarkably confusing!

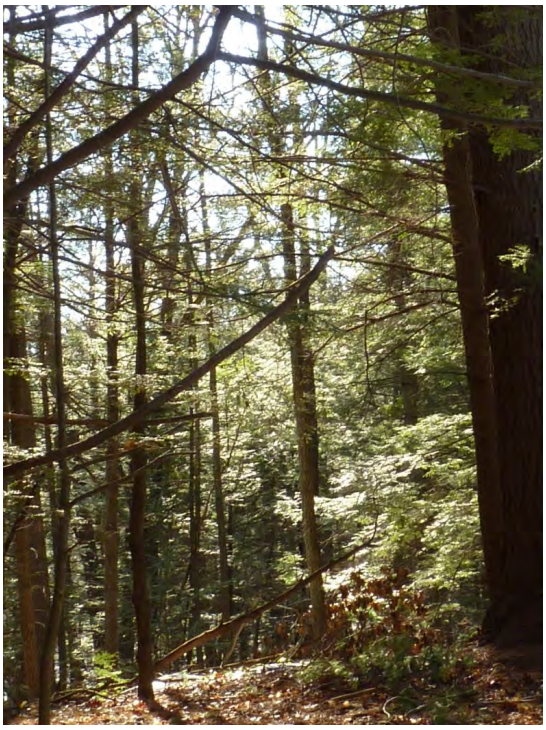
Although not quite a positive, another piece of good news is that—relative to many other conservation areas—invasive, non-native plants are only a minor issue at Roberts Hill. At this point, they are entirely absent from the conservation area's interior and where they do occur, they are in low numbers. So far, invasive plants have been found in just four places, all of which were altered in the past. The two "worst" invasions are along Dimock Street: along the trail/sewer line, you can



Named in honor of Robert Lyman, the name Roberts Hill is now limited to this single knob, but in the early 1800s, all of what we now call the Sawmill Hills was known on the map as Roberts Hills. Lyman was one of Northampton's earliest settlers, a perpetual wanderer and hunter and the one who found the deposits that would become the lead mines in Southampton. The elevation contours on this image reveal how steep much of this conservation area is; at its highest point, it measures 581 feet above sea level.

find privet, multiflora rose, Japanese barberry, Morrow's honeysuckle, and catalpa and up the street, near an old foundation, you can find Norway maple, garlic mustard, winged euonymus, Japanese and Asiatic bittersweet. The other two spots with invasive plants are along the edge of the old ice pond, where a few glossy buckthorn and Asiatic bittersweet have seeded in, and along the edge of the Mill River, where both bittersweet and Catalpa occur.

The last big change at Roberts Hill is a negative. This conservation area, like everywhere else in Northampton, has become invaded by hemlock woolly adelgids. What were healthy hemlock stands in 1993 are now thin and dying.



Ecologists predict that all of the hemlock trees in our area will die out within the next few decades, primarily because of hemlock woolly adelgid. This grove on Roberts Hill will probably be replaced by birch and other hardwoods, but how the loss of such a major species will affect our region's ecology is uncertain.

Vegetation Patterns

Although the hemlocks are dying, they are still alive and the habitat patterns that were described in 1993 at Roberts Hill are still, in the absence of fire, logging, or major wind storms, by and large the same. In the uplands, the drier, rockier sites are still dominated by chestnut oak, while the lower, moister slopes are covered with a mix of oaks (red, white, black and even some scarlet), white pine, hemlock and other hardwoods (e.g. red maple, hickory, black birch, sassafras, ash, tulip tree). The stands of white pine that colonized the former pastures are still healthy, and the hemlocks still cover the steep, rockier hillsides and the wetter hollows and ravines.

Roberts Hill is underlain by thick-bedded gneisses and mica schists. This is the view from the lookout, which takes in the hills in Williamsburg.

In the 1950s, Roberts Hill was mostly forested, but cut by two powerlines and sewerline. The scar from the road that once connected Water Street to Chesterfield Road is clearly visible along the slope, and there are two good sized areas of open pasture, one to the north of the east-west powerline and the other on the flat land near Howard's Ice Pond. The Howard family lived in the house on the corner of Dimock and Chesterfield Roads. Fred Howard was working in the button mill when the 1874 flood struck and his letters to his brother describing the flood were found in the attic decades later. They have been used by historians ever since.

Vegetation Patterns on Roberts Hill

1: Oak-dominated forest, with an abundance of mountain laurel and witch hazel in the understory. Red maple, black birch, white pine, hemlock and scattered sassafras. On highest, driest areas grow low blueberry, huckleberry, bracken and cowwheat. In areas with deeper soils, Canada mayflower, partridgeberry, wintergreen, and wild sarsaparilla. Near the southern powerline, the lower flanks of the hill were cleared pasture.
2: Logged in 1987, this slope includes a mix of hemlock, oak, black birch and scattered shagbark hickory.
3: A former pasture, this area has grown into mostly white pine, with a scattering of oaks, their branching architecture proof that they grew in an open field. A road connecting Chesterfield Road to Water Street in Leeds once cut through here.
4: Moister, more gradual slope dominated by a mix of hemlock and pine, with hardwoods and an abundance of mountain laurel.
5: Steep slope of mixed hardwoods, hemlock and pine
6: Former house site and a richer slope that includes sugar maple, a very large butternut, and a few big tulip trees. Several invasive plants (garlic mustard, Norway maple, winged euonymus, etc.) occur here as well.

W1: "Muck hole"
W2: Howard's Ice Pond, note the large tulip tree nearby as well some invasives
W3: Swamp forest, dominated by hemlock and red maple
W4: Certified vernal pool in small, historic quarry
W5: Low swale and potential vernal pool

Sewerline/water line easement: This dates back to the 1870s. Portions along the path have several invasive plants. The vegetation along the stream side is richer and more fertile than elsewhere in the conservation area.
Powerline easements: Although historically open and altered, the powerline ROWs do not support any invasive plants. They are now a mix of hardwoods and along the north-south ROW, there is an abundance of mountain laurel.

(A) A view of the lower pond that is used in the winter for skating. In the foreground, the top of a sewer manhole cover is visible at the edge of the leaves. (B) White spermatophores—or packets of sperm—left by male spotted salamanders on the bottom of the pond, which is also used by spring peepers, wood frogs, gray tree frogs, green frogs, pickerel frogs and red-spotted newts.

(C) A view of a typical patch of woods at Roberts Hill includes a mix of oak, pine, hemlock, and a variety of hardwoods above a thicket of mountain laurel. (D) Jumbles of rock and rock outcrops are common at Roberts Hill.

(E) The stream that flows out of the former ice pond. (F) About 25 acres of pine and 25 acres of hemlock cover Roberts Hill. (G) American chestnut was once a prominent component in the canopy at Roberts Hill and many young saplings can still be found here.

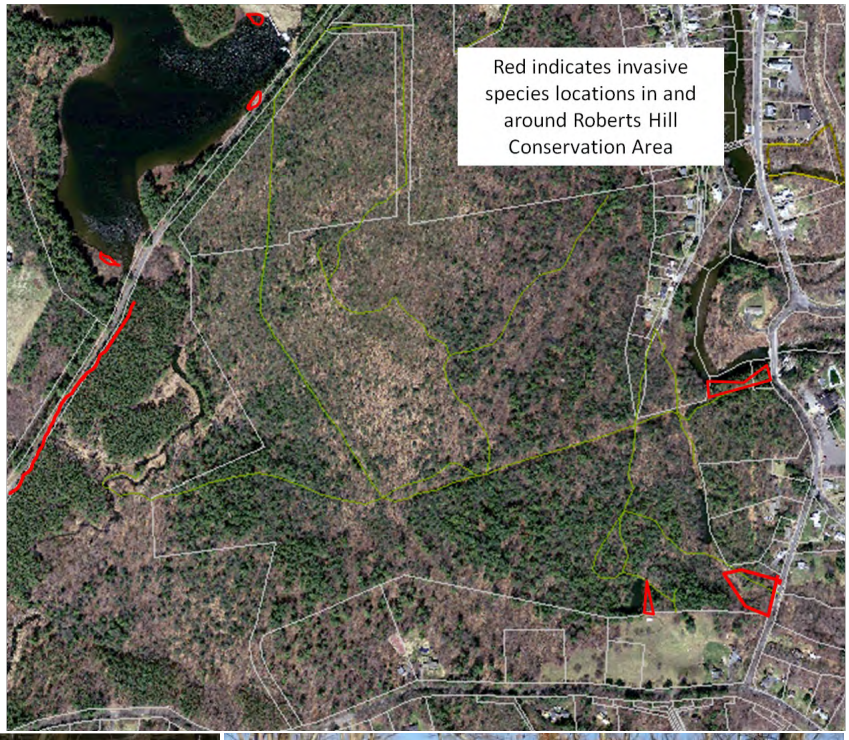
The acidic soils at Roberts Hill support a limited number of species. One of the most common and easy to identify is American wintergreen, sometimes called teaberry.

The stone footings of the old and now long abandoned road that used to run between Water Street in Leeds and Chesterfield Road can still be found along the little brook that feeds the ice pond. The wooden logs across it are (obviously) new.

The vegetation below shady pine and hemlock is almost non-existent. In fact, in many areas of the conservation area, the dominant ground cover is nothing but dry oak leaves!

Recommendations

- Improve the trail to Chesterfield Road and potentially extend a new trail to the bed of the former Roberts Meadow Brook (on DPW land).
- Create better, off-road parking along Dimock Street
- Evaluate whether the "muckhole" and the small depression along the former electric line are functioning as vernal pools and can be certified.
- Control invasive plants along the trail off Dimock Street, at the old foundations along Dimock Street and at Howard's Ice Pond. None of these areas is heavily infested—yet. Japanese knotweed and catalpa should be monitored along the Mill River.
- Acquire the private parcels on either side of the access trail that begins on Reservoir Road; this would prevent it from being fragmented by development.



The best parking for Roberts Hill is near Musante Beach on Reservoir Road. From there the trail climbs a steep hill of hemlock and then levels off, with the path passing through a thicket of mountain laurel and oak. This is the simplest way to reach the look-out.

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