

REDISCOVERING NORTHAMPTON

The Natural History of City-Owned Conservation Areas

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Prepared for:

Northampton Conservation Commission
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Laurie Sanders' passion for natural history grew out of her experiences exploring a large marsh and mountain behind her childhood home in Cheshire, CT. She first came to Northampton in 1983 as a student at Smith College, where she received her degree in 1988. Since then, she has worked as an environmental planner, as an instructor/naturalist in Costa Rica, and as a botanist for the The Nature Conservancy (Connecticut Chapter) and the US Forest Service. In 1993 she received her M.S. from The Field Naturalist Program at the University of Vermont.

She currently lives in Northampton.

Methods and Discussion

In order to understand why our conservation areas and their surroundings look the way they do, I have relied on what could be called a "whole-systems" approach. This approach dissects a landscape into its component parts (bedrock geology, surficial geology, plants, animals, and human influence), and then reassembles it into an integrated whole that reflects the interrelationships between these separate pieces.

To accomplish this, I visited each conservation area three or more times. On the second or third visit I prepared large-scale biological community maps as well as detailed vegetation maps. The divisions between communities were based on several considerations: plant species composition, plant age, soil properties (moisture, texture, deposition history), light levels, slope, aspect, land use history, and the geologic history of the specific site.

At each site, the wildlife that use the area permanently, transitionally or seasonally was also considered. In spite of the abundance, diversity, and importance of invertebrates, few are included because of the limited duration of this project. Information on vertebrates (mammals, birds, amphibians, and reptiles) is included either in the text or in appendices 1-3. Time constraints prevented the preparation of a complete species list for each site.

Information on surficial geology came from my own familiarity with the area's glacial history and from the Hampshire County Soil Survey. Additional soil pits were dug at the Pines Edge and Fitzgerald Lake Conservation Areas. Other sources for bedrock and surficial geology are cited in the bibliography.

Information on land use history was gleaned from field work (presence of stonewalls, fences, cut stumps, etc) as well as from maps, archival photographs and the reference section at Forbes Library. Terry Blunt, Wayne Feiden, Ed Gross, Fred Morrison, Hazel Palmer, Jim Parsons and Morton Stowe provided additional information about the land use history at certain conservation areas.

What follows, then, is my ecological evaluation of the City's existing conservation areas and a preliminary ecological overview of three potential acquisition or expansion sites: Sawmill Hills, Mineral Hill and the Marble Brook drainage.

As a result of my work, I was able to divide the town into 16 major habitat types. Omitting agricultural land, gravel pits and dumps, and residential-urban-industrial areas, thirteen "natural" habitats are left:

Uplands

1. Recently abandoned agricultural land
2. Glacial outwash plains and deltas (i.e. sandplains/pitch pine habitats)
3. Drumlins
4. Ravines
5. Woodlands on glacial tills (no bedrock exposed)
6. Rocky uplands

Wetlands

1. Floodplain forest
2. Rejuvenated wetlands
3. Beaver ponds
4. Swamps
5. Bogs
6. Vernal pools
7. Streams (intermittent and permanent) and the Mill and Connecticut Rivers

Existing conservation areas or protected land (USDA) include examples of ten of these habitats. Missing from the list are (1) ravines, (2) bogs and (3) pitch pine forests/sand plains.

1. Ravines are uncommon in Northampton, but one worthy of further study is at Day Brook behind the Hampshire County Long-term Care Facility. To date, this ravine has yielded two plants that are not found elsewhere in town (wood sorrel (*Oxalis montana*) and spring beauty (*Claytonia sp.*)). This area also provides rich habitat for wildlife (bear, deer, winter wren) and other less-than-common plants. Another ravine-like area that should be examined is the drainage behind the Veteran's Hospital.
2. Bogs are also not common in our city. So far I have located three "bog-like" wetlands and one true bog. One of the bog-like areas is in a glacial kettle (a rare feature in Northampton) near Marble Brook (see write-up and map for details) and another is a perched peat pocket on the Fitzgerald property near the Fitzgerald Lake Conservation Area (see write-up and map for details). What appears to be a former bog lies near the corner of Chesterfield Road and Spring Street. According to Jim Parsons, this area used to have cranberries, but about 30 or so years ago a drainage ditch was dug and now this former peatland looks more like a grown-in field with a ground layer of sphagnum moss.

One of the success stories of my work this summer was the discovery of a true bog adjacent to the Brookwood Marsh Conservation Area. This bog and its

surrounding wetland complex have a very interesting geologic and land use history, and the area is part of a large wildlife corridor that extends from Mount Tom to the Berkshires. In addition, it contains many species of plants and animals rare to Northampton and is home to at least one state-listed species. The protection of this bog should be among the Commission's top priorities.

3. The final habitat type not yet represented in the suite of conservation lands in Northampton is a pitch pine/sand plain community. This type of habitat begins as glacial deltas and outwash plains. Typically quite level and very permeable, they are often used for housing developments, airports (Westover Air Force Base, Barnes Airport) and cemeteries (for example, Saint Mary's & Spring Grove). Others have been mined for their pure sands and gravel (Willards, Brakey's). This has happened not just in Northampton, but throughout the Northeast, making sand plains one of New England's most threatened habitat types. Today, pitch pine/sand plain habitats are severely fragmented and are often the "wastelands" sought out and further degraded by ATV and motorbike devotees.

Sandplains contain fire-adapted plant species, such as pitch pine, scrub oak, scarlet oak, wild lupine (state-listed), and a variety of grasses. Although few of its plants are rare, sand plains often contain rare fauna. These include hog-nosed snakes (two known Northampton sites) and several rare moths in the Geometridae (inch worms) and Noctuidae (underwing moths). My preliminary survey work indicates that a patchwork of sandplain habitat exists between Route 66 and Willard's gravel operation at the west end of Burt's Pit Road. For more detailed information, I encourage the Commission to contact Andrea Stevens at UMASS (773-0497). She is involved in a project that will identify the remaining pitch pine communities in Hampshire County.

Knowing which habitats are not represented in our city is one way to evaluate potential acquisitions. Another way is to look for sections of Northampton where no conservation land yet exists (see attached chart). One area lacking conservation land is in the southwestern part of the city. This was part of my reasoning for giving a high rating to Mineral Hill, an area which is ecologically interesting and botanically rich.

A consideration in past acquisitions has been to look for property that joins with existing acreage (e.g. Mill River corridor and Forest Legacy land around Fitzgerald Lake). This makes sense and I encourage it, but I also caution you to look closely when a parcel is less than 15 acres in size. And look even more closely if it is a new separate piece that doesn't link with anything else. I say this specifically in reference to areas like Indian Hill, Vistron and Mary Brown's Dingle. Although they have some value, they are also management burdens and none of them are ecologically significant.

When thinking about linkages and corridors, I'd also like to encourage the Commission to look closely at the large corridor that runs from Mount Tom through Arcadia Wildlife Sanctuary, crosses Route 10 and then continues northwest to the Berkshires. A key piece in this corridor is the Route 10 land between Arcadia and Pine Grove Golf Course. Not only is it the last remaining forested stretch between Northampton and Easthampton, it is also an important wildlife link. Evidence for this are the numerous wildlife sightings (including bear, deer and coyote) that occur along this stretch of highway. Currently zoned for industrial use, the future development of this parcel will require very careful, ecologically sensitive planning.

Another management issue is logging on conservation land. From my perspective, it should cease. Right now the only land in Northampton that will not be cut in the future are 300 acres of forested land owned by Massachusetts Audubon's Arcadia Wildlife Sanctuary. The town conservation land should adopt the same policy. The argument to log to increase habitat diversity is a weak one in Northampton where all around our conservation areas the forests have been and will be cut in the future. There is no shortage of young (<100 year old) forest in Northampton. What is missing are stands with 200+ year old trees. Moreover, the degradation of the forests by logging (skid roads, scarring, aesthetics) isn't worth the small amount of money the City receives for the sale. New acquisitions, studies and maintenance should be funded by grants, City open space funds, and the assistance of local grassroots alliances.

And speaking of protection, I want to encourage the Commission to do all it can to aid the local and environmental police to curb the overuse and abuse of Rainbow Beach. As the quality of the Connecticut River improves, the amount of activity on the river is bound to increase. Unless illegal activities are stopped now, it will be harder and harder to prevent the construction of seasonal camps, dumping, vandalism and the sewage problems associated with overuse. These problems are already serious at Rainbow Beach, and similar things have occurred at Elwell Island.

Map 1. Map of Northampton and its Conservation Areas

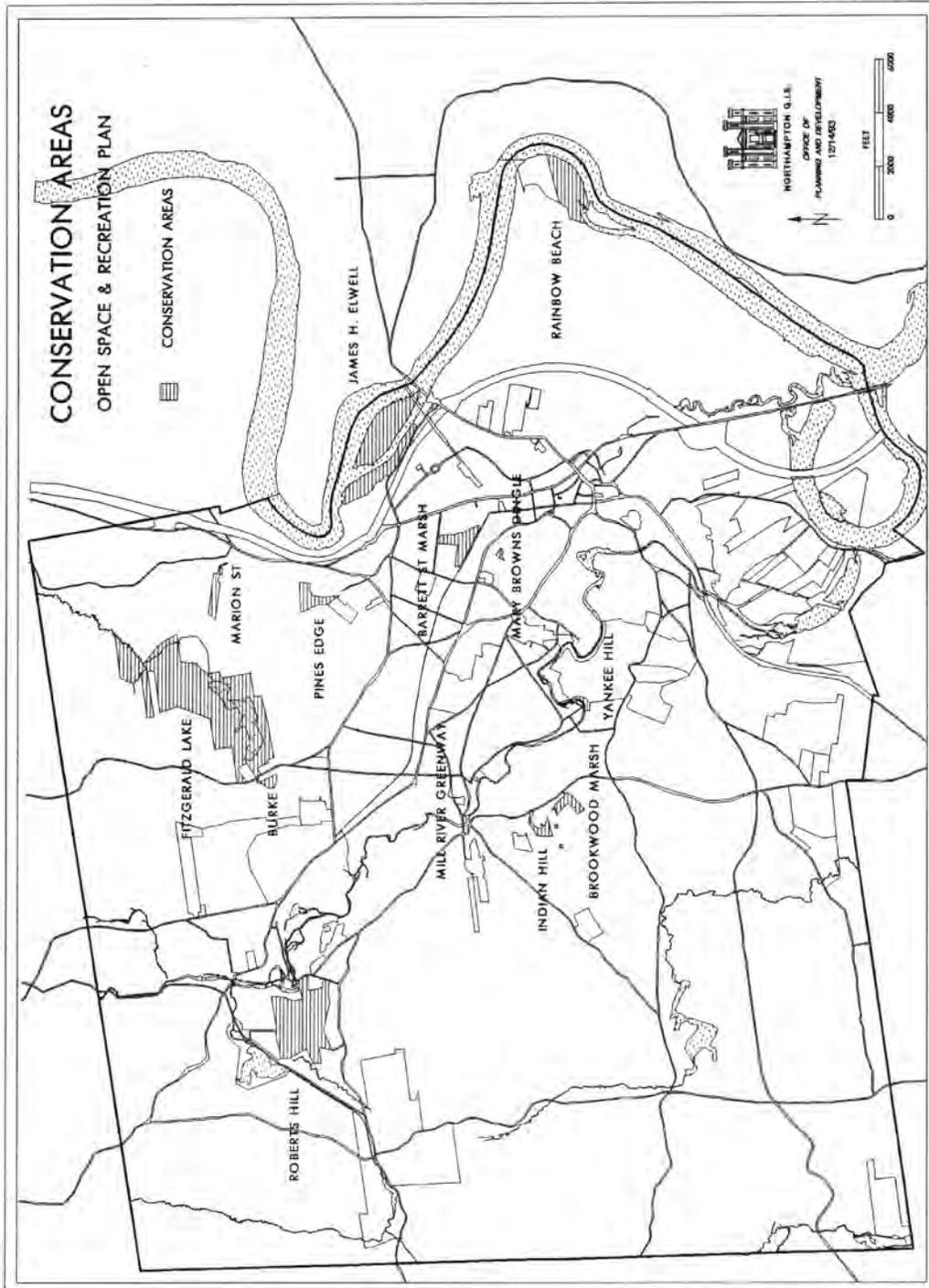


Chart 1. A Summary of Northampton's Conservation Areas

Chart 1. A Summary of Northampton's Conservation Areas

Conservation Area	Size (acres)	Location in town	> 50% Wetland	Extensive Upland	Wildlife Value	Educational Value	Quality Land	Nearby City Land	Part of Big Corridor	Critical Habitat	Rare Species	Watershed/Aquifer Recharge	Management Concerns	Non-native Species	Signs	Trails
Barrett Street Marsh	20	East	X		good	excellent		X			T		I, L, V	X	X	X
Brookwood Conservation Area	15	Central	X		good/excellent*	good/excellent	X	X	B		S, T	X	D	X		
Burke Conservation Area	5	North-east	X		good	very good	X	X	A		T	X	D	X	X	
Elwell Conservation Area	110+	North-east	X		very good	excellent			C	X	S, T		I, L, V	X	X	
Fitzgerald Lake Conservation Area	276	North-east	X	X	excellent	excellent	X	X	A	X	S, T **	X	ATV, V	X	X	X
Indian Hill Aquifer Area	7	Central	X		poor	poor		X	B			X	D	X		
Marian Street Conservation Area	12	North-east		X	good	marginal	X	X	A				D	X	X	
Mary Brown's Dingle	2	East	X		marginal/poor	marginal/good							D	X		
Pines Edge Conservation Area	15	North-east	X	X	good	very good	X	X	A		T		D			X
Rainbow Beach Conservation Area	80	East	X		very good	excellent	X		C	X	S, T		I, O, V	X	X	
Roberts Hill Conservation Area	104	North-west		X	very good/good	good	X	X	B			X	ATV		X	X
Yankee Hill Conservation Area	5	Central/East		X	marginal	marginal	X	X	C				V	X	X	X
Vistron Conservation Area	.5	Central			poor	marginal		X					D	X		

*=Excellent if large nearby wetland is protected
 **=Historical record for marbled salamander

L=Litter
 O=Overuse
 V=Vandalism

S=State Listed Species
 T=Rare Within Town
 A=Forest Legacy Land
 B=Mt. Tom-Berkshires Corridor
 C=River Corridor

ATV=Off-road Vehicles
 D=Dumping
 I=Illegal Camping

NORTHAMPTON'S MOST ACCESSIBLE CONSERVATION AREA

A Natural History of the Barrett Street Marsh

It's late October and in the fading afternoon light, the colors of the marsh shift from brown and tan to honey gold. For a few minutes, the last rays of daylight transform the remaining maple leaves into a fiery orange red. The sun drops below the horizon and the colors dissolve into muted browns, grays, and blacks.

As I wait at the end of the boardwalk, the first flock of ducks appears. They circle the marsh once, twice and then quickly drop down to a patch of open water, hidden from view by a wide band of cattails.

Within 15 minutes, hundreds more arrive. In pairs and large flocks, they track the marsh's edge. Round and round, mallards, black ducks and wood ducks bank into tighter and tighter circles. As they plummet, pandemonium breaks out--there is wild splashing, quacking, and clucking. Above the fray, I hear a wood duck's haunting autumnal wail.

This "great duck arrival" happens every night from late October to early December, not in some remote wilderness area, but only a ten minute walk from downtown Northampton at the Barrett Street Marsh. Its location near hundreds of homes and four elementary schools along with wheelchair-accessible boardwalk (1992) makes this 22-acre wetland Northampton's most accessible conservation area.

In addition to being a great place to watch incoming ducks, the Barrett Street Marsh is a spot where traffic sounds can be drowned out by chorusing spring peepers, where yellow warblers and yellowthroats nest in summer, and where avid birdwatchers sometimes find secretive sora rails during their annual Christmas bird count.

When Northampton was still a young town, the Barrett Street Marsh was only the extreme western edge of a much larger wetland. Underlain by the impervious clays of glacial Lake Hitchcock, the original wetland extended from the east end of what is now Prospect Street over to North Street. Water from the wetland flowed south through two brooks, one along State Street and the other near Market Street. Much of this land was ditched and drained, first for farmland and pasture and eventually for commercial and industrial uses.

Decades after King Street was built along a strip of relatively dry land, a branch of the New Haven-Northampton Canal was built through this large wetland. Now buried below the asphalt of Super Stop & Shop, the canal (1830-1847) ran up through State Street and continued north toward the Connecticut River. Unfortunately for the canal's investors, the waterway was always a losing venture, and when the railroad along King Street was completed in 1847, the canal fell almost immediately into disuse.

In 1867, a new railroad branch that ran from King Street to Williamsburg was added. To complete this length, fill was brought in along the south side of the existing conservation area. A century later, the railroad ceased operation and in 1983, the abandoned line was converted into the Northampton bike path.

Although the exact dates are uncertain, it's clear that the most dramatic changes to the western edge of the original wetland (the area we call the Barrett Street Marsh) were caused by the construction of a series of drainage ditches that converted these "unusable swamplands" into pastureland and hayfields. For many years, these drainage ditches were maintained by the City, which owned and managed the land as part of the City Poor Farm, or Alms House. Located on Prospect Street where Congregation B'nai Israel now stands, the Alms House was in operation from the early 1800's until 1952.

By the 1960's, the poor farm was long gone but the land was still used by area farmers. Around this time, the maintenance of the drainage ditches stopped and sediment began to accumulate. The water table rose, and rather quickly the pastures and hayfields began to revert back to wetland. By the 1970's, stricter wetland regulations assured the ditches' demise and the rejuvenation of the wetland. Already cows had been gone for more than two decades and the last of the haying operations was soon to end.

In 1975, two Northampton residents, Willow Zuchowski and Fred Morrison, approached the Conservation Commission and suggested that this rejuvenated wetland be transferred from the City to the Conservation Commission. The transfer was completed and in 1976 the Barrett Street Marsh became the City's second conservation area.

In the 20 years since the area received "conservation area" status, all but a tiny portion of its former hayfields and pasture have been colonized by cattails (*Typha latifolia*), meadowsweet (*Spirea latifolia*), tussock sedges (*Carex stricta*) and brushy tangles of silky dogwood (*Cornus amomum*) and alder (*Alnus rugosa*). The remainder, a slightly higher peninsula of land, is now covered with crab apple (*Malus sp.*), red cedar (*Juniperus virginiana*), a mix of grasses and other plants characteristic of abandoned farm fields. The slope along the former railroad bed is now forested with red maple (*Acer rubrum*) as is a tongue of low-lying upland that runs north-south from Barrett Street.

Although most of the drainage ditches are no longer distinguishable, the largest and deepest of them is still recognizable for much of its length. Known as King Street Brook, the ditch runs through the wide belt of cattails from the bike path to Barrett Street. Beyond Barrett Street, the brook flows past Denise Court and through a series of pipes which eventually carry it under King Street, Route 91 and Damon Road. The brook reappears

behind the River Run Apartments and flows through a deep trench into the Connecticut River. This northward flow is a 180° switch from its former drainage through downtown Northampton.

Fed by runoff from Round Hill, Mary Brown's Dingle, and the Prospect Street area, King Street Brook carries more than water. Roadsalt, fertilizer from yards, oil, radiator fluid and other pollutants are also swept along. One consequence of this is that very few aquatic organisms are able to survive near the beginning of King Street Brook. However, as the water moves slowly through the marsh, these impurities are dispersed, bound to other particles, or broken down and converted to harmless or less harmful forms. The marsh¹ is so effective at pollution abatement that by the time the brook reaches Barrett Street, the water is rich in aquatic organisms. Dragonfly and damselfly nymphs--insects that require clean water to survive--, as well as diving beetles, caddisfly nymphs, daphnia, and snails are just a few of the common creatures found by scooping a pailful of water.

The Barrett Street Marsh also provides storm water retention. By holding back and slowly releasing floodwater, the Barrett Street Marsh contributes in a small but important way to mediating flooding further downstream. Healthy wetlands and undeveloped floodplains can dramatically reduce the velocity of floodwaters and cost far less than building and maintaining dikes and dams.

Another valuable function of this wetland is the habitat it provides for wildlife. Although its small size and urban location exclude large mammals like black bear, deer and coyotes, the marsh is home to a variety of smaller mammals. Muskrats, gray squirrels, raccoons and opossums are among the most commonly sighted mammals, and fox tracks are occasionally seen on the snow-covered ice in winter.

In addition to furry creatures, the marsh is the year-round or seasonal home to at least four dozen kinds of birds, five species of amphibians, two types of reptile, and hundreds of insect species. In April, spring peepers chorus, garter snakes bask on dry hummocks and the first mourning cloak butterflies are on the wing. By May, the leaves are popping out and for a few weeks, a visitor to the marsh will hear the flute-like trill of dozens of male American toads. Joining the toads in song are red-winged blackbirds, grackles, robins, yellow-rumped warblers, common yellowthroats, rose breasted grosbeaks, swamp sparrows, yellow warblers and many more.

¹ Although sometimes incorrectly called a swamp, the area is a true marsh. Swamps are wetlands with tall trees. Marshes, however are characterized by shallow, open water with hummocks of sedges and other waist-high vegetation.

Crucial to the animal diversity seen at the Barrett Street Marsh are the plants which offer the animals cover, food, and places to raise and rear their young. Land use history, the degree of wetness and especially patterns in plant composition define the marsh's five major communities: (1) cattail colony; (2) meadowsweet/tussock sedge community; (3) wetland shrub thicket; (4) red maple forest; and (5) abandoned, drier field (Maps 2 and 3).

Cattail Colony

Of the five broad plant communities that exist at the marsh, the largest is a nearly pure stand of cattails. Often over six feet in height, the luxuriant growth of the cattails along King Street Brook may be due, at least in part, to high levels of phosphorus and nitrogen from lawn fertilizer runoff. This former pastureland is now the best place in the Barrett Street Marsh to see muskrats, ducks, red-winged blackbirds and American toads.

Meadowsweet/Tussock Sedge Community

Bordering the cattails and also within the former pastureland are several acres covered by a meadowsweet/tussock sedge community. Meadowsweet and its close relative steeplebush (*Spirea tomentosa*) have colonized the old hummocks of tussock sedge that developed when the water table began rising.

This is a very diverse community with dozens of wetland species. In addition to the few cattails growing along its wetter margins, this community contains beggar's tick (*Bidens cernua*; *B. vulgata*), turtlehead (*Chelone glabra*), joe-pye weed (*Eupatorium maculata*) and swamp candle (*Lysimachia terrestris*). Other common plants in this area are maddog skullcap (*Scutellaria lateriflora*), arrow-leaved tearthumb (*Polygonum sagittatum*), delicate marsh ferns (*Thelypteris palustris*) and in the watery depressions, common arrowhead (*Sagittaria latifolia*).

The division between the cattail and meadowsweet/tussock sedge communities may be due to lower nutrient availability and the height of the watertable. Unlike cattails, the wetland species that grow in this area cannot survive long periods in standing water.

Wetland Shrub Thicket

Higher and drier still are the areas dominated by silky dogwood/arrowwood/alder thickets. Scattered among these shrubs are young red maples, slippery elm (*Ulmus rubra*) and elderberry (*Sambucus canadensis*). Open and sunny, this community rivals the

meadowsweet/tussock sedge zone for plant diversity. Among its more common species are touch-me-not (*Impatiens capensis*), boneset (*Eupatorium perfoliatum*), asters (*Aster* spp.), arrow-leaved tearthumb (*Polygonum arifolium*), meadowsweet and several species of sedges and grasses. Growing up and over all of these plants are the sprawling vines of wild balsam apple (*Echinocystis lobata*), with its spiny, lantern-like fruits, and virgin's bower (*Clematis virginiana*), with its feathery, curved seeds.

Red Maple Forest

Two red maple forests are found within the conservation area: 1) along the north slope of the bike path, and (2) along the low-lying peninsula that extends south from Barrett Street. Near the bike path, the forest is an even-aged stand, roughly 30 years old that has grown up on the moist fill. In this section, the understory is composed of spotted touch-me-not, cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), interrupted fern (*Osmunda claytoniana*), royal fern (*Osmunda regalis*), New York fern (*Thelypteris novaeboracensis*), Canada lily (*Lilium canadense*) and dewberry (*Rubus* sp.). Young black cherry (*Prunus serotina*) is also found scattered in the understory. Shrubs, however, are rather localized. Three of the most common are winterberry (*Ilex verticillata*), chokeberry (*Prunus virginiana*), and high-bush blueberry (*Vaccinium corymbosum*).

A small drainage ditch in this area supports a narrow, but well developed spongy sphagnum moss. Sheep laurel (*Kalmia angustifolia*) and leatherleaf (*Cassandra calyculata*), which is not common in Northampton, are both found here.

Two hundred feet west of the boardwalk, near a second drainage channel, the red maple forest is older and taller. In much of this area, the ground has a gentle slope and the soils are not as well-drained as those below the even-aged stand. These changes are reflected in the composition of the understory, which, in addition to touch-me-not and cinnamon fern, includes poison ivy (*Toxicodendron radicans*), virginia creeper (*Parthenocissus quinquefolia*), jack-in-the-pulpit (*Arisaema triphyllum*) and common arrowwood (*Viburnum recognitum*).

The 50 to 100 foot wide peninsula of red maple that begins at Barrett Street and extends south is similar to the red maple slope along the bike path in both age and species composition.

Abandoned, Drier Fields

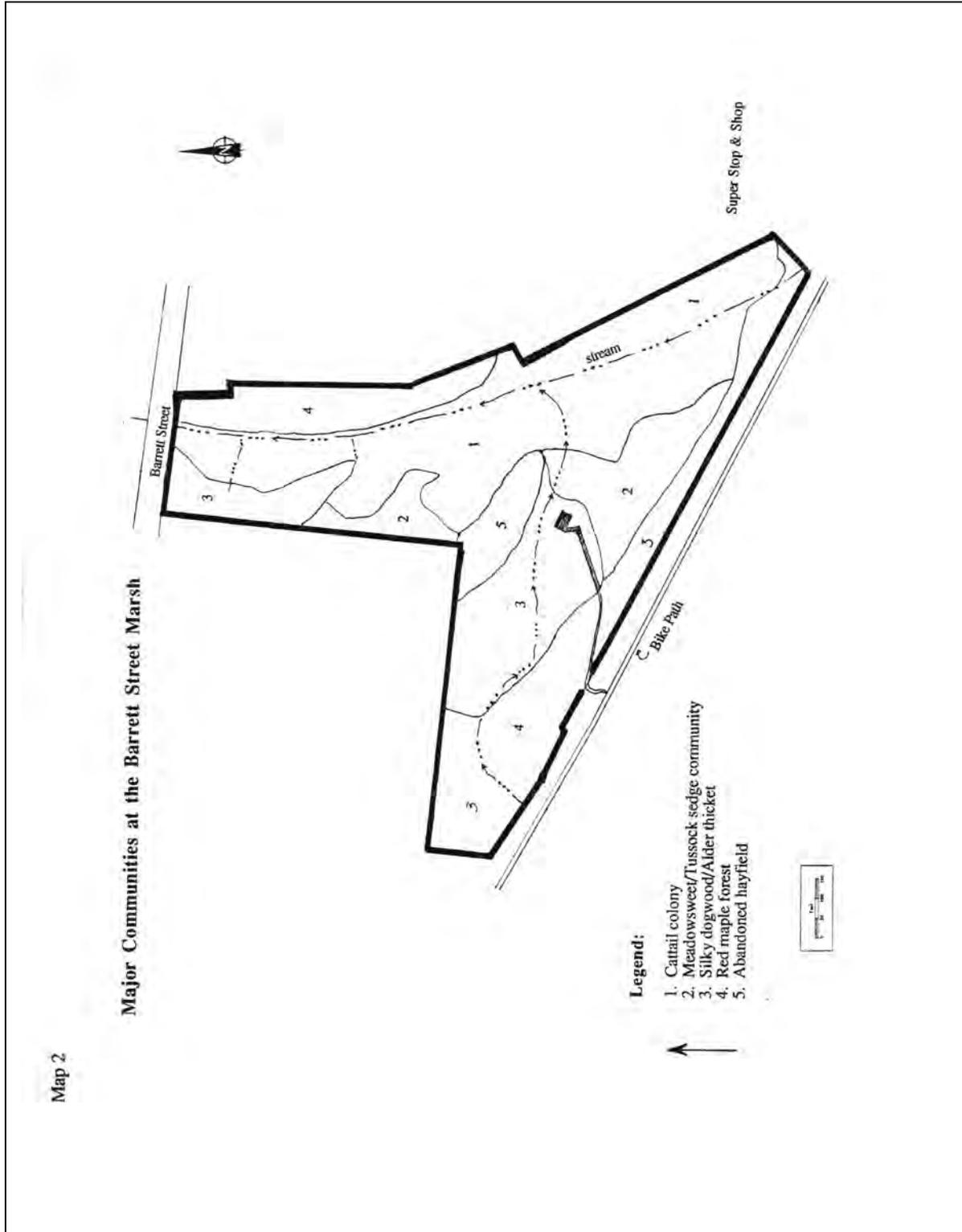
The final community type is found on a spit of land southeast of the Coachlight

Apartments and not far from the end of the new boardwalk. Slightly higher and drier, this area supports a flora characteristic of abandoned fields. Crab apples (*Malus* sp.), red cedar (*Juniperus virginiana*), white pine (*Pinus strobus*), hawthorn (*Craetagus* spp.), and large clones of panicled dogwood (*Cornus racemosa*) are among the most common woody plants. Grasses and sedges dominate the herb layer, but wildflowers like oxeye daisy (*Leucanthemum vulgare*), daisy fleabane (*Erigeron annuus*) and cow vetch (*Vicia cracca*) are also abundant.

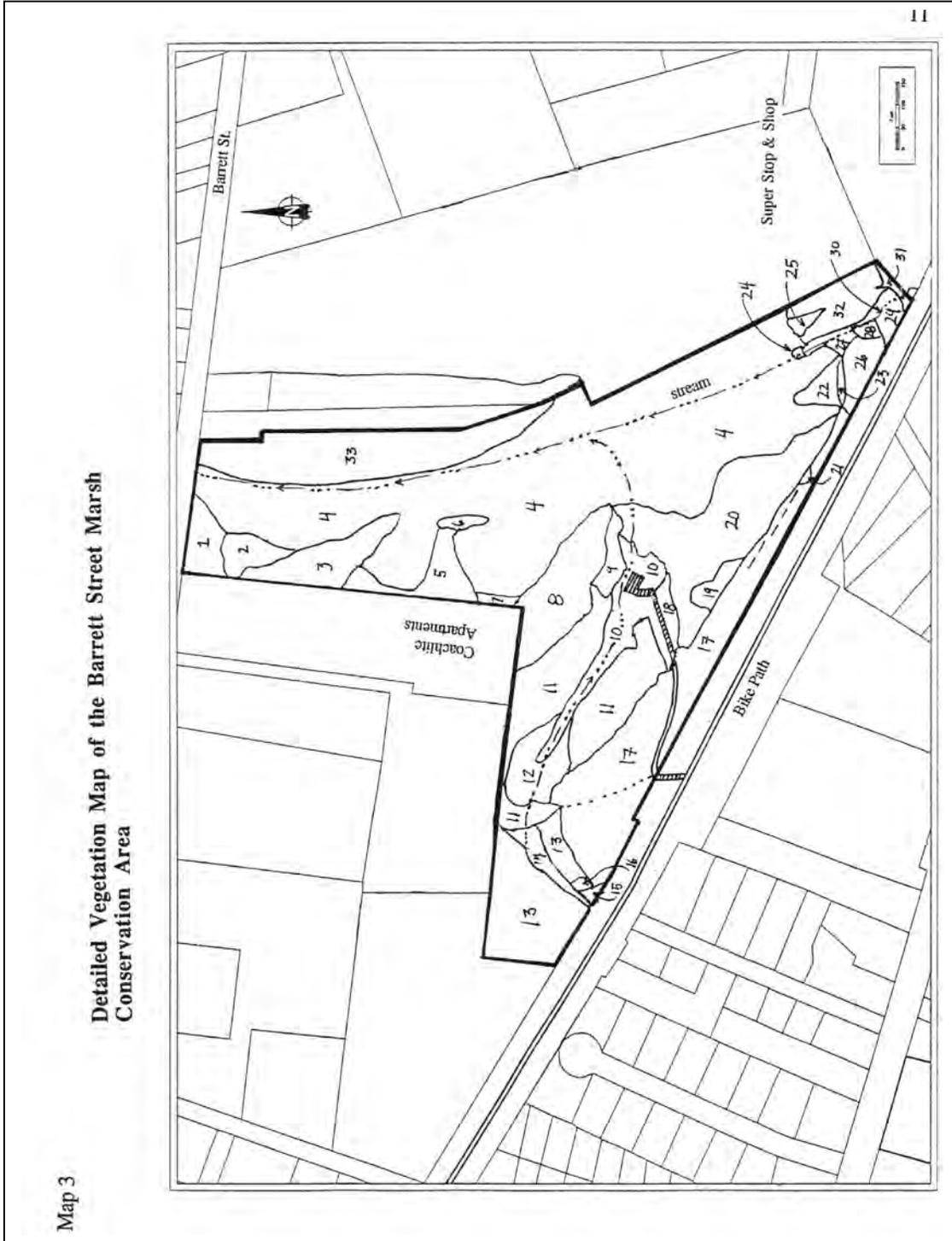
Summary

There aren't many cities in Massachusetts than can boast about having a rich natural area so accessible to their centers. The Barrett Street Marsh is a rejuvenated and rejuvenating wetland that provides educational, aesthetic and functional benefits to the residents of Northampton.

Map 2. Major Communities at the Barrett Street Marsh



Map 3. Detailed Vegetation Map of the Barrett St. Marsh Conservation Area



BARRETT STREET MARSH CONSERVATION AREA
Legend for the Detailed Vegetation Map

1. A small open pocket of sedges and joe-pye weed ringed by red maple and silky dogwood.
2. Wet ground with standing water and rice cut grass, joe-pye weed, cattail, beggar's tick, and candlestick rush.
3. Slightly higher ground covered with red maple, silky dogwood, paniced dogwood, crab apples, arrowwood, goldenrod and some of the non-native shrub, common buckthorn.
4. Cattails (*Typha latifolia*)
5. Part of a former hayfield now dominated by tussock sedge, meadowsweet and grasses.
6. Red maple and silky dogwood
7. A thin strip of silky dogwood, meadowsweet, silver maple, and arrowwood. Upland border is black locust.
8. Overgrown, upland pasture with crab apple, red cedar, red maples and a mix of grasses, goldenrods, and asters.
9. Low-growing silky dogwood thicket
10. Open marsh with tussock sedge, marsh fern, beggar's ticks and willow herb
11. Brushy thicket characterized by alder, arrowwood, red maple and meadowsweet.
12. Open, recently deposited sediments dominated by touch-me-not, boneset, meadowsweet, aster, joe-pye weed, tussock sedge and arrow-leaved tearthumb.
13. Older, open red maple forest with an understory of poison ivy, Virginia creeper, touch-me-not and occasional patches of honeysuckle, crab apple, and common buckthorn. Jack-in-the-pulpit is frequent.
14. Drainage channel

15. Japanese knotweed (*Reynoutria japonica*)
16. Arrowwood (*Viburnum recognitum*)
17. Slope from bike path dominated by even-aged red maple forest (approx. 30 years) with cinnamon, interrupted, royal and sensitive fern common in the understory. Skunk cabbage occasional; touch-me-not frequent. Along the drainage channel are sphagnum moss, leatherleaf and sheep laurel.
18. Meadowsweet and cattail
19. Sensitive fern and burreed.
20. A large, open area with hummocks of vegetation surrounded by standing water. The most common plants include meadowsweet, cattail, beggar's tick, turtlehead and tussock sedge.
21. Swamp rose, meadowsweet, joe-pye weed and common winterberry. An old tree fort is nearby in an old red maple.
22. Meadowsweet and cattail
23. A thin zone with dense stands of silky dogwood, common winterberry, and arrowwood.
24. Alder with an understory of sensitive fern, touch-me-not and sedges.
25. Bulrush (*Scirpus*)
26. Red maple with an understory of Canada mayflower, touch-me-not, cinnamon fern, royal fern, dewberry, some chokeberry and high-bush blueberry.
27. Open marsh with mix of ground nut, cattail, touch-me-not, turtlehead and meadowsweet.
28. Alder thickets with touch-me-not below.
29. Alder, silky dogwood, multiflora rose, grape and staghorn sumac above and touch-me-not, goldenrod, jumpseed, joe-pye-weed and aster below.
30. A berm with a mix of gray birch, alder, blackberry with abundant sedges, grasses, touch-me-not and goldenrod in open areas.

- 31.** Black willow with Morrow's honeysuckle, multiflora rose, and panicked dogwood below.
- 32.** Cattail, sweet flag and touch-me-not
- 33.** Red maple upland

THE NATURAL HISTORY OF THE BROOKWOOD CONSERVATION AREA AND AN ADJACENT WETLAND COMPLEX

A hundred feet from the parking area is a small beaver pond, surrounded with waist-high meadowsweet (*Spirea latifolia*), clusters of royal fern (*Osmunda regalis*), jumbles of sedges (*Carex* spp.), and several, short-statured red maples (*Acer rubrum*). Perched on top of one of these red maples, a male song sparrow, head back, chest puffed, opens his beak and sings a long, melodic string of notes. After a momentary pause, he sings again. And then again. Within a few minutes, the songs of nearly a dozen birds are heard--the raspy calls of red-winged blackbirds, high-pitched squeaks of rose-breasted grosbeaks, rich, full notes of Northern orioles, and the witchedy-witches of common yellowthroats. Welcome to the Brookwood Conservation Area.

Located between Crestview Drive, Ellington Road, and Florence Road, this 15-acre, L-shaped parcel can be divided into four broad communities: (1) abandoned, wet pasture, (2) the powerline swath, (3) a red maple swamp/beaver pond, and (4) a small section of heavily disturbed swamp forest (Map 4 and 5).

Abandoned, Wet Pasture

On the north edge of the conservation area, the former pasture land is level and underlain by glacially deposited, sandy-stony soils. Since it was abandoned 20 years ago, a dense stand of red maple poles have shot up. Their density dramatically reduces the amount of light that reaches the forest floor where few herbaceous plants are able to survive.

At the southern end of this block of former pasture, just beyond one of the two stonewalls that cross the property, the land use history is obviously different. Much more open and sunny, this smaller block was clearly maintained as a grassy spot years after it was abandoned as pasture. Because of this, the vegetation is characterized by light-loving species, such as panicled dogwood (*Cornus racemosa*), honeysuckle (*Lonicera morrowii*), gray birch (*Betula populifolia*), quaking aspen (*Populus tremuloides*), and a wide mix of grasses and wildflowers. Near the powerline, a slightly wetter section contains a stand of speckled alder (*Alnus rugosa*), easily recognized by its warty bark, dark green leaves and fruits, which resemble miniature pinecones.

The Powerline Swath

Paralleling the western edge of the former pasture and serving as the back property line for the homes on this side of Ellington Drive is a 50+ foot wide powerline right-of-way. For most of its length, the right-of-way is relatively dry and brushy, with two exceptions. Midway along the powerline is a small, rocky stream channel that, before the Ellington Drive

homes were built, drained the large wetland complex to the south and west. The other wet spot lies at the south end of the conservation area. Here, the powerline runs through an open, marshier section, where in addition to tussock sedge (*Carex stricta*) and shadbush (*Amelanchier canadensis*) are the purple-blossomed stems of purple loosestrife (*Lythrum salicaria*). Although attractive, this non-native plant readily outcompetes native plants, which are of greater value to wildlife. At this time, the invasion is moderate, however unattended it may spread to the larger wetland where it could have very negative consequences. A two day, loosestrife pulling party by concerned neighbors could eliminate this potential threat.

Red Maple Swamp/Beaver Pond

Bordering the powerline and within the conservation area is the edge of a thirty acre wetland. Although just a sliver of the much larger wetland, this section, which includes both red maple swamp and two small abandoned beaver ponds, is the most diverse within the conservation area. For instance, on one of the beaver dams, one finds a lush tangle of false loosestrife (*Decodon verticillata*), chokeberry (*Aronia melanocarpa*), willows (*Salix rigida*, *S. sericea*) and a mix of two dozen grasses, sedges, and wildflowers. In this same area live Northern watersnakes, snapping turtles, painted turtles, muskrats and several amphibian species.

Because some of the houses on Ellington Drive are built on fill, they are the vulnerable to rising water levels caused by the beaver dams. In order to reduce basement flooding in these homes, the City of Northampton installed a pipe to help stabilize the water level in 1992, and when the beavers were still present, an abutting property owner periodically removed new sections of the beaver dams.

Disturbed Swamp Forest

Moving west from the beaver pond-red maple swamp area, one reaches the final plant community within the conservation area. Here, the land has been dramatically altered by past bulldozing and filling. Twenty-five years ago, in order to create more buildable land, the developer of Ellington Drive and Crestview Road dumped boulders and fill into this wetland margin. These rocks and bulldozed berms, as well as the tangle of pin cherry (*Prunus pennsylvanica*), aspen (*Populus tremuloides*), and blackberry (*Rubus alleghaniensis*) are evidence of these past abuses. At some time in the future, the Conservation Commission may want to restore this degraded area, possibly by securing funding through U.S. Fish & Wildlife's Partners for Wildlife Program. Berms, rocks and alien plants could be removed and native wetland plants could be encouraged. At the same time an observation platform overlooking the wetland could be built in this section.

Beyond Brookwood Conservation Area

The diversity of plant and animal life at the Brookwood Conservation Area is largely due to the presence of large wetland complex that it joins. Encompassing nearly 30 acres, this wetland contains an extensive red maple swamp, marshy borders, a shallow pond, and most significantly, Northampton's only known bog. Bogs are specialized environments that develop where the flow of groundwater is restricted and where the water level remains at or just below the vegetated surface for most of the year.

Covering one third of the wetland, the bog includes both open water and thick, floating mats of sphagnum moss. Surviving the rigors of these waterlogged, nutrient poor, highly acidic conditions is an unusual plant community, with cranberry (*Vaccinium oxycoccus*), rhodora (*Rhodora canadense*), cotton grass (*Eriophorum virginicum*), insectivorous sundews (*Drosera rotundifolia*) and hundreds of orchids known as rose pogonia (*Pogonia ophioglossoides*).

In addition to these interesting plants, a spotted turtle (*Clemmys guttata*), a species "of special concern" in Massachusetts, was found in the red maple swamp in May, 1993. A subsequent visit in June turned up hundreds of empty spotted salamander (*Ambystoma maculata*) egg masses in the bog's open waters. Because bogs are such specialized habitats, it is very likely that further studies in this area will reveal other state-listed species.

Why is there a bog here at all? A good guess is that the conditions needed to initiate a bog occurred here during the tenure of glacial Lake Hitchcock. At that time (15,600-12,400 years ago), this area was within a well-protected cove on an island just off the western shore of the lake (Fig. 1). Calm water conditions enabled fine clay particles to settle out from the lake's milky waters. The draining of Lake Hitchcock left this area high, but not dry, because the clays now formed an impervious lining which trapped water inside this basin-shaped depression. With an impermeable bottom, restricted waterflow and little nutrient input, the conditions were set for the development of a bog. It's quite possible that our present day bog began to form as long as 12,400 years ago when the lake drained. This idea could be tested by analyzing the pollen grains in the peat profile.

Although the geologic origin of the bog is speculative, the land use history of this site is better known. This large wetland is the famous "Burt's Pit", named after Gaius Burt who mined peat here in the early 1800's. After Burt, other people continued off and on to mine the bog's peat and underlying mucky soils, selling these resources to farmers as a soil conditioner. Later farmers tried in vain to convert the northeast corner of this "muck hole" into usable pasture. A 1965 aerial photograph shows a series of east-west running drainage

channels. Now largely hidden by red maples, meadowsweet, and a diverse mix of wetland species, these channels are easily found when crossing the wetland because suddenly you're thigh deep in soft muck. Other evidence that this area was once marginal pasture are the remains of old fence posts and barbwire that run along the drainage ditches.

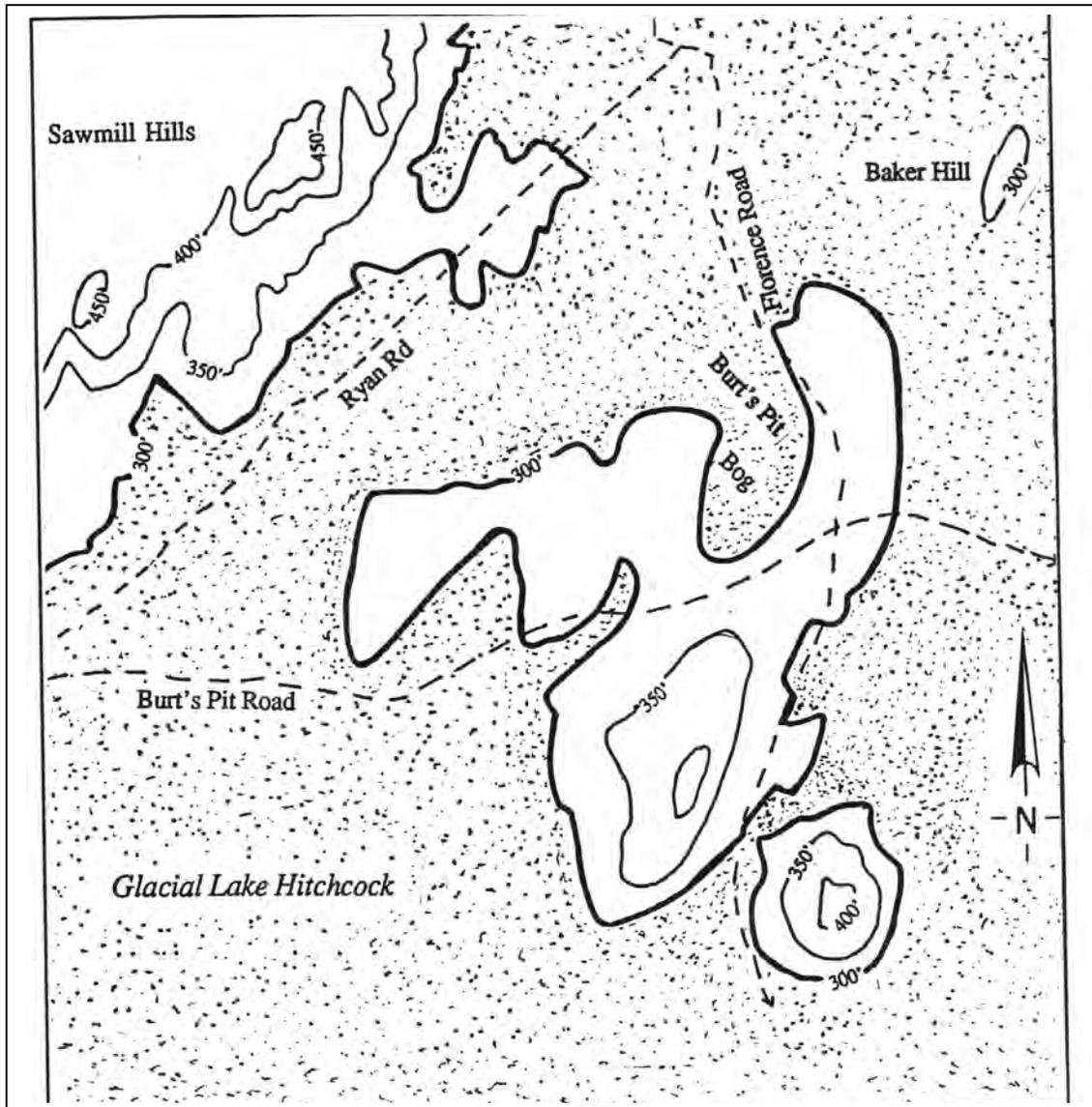
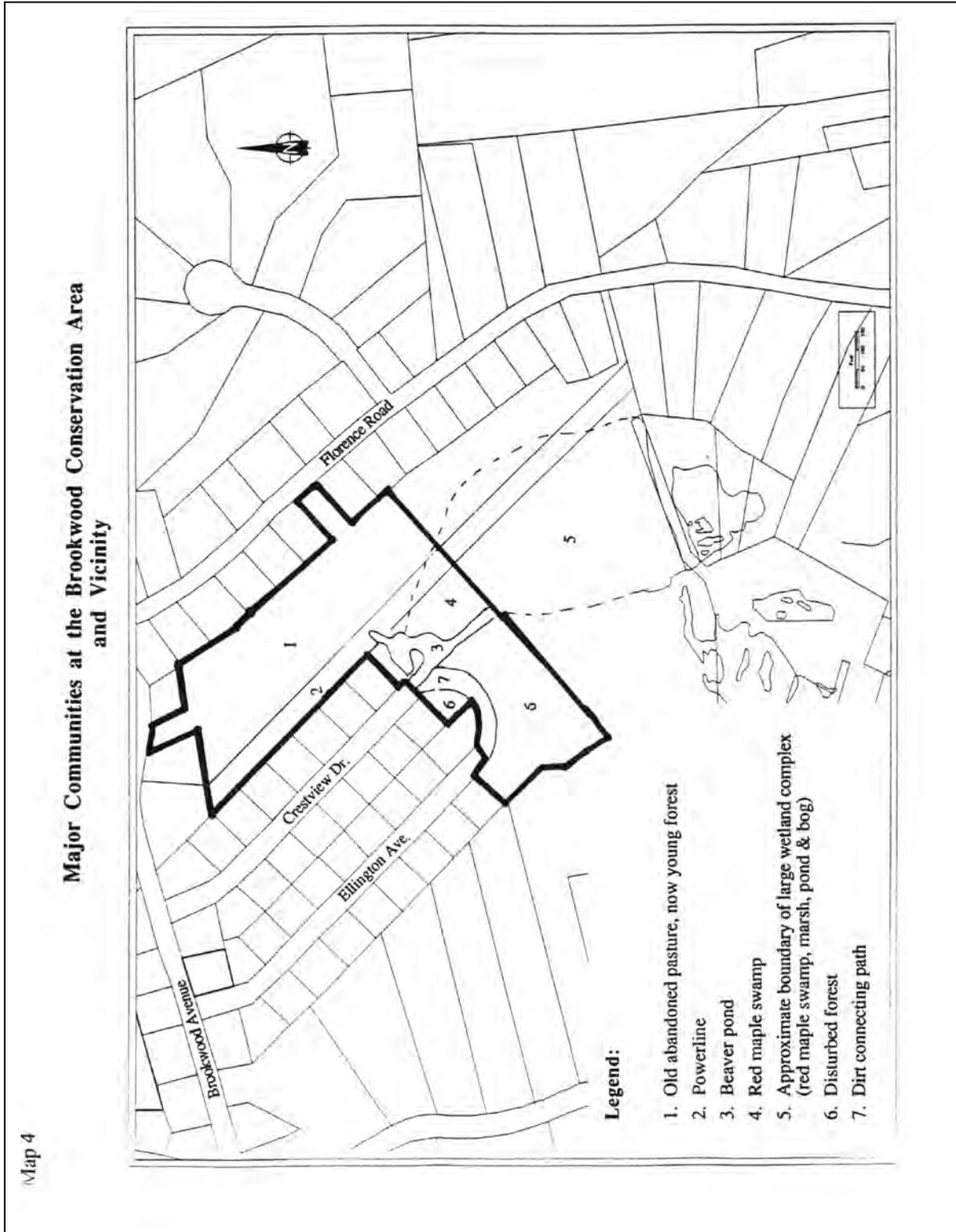


Figure 1. The Burt's Pit wetland area as it appeared 15,600-12,400 years ago when the area was a protected cove on Sanders Island in glacial Lake Hitchcock.

Considering this wetland's (1) role in Northampton's history, (2) ecological importance, (3) large size, (4) connection to the Brookwood Conservation Area and (5) position within the Mount Tom-Berkshire corridor, its protection should be one of Northampton's highest priorities.

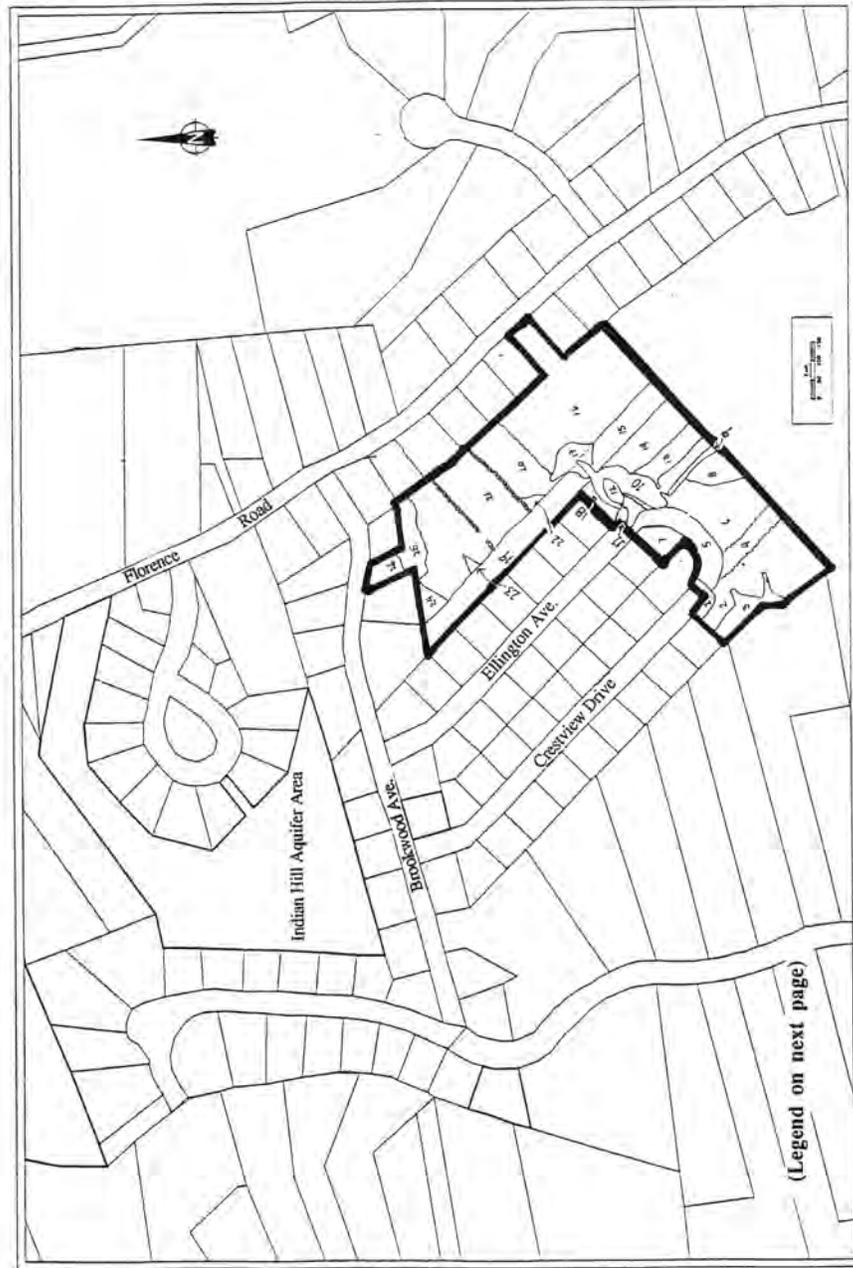
Map 4. Major Communities



Map 5. Detailed Vegetation Map

Map 5

Detailed Vegetation Map of Brookwood Marsh Conservation Area



BROOKWOOD MARSH CONSERVATION AREA

Legend of the Detailed Vegetation Map

1. Goldenrod
2. Alder and willow with an understory of goldenrod, spotted touch-me-not, water horehound, and grape
3. Big-toothed aspen, pin cherry and staghorn sumac
4. Old logging road, now with grasses and blackberry tangles
5. Old road that was originally graded to connect Ellington Drive and Crestview Avenue; yard wastes
6. Black locust, staghorn sumac, pin cherry, trembling aspen and grapes form the canopy. Goldenrod, blackberry, virginia creeper, touch-me-not, and lady fern grow in the understory. The landscape here has been drastically altered by bulldozing operations; numerous berms and boulders, as well as the plant species present, attest to this fact.
7. Open grass area
8. Big-toothed aspen area.
9. Strip of red maple and water willow (*Decodon verticillata*) alongside open water near partial beaver dam.
10. Open water with duckweed and wolffia. Arrowhead and waterwillow frequent.
11. Partial beaver dam adjacent to open, wet meadow area. This meadow area is full of rice cut grass, boneset, willow, chokeberry, beggar's ticks, and many other sedge and grass species. A rich pocket.
12. Peninsula of upland dominated by gray birch and red maple.
13. Low-statured (5'-15') red maple-meadowsweet-alder-winterberry swamp. Hummocks with sphagnum, marsh fern, and abundant with sedges.
14. Taller (20') red maple swamp. Winterberry, royal fern, and beggar's ticks abundant.

- 15.** Marshy section of powerline right-of-way. Purple loosestrife, tussock sedge, swamp candles, marsh fern and diverse sedge community.
- 16.** Red maple (30-40') swamp forest. Sensitive fern and dewberry abundant. Very open and easy to walk through.
- 17.** Alder thicket.
- 18.** Staghorn sumac, young poplar, common milkweed, multiflora rose, and grass tangle.
- 19.** Upland, brushy section of powerline right-of-way. Includes dense patches of non-native honeysuckle.
- 20.** Open, former field now with islands of red maple, gray birch, and winterberry. Canopy averages 20' in height. Along paths are numerous grasses, goldenrod, and various wildflowers that are common in disturbed settings.
- 21.** Dense red maple (3-4" in diameter) poles, with occasional gray birch and white pine. Understory plants absent.
- 22.** Willows, young oak and understory of non-native honeysuckle.
- 23.** Quaking aspen, bracken fern and alder. Rocky remnants of former stream bed.
- 24.** White pine with red maple, gray birch, and quaking aspen along the margins. Canada mayflower is the dominant herb in the understory.
- 25.** Quaking aspen above, New York fern and cinnamon fern below.
- 26.** Low swale vegetated with quaking aspen, red maple, slippery elm. Yard wastes present.

BEYOND THE ROADSIDE EDGE:

Explorations of the Burke Section, Fitzgerald Lake Conservation Area

As you near the main entrance to Fitzgerald Lake Conservation Area on North Farms Road, it's easy to overlook another of the City's important conservation areas. Just north of Spring Grove Cemetery, between two house lots, is a small bridge that crosses a hidden brook.

Donated by Dorothy Burke in 1984 and 1989, this five acre wetland complex is an important wildlife link between Fitzgerald Lake and several hundred acres of the Veteran's Hospital property. It also has high potential for use as an outdoor classroom by JFK Middle School students and in the future could act as a link for middle school classes travelling between the school and the Fitzgerald Lake Conservation Area.

The brushy perimeter along North Farms Road gives no hint, no suggestion about how biologically interesting this conservation area is. From the road, a short, steep bank leads down to the sandy-bottomed stream and its wet floodplain. Fifteen feet from the road, the tangle of multiflora rose and other light-loving species starts to drop out and is replaced by clusters of speckled alder (*Alnus rugosa*), silky dogwood (*Cornus amomum*), and witherod (*Viburnum lentago*). Although difficult to get "through", it's fairly easy to navigate around these shrub islands. Thriving in the shrubless areas are the bright green fronds of sensitive fern (*Onoclea sensibilis*), large leaved skunk cabbage (*Symplocarpus foetidus*), and hundreds of touch-me-not (*Impatiens capensis*) (Map 6).

The stream continues along the north edge of the conservation area with a large wetland extending to the south. Moving upstream another fifty feet, the character of this wetland changes. Beyond a slightly higher and drier "island" vegetated with white pine (*Pinus strobus*), and occasional elm (*Ulmus rubra*) and hemlock (*Tsuga canadensis*), the ground becomes wetter and a classic swamp occurs. Tall red maples dominate the canopy and on the sphagnum and moss-covered hummocks of vegetation (mostly upturned old tree roots and old sedge hummocks), winterberry (*Ilex verticillata*), blueberries (*Vaccinium corymbosum*), azaleas (*Rhododendron roseum*), and chokeberries (*Aronia melanocarpa*; *A. arbutifolia*) abound. Broad patches of cinnamon fern (*Osmunda cinnamomea*), rough-leaved goldenrod (*Solidago patula*) and silky dogwood grow in open patches and green ash (*Fraxinus pennsylvanica*) and yellow birch (*Betula lutea*) become more common. This area also contains small populations of two plants that are rare in Northampton: alternate-leaved buckthorn (*Rhamnus alnifolia*), a shrub seldom found in the Pioneer Valley and larch (*Larix laricina*). At present, the Burke Section is the only known Northampton location for this native buckthorn, which typically grows in cold bogs and swamps further to the north or at higher elevations. It is also only the second known, naturally occurring site in Northampton

for larch, which also prefers cold peaty soils.

From here, heading east, the vegetation pattern changes again to include an open swamp forest that is dominated by young red maple (*Acer rubrum*), lots of poison sumac (*Toxicodendron vernix*) and an herb understory of sedges and marsh horsetail (*Equisetum sylvaticum*), an ancient species with feathery, spiralled branches. The presence of barbed wire on some of the nearby trees and the current species composition suggests that this area was used as a pasture in the past.

At the southern edge of the Burke Section, forested land rises abruptly and then gradually ascends to the open fields of the Spring Grove Cemetery². Of particular interest on these uplands is a huge tulip tree measuring approximately 15 feet in circumference. Located on a property corner, this tree was not cut in the past because it was used as a "witness tree" in property surveys.

Not far from the tulip is an area that has been and continues to be used by the Department of Public Works as a place to dump extra sand, leaves and other fill. Unfortunately, this debris is spilling into the wetland and has created the additional problem of encouraging the aggressive spread of an unwelcome non-native plant called Japanese knotweed (*Reynoutria japonica*).

The name of the nearby cemetery is a clue as to why the Burke Section is so wet and may also help explain why alternate-leaved buckthorn, larch and at least two other "northern" species (Canada yew (*Taxus canadensis*) and blue-bead lily (*Clintonia borealis*)) grow here. At the base of the sandy slope below the cemetery, numerous cold, clear springs bubble up. The year-round cold temperatures of these springs may prevent soil conditions from warming even during the summer, and thereby essentially simulate a climate more typical of higher elevations and latitudes.

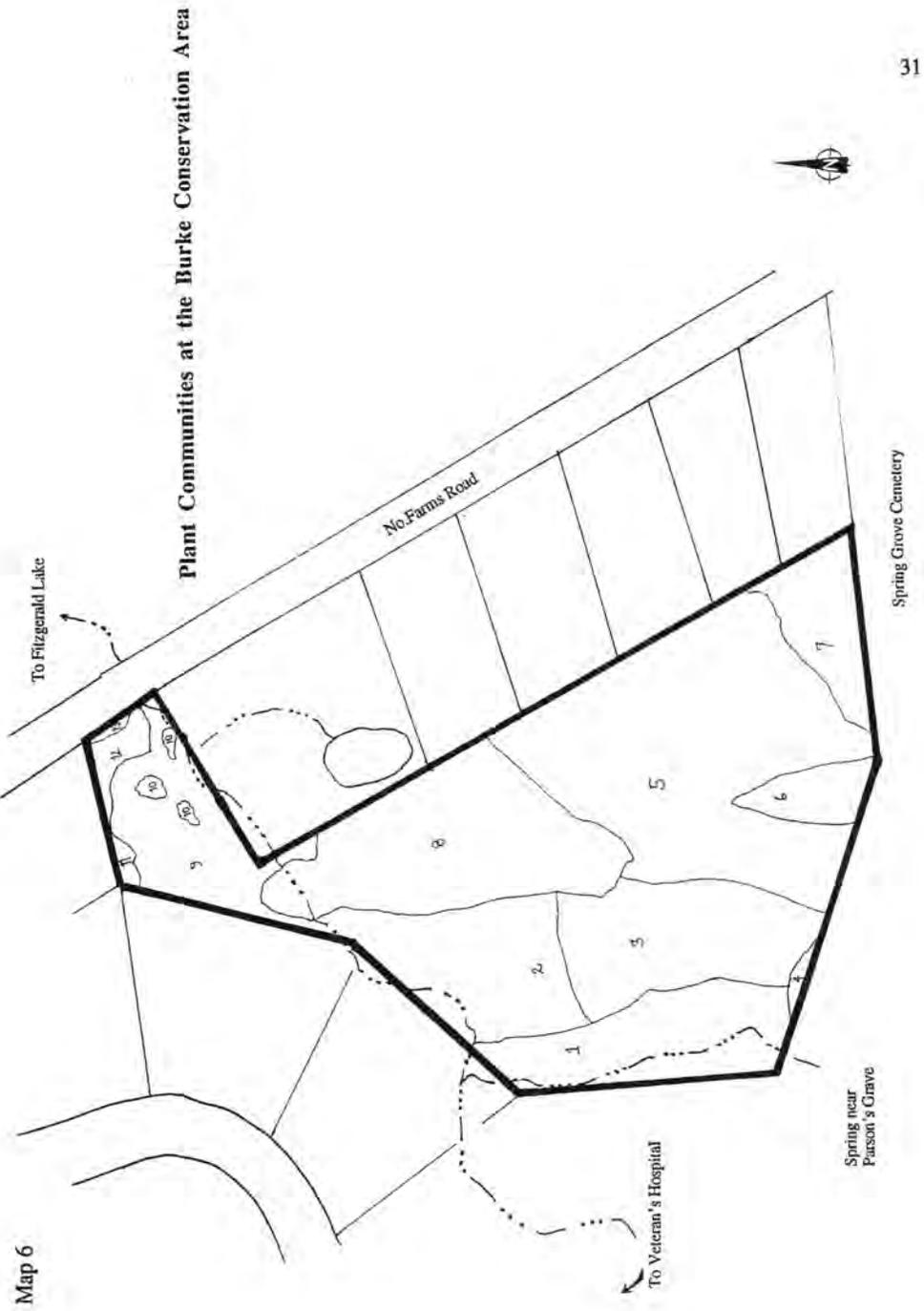
The sands that form the hillside and cemetery are part of an ancient delta that formed when the Mill River flowed into glacial Lake Hitchcock, 15,600-12,400 years ago. At the toe of the slope, these sands overlie an impervious clay layer (also deposited during the tenure of Lake Hitchcock) and ground water, unable to percolate further, surfaces.

² Spring Grove Cemetery is the only Northampton site for wild lupine (*Lupinus perennis*), currently "watch listed" in Massachusetts. Years ago, when the Cemetery was burned annually, wild lupine was much more widespread. Given this observation, the DPW should consider a controlled spring burn as part of its maintenance plan. The cemetery also contains the City's only known population of blunt leaved milkweed (*Asclepias amplexifolius*).

These springs flow into the main feeder brook for Fitzgerald Lake. This brook begins in Haydenville then flows south behind the Veteran's Hospital before veering east and crossing the Burke Section.

The protection of this watershed, with its extensive forest, should be a priority not only for the City of Northampton, but also the Town of Hatfield, whose aquifer is recharged by these waters.

Map 6. Plant Communities



THE BURKE SECTION, FITZGERALD LAKE CONSERVATION AREA

Legend of the Plant Communities

1. Yellow birch, hop hornbeam, alder and an extensive stand of cinnamon fern dominate this stretch along the stream that arises from the springs at Spring Grove Cemetery.
2. An open, sunnier section of the swamp with red maple and abundant cinnamon fern.
3. A mix of red maple, yellow birch, green ash, and occasional hemlock grow in this section of the swamp. Poison sumac, chokeberry, pinxter flower and blueberry are abundant. Also present are a dozen individuals of alder-leaved buckthorn, the only known locality for Northampton, and three larch, only the second known site in town where this species naturally occurs. Skunk cabbage is frequent.
4. Yard waste from Spring Grove Cemetery and a dense stand of Japanese knotweed.
5. An open, sedge-marsh horsetail understory grows below a thin canopy of red maple and scattered poison sumac. Very seepy ground with numerous springs.
6. Tongue of dense red maple.
7. Dense stand of sensitive ferns below red maple. Upland woods form border.
8. Dense thicket with lots of poison sumac, elm, ironwood and clusters of silky dogwood.
9. Clusters of silky dogwood, arrowwood, alder and elderberry with scattered red maples and a dense understory of skunk cabbage, touch-me-not, sensitive fern and cinnamon fern. This area is flooded in heavy rains and is perennially wet.
10. Silky dogwood and alder islands.
11. Brushier edge with occasional multiflora rose, honeysuckle and silky dogwood.
12. Open, bright roadside edge thick with multiflora rose, as well as Morrow's honeysuckle and Asiatic bittersweet. Other common roadside wildflowers also present.

REDISCOVERING ELWELL CONSERVATION AREA

The Natural History of a Familiar Landscape

From the Rail Trail I watch as the traffic streams over the Calvin Coolidge Bridge and the early morning mists rise and swirl over the blue-black waters of the Connecticut River. Someone in a single scull glides under the Rail Trail, and heads up into the broad, shallow-bottomed channel between Elwell Island and the mainland. This is a special place, one of the few stretches of river where both sides, including all of the island, are protected as conservation land.

Named after the family that owned the land for a century and a half, the 100+ acre Elwell Conservation Area is the Northampton Conservation Commission's second largest property. And it's growing. Since its purchase as a conservation area in 1981, as many as fifteen additional acres have been added to Elwell Island, not through acquisition, but through active deposition by the river.

Elwell Island is, in geologic time, a very new addition to the river. As late as 1794, city maps show not a trace of it (Map 7). However, by 1831 the first eight or so acres had formed and the area was already known as Elwell Island (Map 8). By the 250th anniversary of Northampton in 1904, the island had grown to approximately 25 acres (Map 9) and in 1981, when the property was purchased with the help of federal and state grants, it had expanded to 60 acres (Map 10).

Sandbars and islands are relatively common phenomena on meandering rivers like the Connecticut. In this case, however, the island's beginning and subsequent growth may have been related to the increase in erosion and flooding caused by regional deforestation during the 1800's. In addition, legend has it that the formation of the island was helped along by its first owner, Levi Elwell, who is said to have planted young willows to stabilize the soil on a newly developed sandbar. Whether Elwell planted willows on the island or not, by using the land as hayfields and pasture, he and his heirs strongly influenced the face of the island that we see today.

Knowing how the Elwell's used the island only partly explains the broad patterns we see today. The rest of the explanation requires recognizing differences in soil types, plant associations and flooding dynamics. Using this approach, four principal biological communities become apparent. The two most extensive communities are the open meadow, easily viewed from the Rail Trail, and the floodplain forest. The two smaller communities are the mudflats and the young sandy deposits called point bars (Map 11).

The Meadow

The open meadow covers nearly half the island, and is a half mile long by 300-400 feet wide. For more than a century, from the 1830's through the early 1940's, the Elwell's managed this section as cattle pasture and hay fields. Since then, the only management of the area has come in the form of annual flooding and repeated brush fires, most recently an eight acre burn in the fall of 1992.

Examined more closely, the open meadow can be broken down into a patchwork of smaller plant communities. Although dominated by goldenrod (*Solidago canadensis*), there are also swaths of ostrich fern (*Matteucia struthiopteris*), open areas with grasses, and near the northern end, huge patches of soapwort (*Saponaria officinalis*) and poison ivy (*Toxicodendron radicans*) (Map 12).

By mid-summer, the meadow vegetation is dense. The goldenrod (*Solidago canadensis*) is taller than an adult and the ostrich fern is chest-high. Towering over the ostrich fern are isolated clusters of stinging nettle (*Urtica dioica*), the principal food plant for red admiral butterfly caterpillars. In the grassy places, wild germander (*Teucrium canadense*), an unusual looking mint with pink-lavender blossoms, flowers in abundance in July and early August.

With all the seed that repeated flooding brings in, one puzzling question is why woody plants haven't colonized the open meadow. Fires may be part of the answer, but more likely it's because woody plants can't germinate and survive below the existing vegetation. The dense herb layer blocks most light from reaching the ground and in some areas, has a thick root zone that suppresses the growth of seedlings. In addition, goldenrod is thought to be allelopathic, producing chemicals that suppress the germination and growth of other species.

Floodplain Forest

Bordering the meadow on three sides is floodplain forest, the second largest community on the island. In many areas, the forest provides a classic example of this habitat type, with a tall canopy, no shrub layer, and a lush layer of herbs. Like the open meadow, the floodplain forest can be subdivided into smaller subsets, three in this case, based on the age and composition of its trees (Map 12).

The bulk of the floodplain forest lies on the oldest portion of the island. Here, monster cottonwoods (*Populus deltoides*) over three feet in diameter share the canopy with huge silver maples (*Acer saccharinum*). One hundred feet below them, the forest floor is carpeted

by nearly solid stands of either ostrich fern or wood nettle (*Laportea canadensis*). In the wetter lowspots, much smaller patches of false nettle (*Boehmeria cylindrica*), sensitive fern (*Onoclea sensibilis*) and touch-me-not (*Impatiens capensis*; *I. pallida*) are found.

The second type of floodplain forest is found on the younger, sandy deposits along the northern margin of the island. The precursor to the older floodplain forest, this area is dominated by small (under fifty foot tall) cottonwoods (*Populus deltoides*) and a thick understory of silver maple (*Acer saccharinum*) saplings and little else.

The final type of floodplain forest is found below the Rail Trail bridge and is dominated by box elder (*Acer negundo*) in the overstory and ostrich fern in the understory. The dominance of box elder, a species that often comes in after clearing, is consistent with the history of disturbance (trampling, fires) in this section.

The Mudflats

Mudflats are found in only two inlets: one long and narrow on the north side, and the other, much smaller, along the southwest shore. These inlets provide the sheltered, calm-water conditions necessary for fine silts and clays to settle out and the mudflats to develop.

Underwater for several months of the year, these areas are exposed during periods of low water. In shallow, isolated pools on the mudflats, American toads (*Bufo americana*) breed in late May and early June. By July the little toadlets can be found hopping across the mud.

During the growing season, these exposed muds are ringed by an interesting community of plants that has evolved to cope with a saturated watertable. Arrowhead (*Sagittaria latifolia*), mud plantains (*Alisma subcordatum*), false pimpernel (*Lindernia dubia*), monkey flower (*Mimulus ringens*), rice cut grass (*Leersia oryzoides*) and clammy hedge hyssop (*Gratiola neglecta*; *G. aurea*) are specific to silty mudflats and are among the most common finds (Map 12). Also present is the aggressive, non-native plant, purple loosestrife (*Lythrum salicaria*). Although its blossoms are attractive, this plant outcompetes native species, which provide better food and cover for wildlife. Fortunately, on Elwell Island the purple loosestrife population is still small enough that with a work crew of six to eight people and a week's worth of effort, all the loosestrife could be removed.

Point Bars

At both the ends of the island, extensive, linear sandy beaches have formed. These deposits, technically known as point bars, are important breeding grounds for a rare tiger beetle (*Cicindela puritana*) as well as habitat for another state-listed species, sandbar willow

(*Salix exigua*). Other plants growing on these point bars include a wide assortment of grasses, stands of young cottonwood and silver maple, plus hundreds of cocklebur (*Xanthium strumarium*) (Map 12). Point bars are unusual habitats because the perennial plants that survive on them must be able to tolerate droughty, nutrient poor conditions as well as extended periods of flooding. These fluctuations also help explain why so many of the species in these sandy environments are weedy annuals, commonly found in disturbed, well-drained soils along roadsides, railroads and in schoolyards.

In addition to rare tiger beetles and willows, these beaches are heavily used by boaters from Memorial Day until Labor Day. In spite of this heavy use, there was surprisingly little trash and only a few damaged trees during a July, 1993, visit. Additional posting and the installation of a sign that lists rules and regulations is recommended.

Wildlife

Although the island floods annually, sometimes for weeks at a time, each year it is recolonized by woodchucks, red fox, deer, mink and raccoons. In winter, the open meadow is an excellent place to watch for red fox, especially if you're on the Rail Trail bridge and have a good pair of binoculars. A walk along the island's shoreline will often turn up sign of mink, muskrat, and beaver, mammals well adapted for a river-island existence.

Red-winged blackbirds, gray catbirds, song sparrows, yellowthroats and red-tailed hawks are a few of the birds that nest on the island, and dozens of other bird species can be seen feeding and roosting on the island.

The Island's Future

Elwell Island continues to expand on both sides of its upstream end, but appears to be relatively stable at its downstream tip. The Connecticut River is gradually eroding the Northampton side of the island and also the bank along Damon Road. The river would also be eroding the Hadley bank were it not for the illegal rock riprapping that has been dumped there over the last fifty years. Because of the riprapping, the river may begin to carry more water in the channel on the Northampton side. If this happens, the present main channel could fill in and the island could one day become part of Hadley.

How the future growth of the island affects the channels of the Connecticut River will be interesting to observe, from both an ecological and social perspective. The stretch of river on the Hadley side is heavily used by boaters, who must now loop around the island's expanding sandbar. If dredging becomes an issue, the recreational-ecological conflicts that

arise will, no doubt, be hotly debated.

The Mainland

The remaining 35-40 acres of the Elwell Conservation Area are located on the mainland, between Damon Road and the river. Beginning a few hundred yards upriver from the Rail Trail Bridge, this section runs for about a mile and is part cornfield and part floodplain forest.

Twenty-five years ago, a walk upriver from the old railroad bridge would have taken you through open agricultural fields. The only trees were those along the river edge. Today, the same walk takes you through an open forest composed of scattered butternut (*Juglans cinerea*), a species in decline due to the invasion of the sirococcus canker (*Sirococcus clavigignenti-juglandacearum*). The understory is dense with touch-me-nots, ostrich fern and in seepier areas, skunk cabbage (*Symplocarpus foetidus*). Along the river's steep, eroding bank, silver maple is most common, but cottonwood, black willow (*Salix nigra*) and elm (*Ulmus rubra*) are also present (Map 12).

Near the few houses on Damon Road are planted stands of spruce (*Picea* sp.) and red pine (*Pinus resinosa*). Now part of the conservation land, these evergreen stands have gone unmanaged for many years and their understories are now a mass of poison ivy, Asiatic bittersweet (*Celastrus orbiculatus*), touch-me-not and young black cherry (*Prunus serotina*). Between the two pine stands is another block of land that has also transformed from open land 25 years ago to a tangly mass of vegetation with a few linden (*Tilia americana*), black cherry and cottonwood in the canopy.

Behind and below these pine plantings, the floodplain forest shifts from butternut to silver maple. Located in this silver maple zone is a good-sized population of green dragon (*Arisaema dracontium*), a threatened plant in Massachusetts. Related to jack-in-the-pulpit, this unusual looking arum is restricted to wet, silty floodplain soils³.

³ Six additional green dragon sites are known in Northampton, but only one other is protected. At present, Northampton has more green dragon sites and larger populations than anywhere in the state.

The westernmost stretch of conservation land is flat, rich agricultural bottomland, currently cultivated in corn. Between the cornfield and the river is a narrow strip of forest that shifts from young (under 25 year old) box elder and grape to staghorn sumac (*Rhus typhina*) clones to a wider band of older (over 25 year old) silver maple. Below the silver maple, the understory is typically open and easy to walk through, with a patchwork of grasses, ostrich fern, poison ivy (*Toxicodendron radicans*), white snakeroot (*Eupatorium rugosum*), virginia creeper (*Parthenocissus quinquefolia*) and Asiatic bittersweet (*Celastrus orbiculatus*).

The upstream end of the conservation area, which lies behind the River Run apartments, is used by residents for swimming, fishing and relaxing. Behind the apartments is a small triangle of upland woods containing large linden, butternut, green ash and silver maple. In addition to ostrich fern, the thick understory also contains large patches of blackberries (*Rubus* sp.), indicating where this section was open and cleared not long ago.

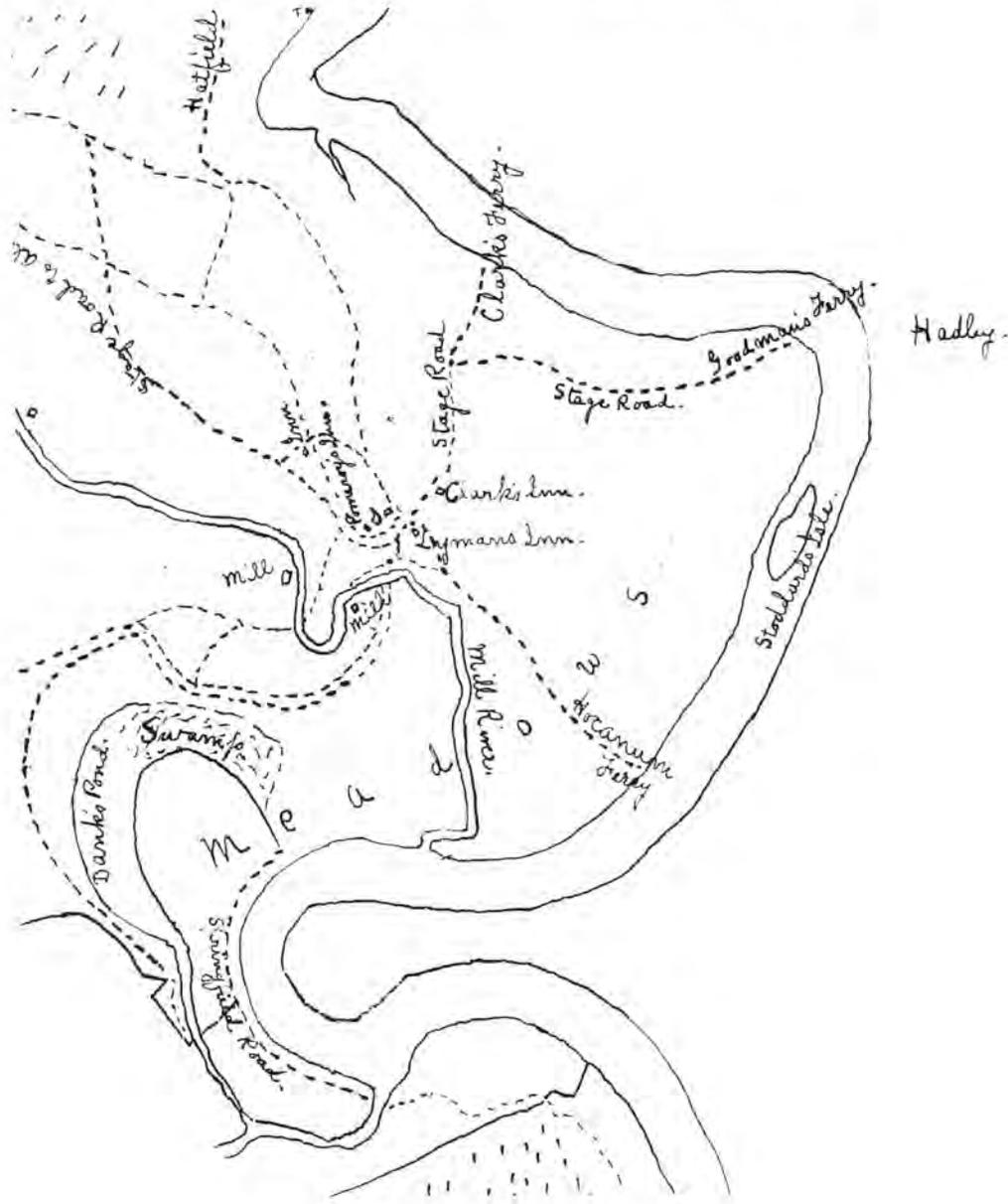
Summary

Elwell Island Conservation Area is a rich area with excellent opportunities for natural history study, landscape interpretation, agriculture and recreation. Aside from encouraging research on the island, posting and regular trash patrol, no management is necessary.

People access Elwell Island by boat, while the mainland portion of the Elwell Conservation Area can be accessed by the farmroad behind the funeral parlor on Damon Road or by footpaths behind the apartments. No trails are maintained in either area.

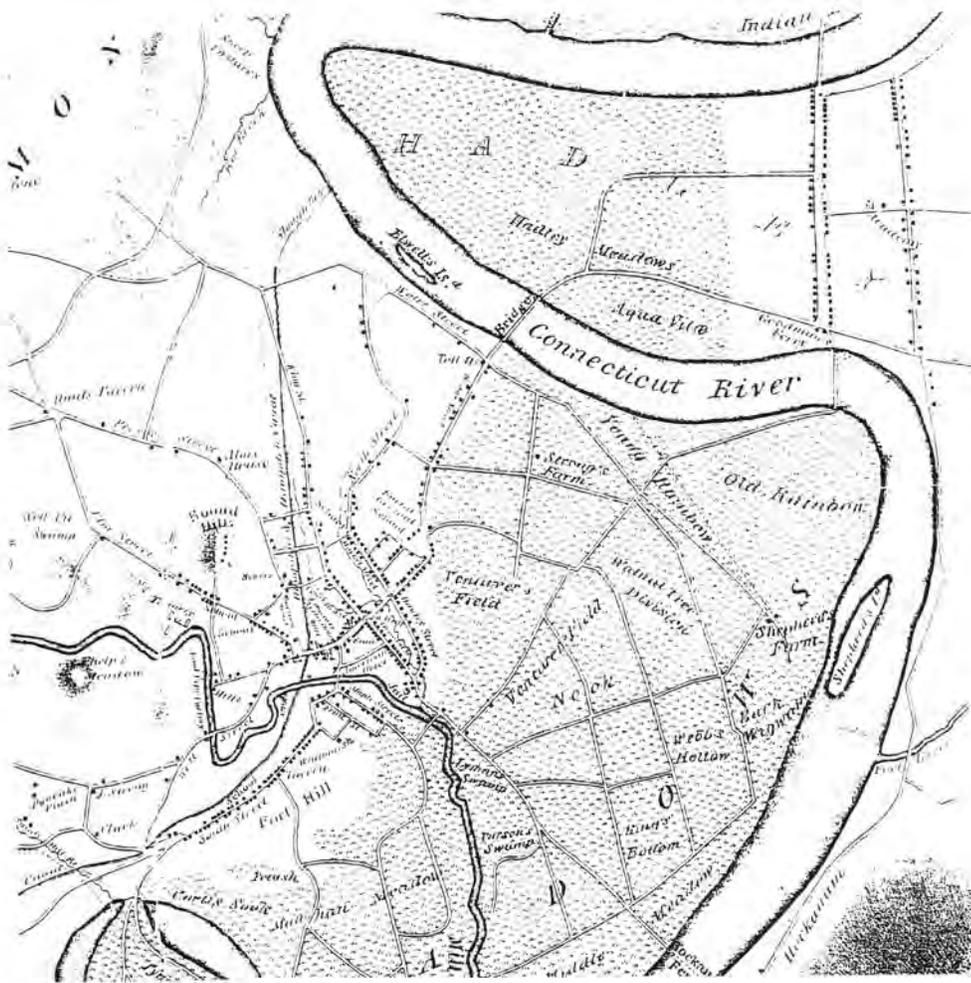
Map 7. The 1794 map of Northampton which shows no trace of Elwell Island.

Map 7. The 1794 map of Northampton which shows no trace of Elwell Island.



Map 8. The 1831 map of Northampton which shows the beginning eight (or so) acres of Elwell Island.

Map 8. The 1831 map of Northampton which shows the beginning eight (or so) acres of Elwell Island.



Map 9. The 1895 map of Northampton depicting Elwell Island, which had grown to approximately 25 acres in size.

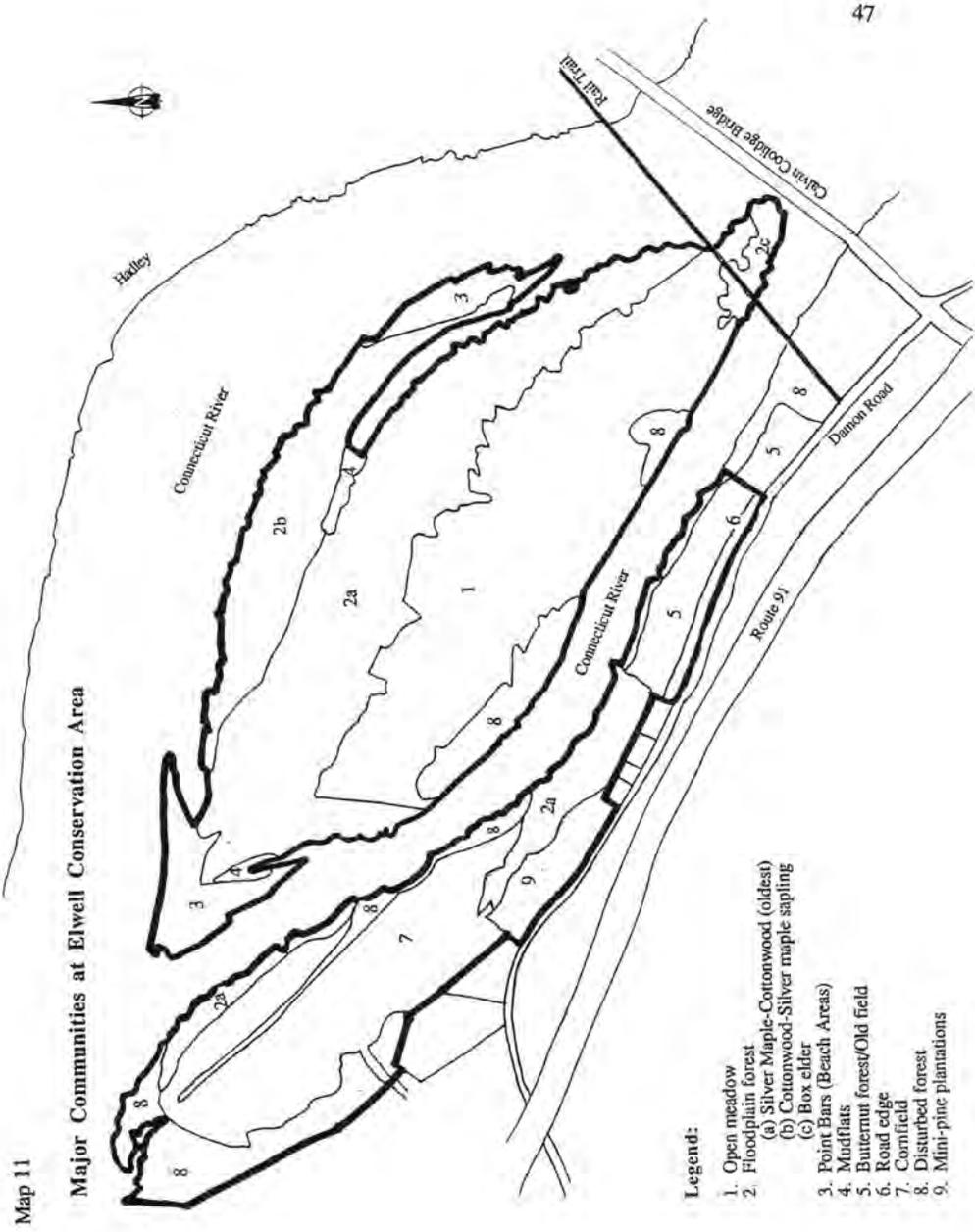
Map 9. The 1895 map of Northampton depicting Elwell Island, which had grown to approximately 25 acres in size.



Map 10. Major Communities

ELWELL CONSERVATION AREA

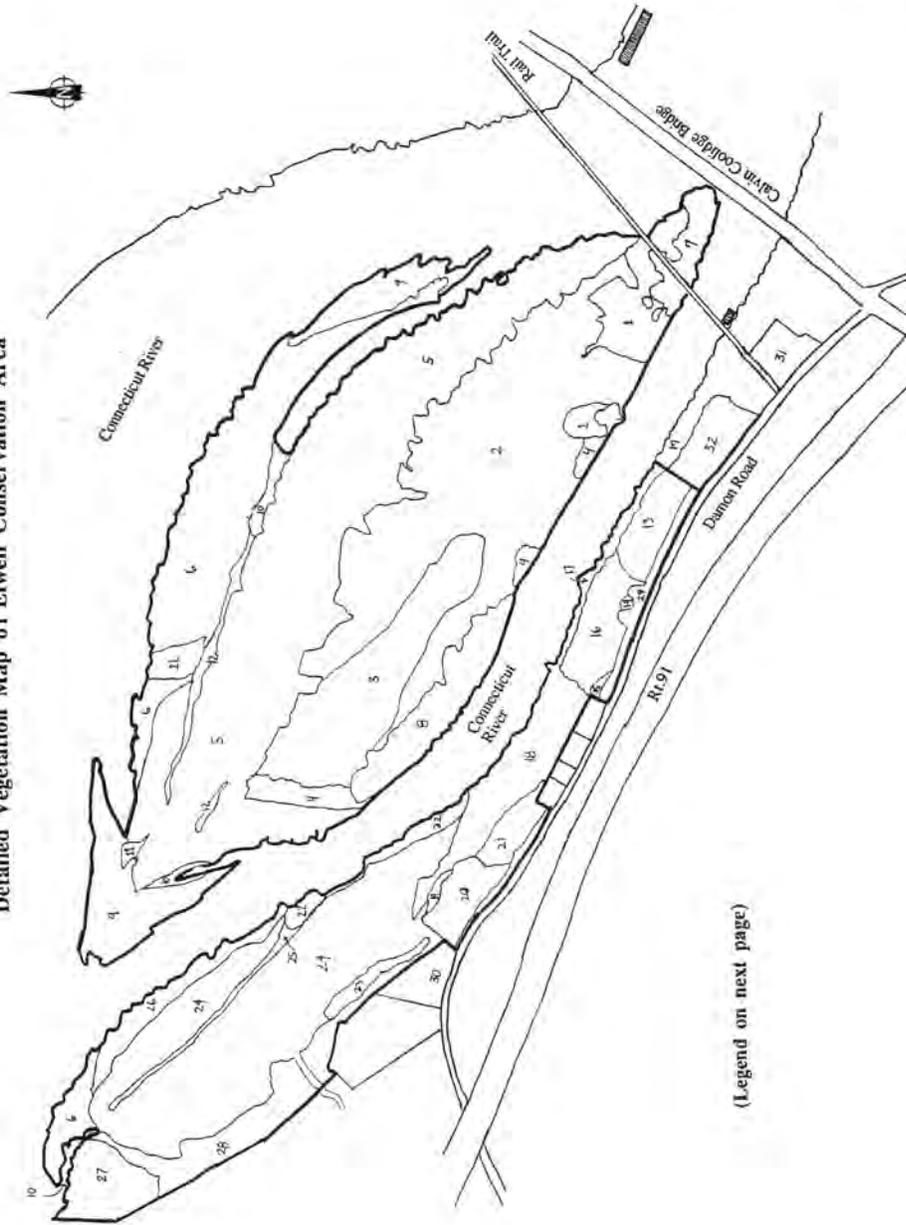
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Map 11. Detailed Vegetation Map

Map 12

Detailed Vegetation Map of Etwell Conservation Area



(Legend on next page)

THE ELWELL CONSERVATION AREA

Legend for the Detailed Vegetation Map

The Island

The Open Meadow

1. Ostrich fern with occasional touch-me-not, stinging nettle, and isolated elderberry and arrowwood
2. Goldenrod (*Solidago canadensis*) dominated with isolated, small grass patches
3. Grass belt with large patches of poison ivy and soapwort; blackberry, asparagus, and common milkweed occasional
4. Staghorn sumac clones

The Floodplain Forest

5. Classic floodplain forest characterized by a cottonwood-silver maple overstory, no shrub layer and an herb layer of either ostrich fern or wood nettle. Patches of virginia creeper and grapes; some problem with non-native Asiatic bittersweet
6. Young cottonwoods with sapling silver maple growing on newly deposited soils
7. Box elder ringed by a silver maple-cottonwood mix
8. Large cottonwoods mixed with silver maple along channel edge

The Point Bars

9. Bare sands with clusters of willow (*Salix* spp.), young cottonwood and silver maple, and stands of Japanese knotweed. Chinese sandbur growing along willow margin.

The Mudflats

10. Diverse community containing abundant pimpnel, arrowhead, rice cut grass, beggarticks (*Bidens cernua*; *B. tripartita*; *B. vulgata*), mud plantain, monkeyflower, *Eleocharis*, *Scirpus*, and purple loosestrife.

* * *

11. Logs, sticks and miscellaneous organics deposited by floodwaters; occasionally abundant patches of touch-me-not
12. Floodchannel with abundant false nettle, touch-me-not and clearweed

The Mainland

13. Open area characterized by touch-me-not (*Impatiens pallida*; *I. capensis*), sensitive fern, ostrich fern, dodder, virginia creeper, and moneywort
14. Seepy area with abundant skunk cabbage, silky dogwood, alder, and touch-me-not
15. Japanese knotweed
16. Butternut forest with goldenrod, touch-me-not, ostrich fern, white snakeroot, garlic mustard, clearweed, and jack-in-the-pulpit in the herb layer
17. Silver maple-cottonwood mix with some butternut and slippery elm
18. Silver maple floodplain forest with few herbs.
19. Shallow depression with mud plaintains, beggar's ticks, smartweeds, grasses, and abundant silver maple seedlings.
20. Planted red pine stand; pokeweed, poison ivy, touch-me-not, virginia creeper, Asiatic bittersweet abundant in understory
21. Planted spruce stand. Mixed understory. See 20.
22. Box elder-grape dominated zone along river
23. Open marsh with cattails, touch-me-not, and tearthumbs
24. Cornfield (approx. 16.5 acres)
25. Staghorn sumac overstory with soapwort, Asiatic bittersweet, and white snakeroot in understory
26. Silver maple forest with some box elder and a patchwork of grasses, asiatic bittersweet,

touch-me-not, and white snakeroot

27. Ostrich fern, blackberry, goldenrod understory below silver maple, linden, cottonwood overstory

28. Red maple, silver maple, cottonwood mix bordered by tangle of blackberry, silky dogwood, elderberry, goldenrod, touch-me-not and bur cucumber

29. Sugar maple forest with some black cherry on fill for Damon Road

30. Department of Environmental Management Regional Office

31. Elwell Island State Park (Rail Trail and Small boat Access) and Department of Environment Management Environmental Police

THE NATURAL HISTORY OF THE FITZGERALD LAKE CONSERVATION AREA

It was a beautiful day. One of those wonderfully hazy, hot afternoons when you realize that summer has really arrived and time seems to float, one hour melting into the next. To take advantage of it, my friend and I decided to go for a leisurely canoe trip. But since we didn't want to drive too far or compete with the weekend motorboat traffic on the Connecticut River, we headed for Fitzgerald Lake.

Located in the northeast corner of Northampton, Fitzgerald Lake is such a super spot that it's surprising so few people visit it. When we arrived there was only one other boat--a father and son who had come to fish. During the next several hours, we saw less than a dozen people, mostly fisherman, trying their luck along the northern shore.

Our outing was also a fishing trip of sorts, but instead of fish, we were hoping to catch sights of birds, reptiles, and other wildlife. We also hoped to find plants which I hadn't yet recorded in Northampton. Because of this, our canoeing was a mixture of gentle, intermittent paddling, lazy drifting and sometimes pulling the canoe behind us as we prowled on foot along the shoreline. The water was refreshing and in certain places we sank in up to our knees in the cool, fine mud.

Throughout the afternoon, we stayed close to the mat of vegetation ringing the shoreline in all but a few rocky sections. In the water just beyond the mat were a variety of interesting aquatic plants, including at least three types of pondweed (*Potamogeton amplifolius*; *P. ephihydrys*; *P. foliosus*), a diminutive bladderwort (*Utricularia minor*), a spatterdock lily (*Nuphar advena*), and extensive patches of an uncommon water lily known as water shield (*Brasenia schreberi*). Closeby, the wettest muds were rife with burreed (*Sparganium androcladum*), arrowhead (*Sagittaria latifolia*), and grass-like plants called *Eleocharis*. Further back from the water's edge, species richness increased dramatically. Among the most common plants were boneset (*Eupatorium perfoliatum*), blue vervain (*Verbena hastata*), virgin's bower (*Clematis virginiana*), spotted touch-me-not (*Impatiens capensis*), asters (*Aster* spp.) and a miscellany of brilliant green sedges, grasses, and rushes. Also within this slightly higher, drier zone were dozens of bright pink-purple blossoms of swamp milkweed (*Asclepias incarnata*), which on this afternoon were a favorite nectar source for fritillary butterflies, two kinds of skippers and several types of bees. There were also two impressive wasps, both over an inch long. One was metallic blue-black, while the other had an orange and ebony body and sported indigo wings.

As we skirted the margin, we saw fish called pumpkinseeds tending their circular gravel nests, basking watersnakes, motionless green frogs, and several kinds of dragonflies

and damselflies. Red-spotted newts swam to the surface, took a gulp of air and then dove quickly back to the safety of the underwater vegetation; painted turtles poked their heads above the surface and then slipped below with hardly a ripple.

Just as it was for us that day, the "lake" is what draws most visitors to the conservation area. Created in the mid-1960's by the Fitzgerald family (of Fitzgerald Fence on Bridge Road), Fitzgerald Lake covers forty acres of what used to be Northampton's most extensive swamp forest and marshland. The lake (actually a large pond) was going to be the focus of a very exclusive development. But as wetland regulations became stricter, the project became less feasible and in 1977, Fitzgerald Lake and 110 acres of the surrounding rocky woodlands, abandoned fields and wetlands were purchased by the City of Northampton.

Since then, additional acquisitions have increased the size of the Fitzgerald Lake Conservation Area to nearly 300 acres, making it almost three times the size of the next largest conservation area. These new acquisitions include a beautiful beaver pond, a section of recently cut forest and more rocky upland woods. The result is that this area, with its combination of extensive wetlands and uplands, is one of the most ecologically diverse in town. Home to nearly all of the types of mammals found in our area (Appendix 3), this conservation land abuts more than one thousand acres of as yet unprotected open space. Beyond the Northampton townline are several thousand additional acres of undeveloped land that extend through Hatfield and up into Whately. Designated by the U.S. Fish and Wildlife Service as Forest Legacy Land, this huge section of wooded hillsides and wetlands includes key watershed for Hatfield's aquifer and is an important wildlife corridor for wide-ranging mammals like bear, fisher, otter and coyote.

Viewed from an airplane, the Fitzgerald Lake Conservation Area and its surroundings are a patchwork of textures and colors. Within the conservation area, the patterns delineate six major units: (1) Fitzgerald Lake, (2) a beaver pond, (3) a conspicuous, north-south strip of younger vegetation on an abandoned telephone right-of-way, (4) a recently cut forest, (5) an old field, and (6) extensive woodlands dotted with dark green clusters of hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*) (Map 13, 14). An early October flight would make it easy to further separate the woodlands by the autumn foliage: the red maple swamp forests would glow brilliant red, while the rocky, oak-hickory uplands would be a wash of greens, golds and burnt orange.

Because most visitors stay around the lake, they don't get to see these other interesting places. One of my favorites is the beaver pond located downstream from Fitzgerald Lake. The easiest way to get there is to follow the abandoned telephone right-of-way (R.O.W) north from the dam (Map 15). The R.O.W. actually leads right to the beaver pond, but as it gets

close, the ground becomes wetter and the vegetation much brushier.

With its hemlock border, open expanse of water, skeletonized trees and lack of trash, the beaver pond has the look and feel of a remote, wild place. Here, you can watch the high-diving performances of belted kingfishers, the shy behavior of wood ducks⁴ and the territorial displays of red-winged blackbirds. Tree swallows dip and glide, bullfrogs call from the shallows, and woodpeckers (downy, hairy, pileated, red-bellied and flicker) poke, hammer and carve the flood-killed trees as they search for insects. On a single outing this July, a group of us found sign of coyote, muskrat, raccoon, fox, deer, bear, beaver (of course) and, along the rocky feeder brook in the pond's northwest corner, the characteristic fish-scale scat of river otters. On the same day, we also discovered two winter wren nests in the roots of a nearby overturned tree and, most exciting, a pair of nesting great blue herons. Rare nesters in Northampton, this pair of great blues successfully reared two offspring.

A good place to watch for wildlife and admire this pond is from the boulders on its northern edge. From the top of these glacial erratics, the view to the south includes open water, scattered dead trees and, in the background, the fringes of a large marsh (Map 13). Now dominated by cattails (*Typha latifolia*) and hummocks of tussock sedge (*Carex stricta*), meadowsweet (*Spirea latifolia*) and red maple (*Acer rubrum*), this marsh covers most of what was once Cooke's Pasture (Map 16). Over the last 30 or so years, the pasture has slowly become a rejuvenated wetland, thanks to industrious beavers' and the gradual filling in of old drainage ditches.

Not far away from these boulders, between two rocky hills at the east end of the pond, is the beaver dam. The beavers have been in and out of this area several times during the last two years. Although they were here during the early part of the summer, they departed again in early September, 1993. Since then, their 4'-5' foot high dam has fallen into disrepair and the water level in the pond has dropped a few inches. Below the dam, the brook continues as "Broad Brook", flowing east through marshland, Cole's Meadow and eventually into Hatfield's Mill River.

On the south side of the beaver dam, most of the rocky upland and swamp forest is privately owned (Map 13, 14). A mixture of younger and older forest, this tract continues virtually uninterrupted, stretching east to Cole's Meadow Road and Route 5 and south for over a mile. Throughout the forest is a network of wood roads that link this area to the 12-acre Marian Street Conservation Area, the 15-acre Pines Edge Conservation and Boggy Meadow Road.

4 This area and the surrounding cattail marsh would be a good place to install several wood duck nesting boxes.

On the north side of the beaver dam is the section of newly acquired conservation land that is very visible from the air because of recent cutting (Map 13). In 1990, loggers removed nearly all the oak (*Quercus* spp.) and white pine (mostly 80-120 years in age). Left behind were thin-crowned red maples, a few seed trees and the white pine, oak and hickory (*Carya* spp.) that weren't worth harvesting. Below this sparse canopy, the area is a tangle of slash, witch hazel (*Hamamelis virginiana*), resprouting mountain laurel (*Kalmia latifolia*), black birch (*Betula lenta*) saplings and dozens of sun-loving, disturbance species like fireweed (*Erechtites hieracifolia*), cleavers (*Galium aparine*) and common speedwell (*Veronica officinalis*) (Map 16).

To get a sense of what this forest looked like before the 1990 logging, you need to backtrack to the west side of the beaver pond and head west into the remainder of the conservation area's rocky uplands.⁵ Covering roughly 50% of the conservation area, these rocky uplands are dominated by oaks--red oak (*Quercus rubra*), black oak (*Q. velutina*), white oak (*Q. alba*) and chestnut oak (*Q. prinus*). Much less common are red maple, hickories, resprouting American chestnut (*Castanea americana*) and small clusters of white pine and hemlock.

As is typical of these dry, acidic upland areas, the understory vegetation is abundant, but low in its diversity. Most characteristic are the knee-high clusters of huckleberry (*Gaylussacia baccata*), low-bush blueberries (*Vaccinium angustifolium*; *V. vacillans*), dangleberry (*V. frondosa*) and acres of waist-high mountain laurel. Interspersed between the shrub layers, bedrock outcrops and patches of decaying oak leaves are colonies of wintergreen (*Gaultheria procumbens*), Pennsylvania sedge (*Carex pensylvanica*) and partridgeberry (*Mitchella repens*). In slightly moister areas, wild sarsaparilla (*Aralia nudicaulis*) and Canada mayflower (*Maianthemum canadense*) are widespread, and in sunny, exposed areas (particularly along the telephone line) trailing arbutus (*Epigaea repens*)--Massachusetts' state flower--is frequent.

During the late 1980's, a 10+/- acre section of these uplands burned (Map 13). Beginning in Cooke's Pasture and continuing over the R.O.W. and across the ridge, this suspicious blaze killed dozens of canopy trees. Charring can still be seen on the bark of most of the living trees and the ground is littered with the trunks and branches of many of those killed by the fire. Many of the scorched trees and shrubs have resprouted, giving the area a

⁵ You could also head north to privately owned land. The species composition of the forest is similar to other upland woods, but the topography is more rugged and marked by dozens of boulder fields and several ridges. Between the ridges are vernal ponds and along the R.O.W. a permanent pond. The latter is a potential breeding site for state-endangered marbled salamanders, which were reported from the Fitzgerald Lake area in the 1930's.

scrubby look. Among the resprouts are hundreds of mountain laurel, witch hazel, oak, red maple, blueberries, huckleberries, American chestnut and sweet fern (*Comptonia peregrina*) (Map 16). This fire-scarred, secondary forest is the preferred habitat for rufous-sided towhees, which are abundant here but virtually absent in the surrounding uplands. Towhee populations have been declining in recent years as secondary growth forests are not as common as they once were.

All of these rocky uplands were historically used as woodlots. Frequently long and linear, it was not uncommon to own a 15-acre woodlot that was only 150 feet wide. Knowing this helps to explain the odd configuration of the Fitzgerald Lake Conservation Area's northwestern boundary: the narrow rectangular tongue of private land is one of these old wood lots.

Today, most of the forest in the conservation area's rocky uplands is between 60-120 years old. Nevertheless, in this area, you can still find some stumps of more recently cut trees. Close to Fitzgerald Lake, the amount of recent cutting increases and in many areas the forest is only thirty to forty years old. In addition to the smaller size of the trees and the presence of cut stumps, the cutting history near the lake is recorded in the disturbance-dependent species that germinated after logging. In these areas, you can find lots of black birch, big-toothed aspen (*Populus grandidentata*), a band of black locust (*Robinia pseudo-acacia*) and even a few old pin cherries (*Prunus pensylvanica*).

As you wander through the Fitzgerald Lake Conservation Area, it quickly becomes obvious that the bedrock is always at near the surface. Classified as a hornblende quartz monzodiorite gneiss, the bedrock was originally part of the volcanic island arc that collided with North America during the beginning stages of the formation of the supercontinent Pangaea. The pressure and heat of the collision melted and transformed the original igneous material into the metamorphosed gneiss we see today. Since then, roughly 400 million years of erosion have worn away more than a mile of overlying rock, exposing the roots of what were once Himalayan-sized mountains.

More recently, during the last two million years, a series of continental glaciations have rounded and modified our local landscape. The last of these departed approximately 12,000 years ago. During its retreat, all but the highest of the bedrock ledges that characterize the conservation area were hidden below the milky, iceberg dotted waters of glacial Lake Hitchcock. During its 3000 year tenure (15,600-12,400 years before present), shallow deposits of silts and clays settled on to a thin veneer of glacial till.

Since the lake's departure, the silts, clays and some of the tills have eroded off the hillsides and have been redeposited in the bedrock basins and along intermittent drainages.

Because of this, many of the depressions and low spots contain thick, virtually impervious clay deposits that tend to collect rainwater and snowmelt (Maps 13, 16). Many of these shallow, scattered pockets support classic wetland vegetation, including cinnamon fern (*Osmunda cinnamomea*), spotted touch-me-not, swamp white oak (*Quercus bicolor*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pensylvanica*), and of course, red maple.

The deepest of these depressions lies just to the northwest of the conservation area (Map 16). Surrounded by obligate wetland plants like pin oak (*Quercus palustris*), tupelo (*Nyssa sylvatica*), buttonbush (*Cephalanthus occidentalis*) and winterberry (*Ilex verticillata*), this area acts like a catch basin, filling temporarily with water during the winter and spring. Dry by the end of summer, this vernal pond is used by species that have evolved to depend on this particular type of habitat. In early April, wood frogs, spring peepers and spotted salamanders, roused by spring rains and warming temperatures, migrate to its icy waters to breed. Delicate-looking crustaceans known as fairy shrimp can also be found here. Wood ducks, mallards, and black ducks visit this woodland haunt in the spring and fall, and deer frequently pass through when the area is dry and grassy.

Another very interesting wetland lies about a mile south on property still owned by the Fitzgerald family (Map 16). A one acre pocket of peat (at least four feet deep and maybe much deeper) is perched in a low spot created by the surrounding hills. This little basin is fed by rainwater, and with little chance of buffering, conditions have developed for those select species that can survive water-logged, nutrient poor, acidic conditions. Growing on a firm mat of sphagnum moss are banks of water willow (*Decodon verticillata*), Northampton's second known population of Virginia chain fern (*Woodwardia virginica*) and thickets of high-bush blueberry (*Vaccinium corymbosum*), mountain holly (*Nemopanthus mucronata*), leatherleaf (*Chaemadaphne calyculata*). Two pitch pines (*Pinus resinosa*) have also been able to survive in these rigorous conditions. Scattered along the edge are swamp white oak, tupelo, red maple and immediately behind, dozens of chestnut oak. Further investigations on the depth of the peat and for state-listed species are recommended.

Not far from this peat pocket is a large abandoned field that borders Fitzgerald Lake (Map 13). In the last 15 to 20 years ago, this area has become a tangle of young trees, shrubs, wildflowers and grasses. White pine, pin cherry and red maple mix with large clones of paniced dogwood (*Cornus racemosa*), goldenrod (*Solidago* spp.), asters and virtually impenetrable thickets of two aggressive non-natives--multiflora rose (*Rosa multiflora*) and Asiatic bittersweet (*Celastrus orbiculatus*). Also present here are two even more insidious species. Much less showy, they are closely related shrubs known as European buckthorn (*Rhamnus cathartica*) and glossy buckthorn (*R. frangula*). Of the two, glossy buckthorn is of greatest concern. Unlike most non-native plants that thrive only in disturbed soil, glossy buckthorn readily colonizes a wide variety of habitat types: woodlands, floodplains, swamps,

marshes, roadsides, bogs, sandplains and more. In these areas, this woody pest can quickly form dense colonies, reducing light levels so drastically that native species cannot compete. What's more is that this species is virtually valueless to wildlife; unpalatable toxins in its leaves and fruit dissuade most species from eating it, and its branches are too thin and sparse for wildlife cover or nesting birds.

The presence of fruit-bearing glossy buckthorn in this area threatens to degrade the remainder of this field and to ruin the integrity of the vegetation around the lake, the beaver pond and in Cooke's pasture. The control of glossy buckthorn, as well as the other non-native species previously mentioned, should be a very high priority.

Future Directions

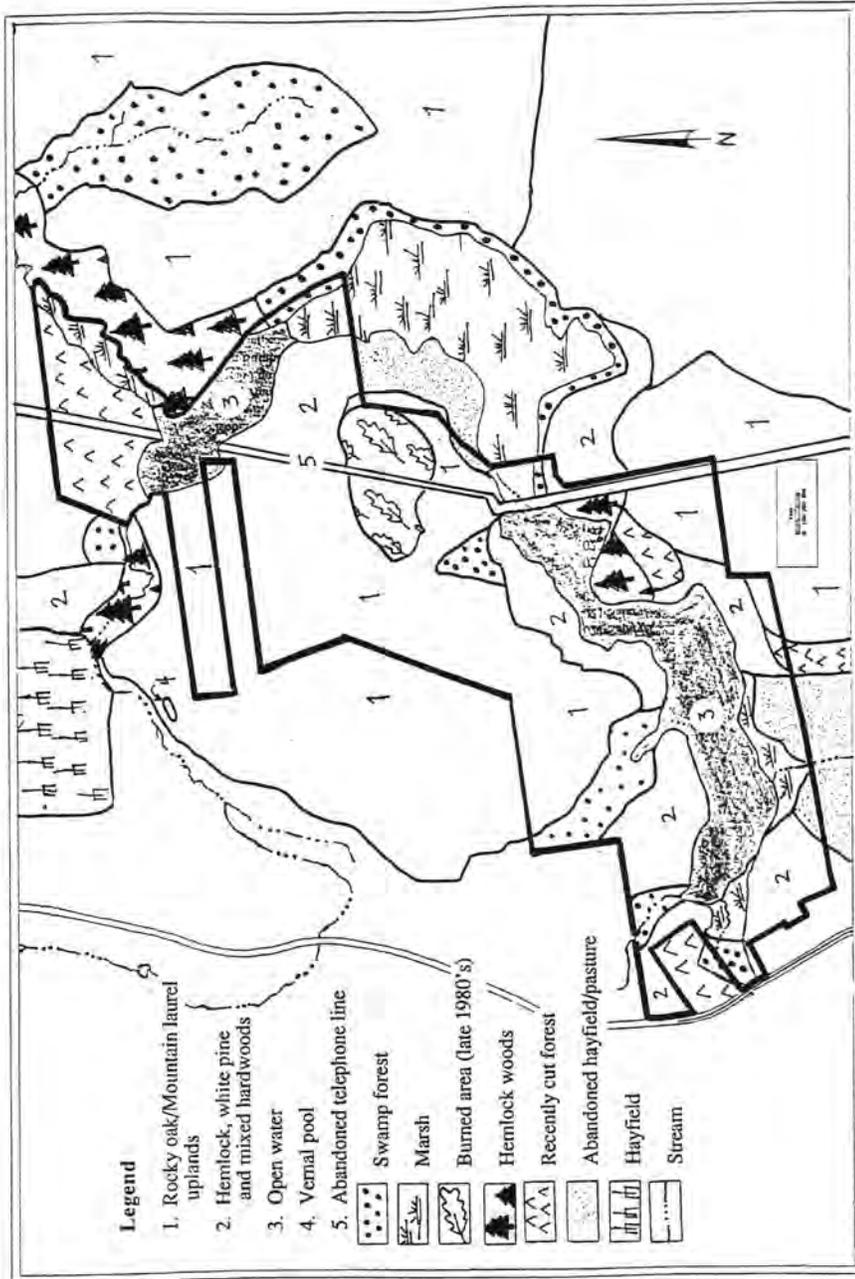
Aside from controlling non-native plants and continuing routine maintenance (trash pick-up, trail improvement, brush clearing along the dam, and blocking 4-wheel drive traffic), the Commission is encouraged to enlist the help of volunteers to certify the conservation area's vernal pools. These volunteers could also provide presence/absence data for state-listed species, particularly for spotted turtles and marbled salamanders, which were both historically reported in the Fitzgerald Lake area.

Key areas for protection should include, if possible, the large vernal pond to the northwest of the conservation area, the peat pocket on the Fitzgerald property, the extensive wetlands between Cooke's Pasture and Pines Edge Conservation Area and the large swamp forest/drainage located between the beaver pond, Cole's Meadow Road and the Marian Street Conservation Area.

The presence of this wild land helps to make the Fitzgerald Lake Conservation Area one of the City's richest ecological areas. In addition to outstanding wildlife habitat, Fitzgerald Lake Conservation Area provides Northampton residents with excellent opportunities for natural history education and recreation. And thanks to members of the Broad Brook Coalition and other volunteers, Fitzgerald Lake is now available to an even wider audience. In November, 1993, this group completed construction of a 500-foot, wheelchair accessible walkway that extends from the North Farms Road parking area, through a red maple-tussock sedge marsh and over to the canoe launch. The strength of the Broad Brook Coalition's commitment to the Fitzgerald Lake area is an inspiration to anyone concerned about conservation land.

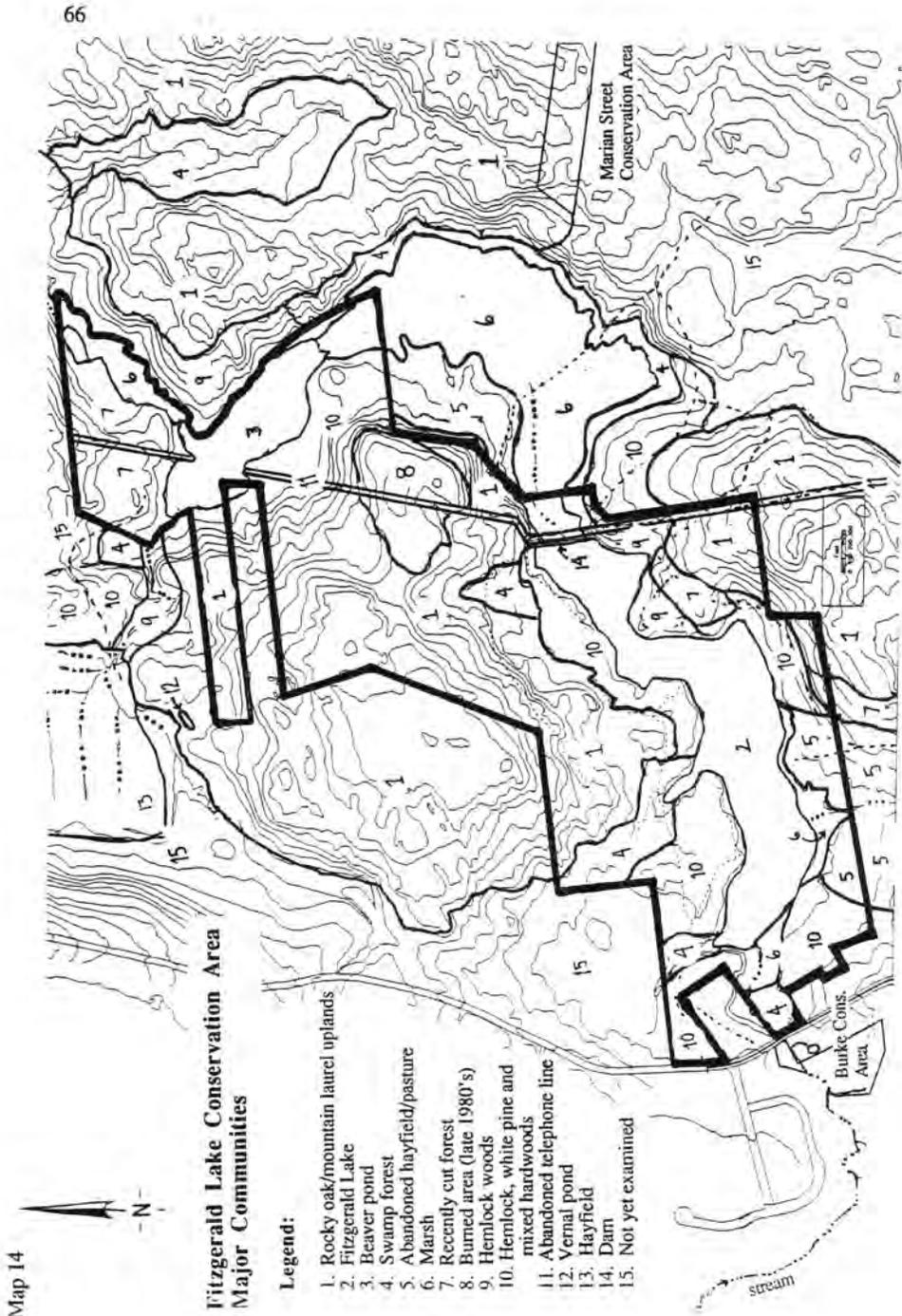
Map 13. Major Communities (without contour lines)

Major Communities at the Fitzgerald Lake Conservation Area



Map 13

Map 14. Major Communities (with contour lines)



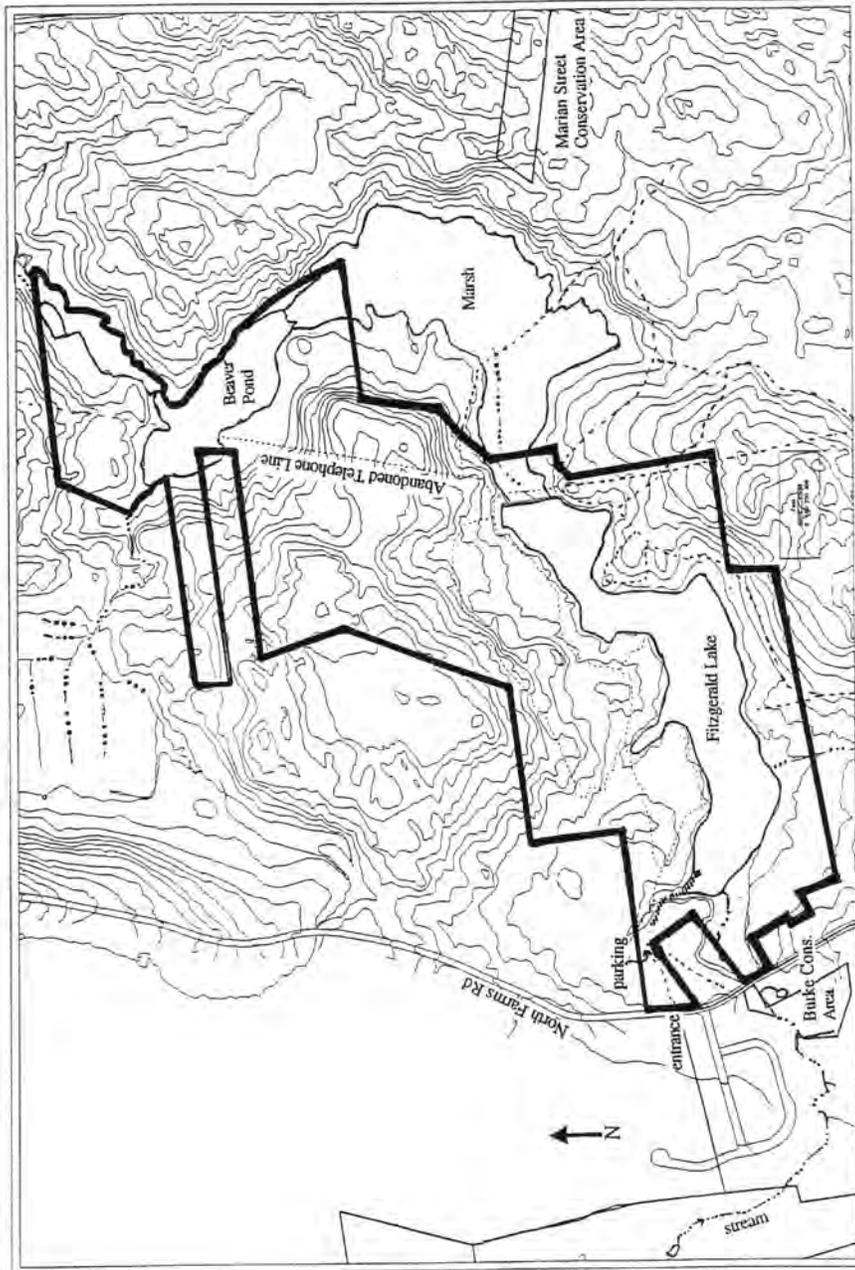
Map 15. Trails

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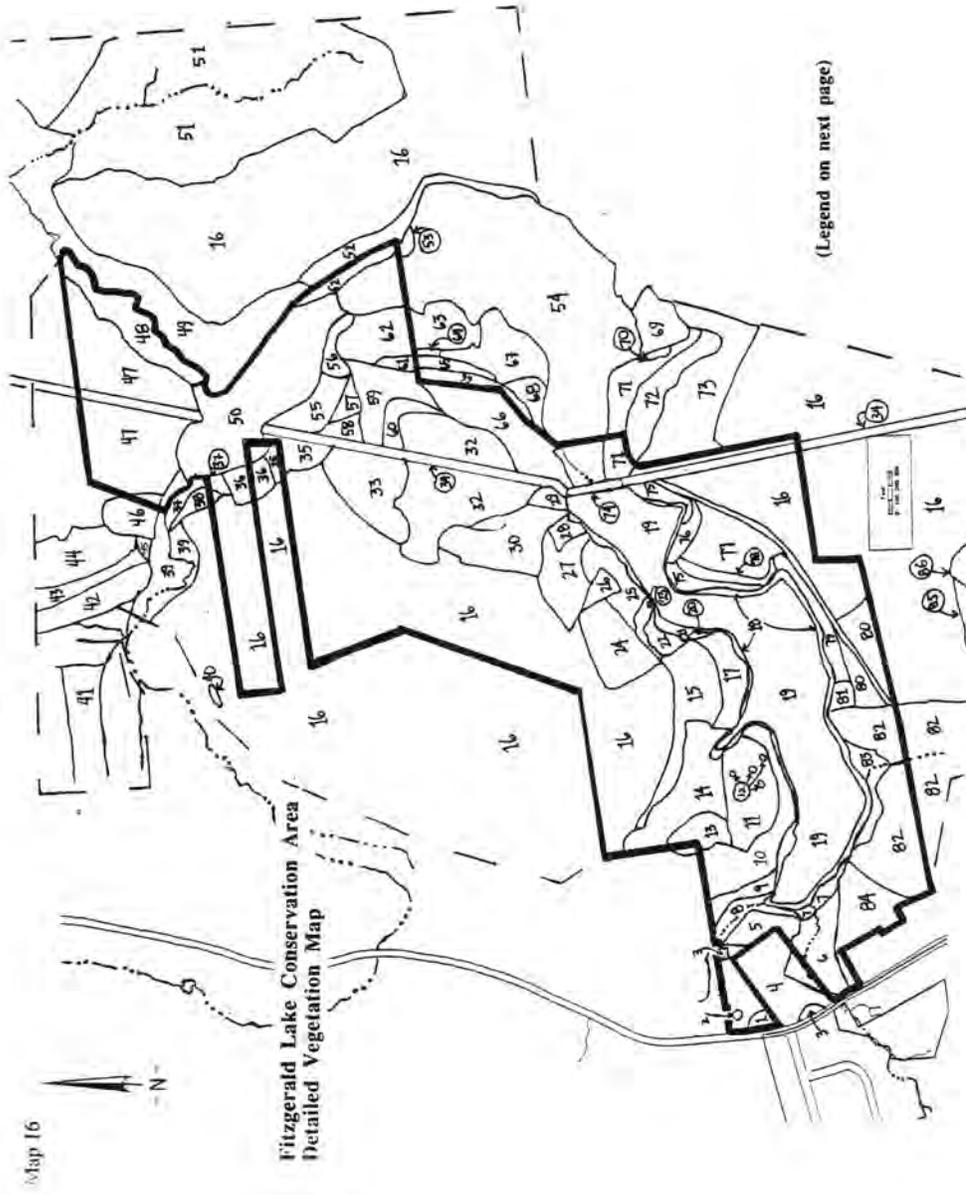
FITZGERALD LAKE

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Fitzgerald Lake Conservation Area
Trails Map



Map 16. Detailed Vegetation Map



FITZGERALD LAKE CONSERVATION AREA

Legend for the Detailed Vegetation Map

1. Red maple and white pine in swamp forest with arrowwood and sensitive fern
2. Temporary pond with duckweed, cinnamon fern, cattail, beggar's ticks, grasses and sedges.
3. Parking
4. Heavily cut over upland area with hemlock and clusters of white pine. Thick understory of oak, red maple, cottonwood, alder, gray birch and multiflora rose. Some trash.
5. White pine and hemlock
6. Open swamp forest with many dead and live red maple. Silky dogwood, meadowsweet, sensitive fern, cinnamon fern, many asters and some cattail and multiflora rose.
7. Band of cattails.
8. Red maple swamp with elm and silky dogwood in understory layer.
9. Hemlock-white pine mix. Many cut stumps.
10. A white pine/hemlock forest with scattered pockets of red maple and white oak. Some cut stumps present.
11. Red maple dominated forest with sugar maple and white oak abundant. Red oak and white pine also present. The understory contains witch hazel (most common), ironwood, mountain laurel, partridgeberry, wintergreen, Christmas fern, New York fern and hay scented fern, ground pine and Christmas pine. Gentle up-and-down terrain.
12. Temporary ponds. Possible locations for spotted salamanders and fairy shrimp. Common winterberry and arrowwood.
13. White pine and hemlock mix. Nearby less red maple than 11 and more yellow birch, witch hazel and red oak. Clusters of pine in understory.
14. A rocky, level area with red maple, hickory, green ash, quaking aspen, big toothed aspen, white oak and red maple. Christmas fern, cinnamon fern and lady fern very abundant. Some

elm and sugar maple, and mountain laurel on rocky fringe. Also present: poison ivy, New York fern and in rocky drainage, arrowwood, common winterberry, black ash, sensitive fern, maple-leaved viburnum and sensitive fern.

15. Mountain laurel and huckleberry below a canopy of red oak, white oak, and black oak. Other common shrubs include: witch hazel, low bush blueberry, late sweet blueberry, hazelnut (*Corylus americana*), maple-leaved viburnum and occasional pine. The herb layer is limited, and wintergreen, *Lycopodium obscurum* and *Carex pensylvanica* dominate. Some cut stumps present. Some sugar maple in understory. Relatively level.

16. Similar to 15 with white oak, red oak, black in the canopy. Many chestnut oak also present. This unit dominates the rocky uplands and has broad thickets of mountain laurel intermixed with open areas where there may be no shrubs or patches of huckleberry, low-bush blueberries, maple-leaved viburnum and hazelnut. Cut stumps are scattered throughout this relatively open, generally easy-to-walk through forest. Wintergreen, partridgeberry, ground pine (*Lycopodium obscurum*), Canada mayflower, wild sarsaparilla, wild oats and *Carex pensylvanica* are the most common herbs in the understory. Also occasional are black birch, red maple, and sprouts of American chestnut.

17. Similar to 14, but few rocks exposed along the level grade. The forest is open and contains hundreds of young ironwood in the understory.

18. Saturated vegetation mat around margin of Fitzgerald Lake. It contains a mix of wetland species, including: *Eleocharis*, arrowhead, touch-me-not, boneset, swamp milkweed, asters, sparganium and a variety of grasses, sedges and rushes.

19. Fitzgerald Lake. Although mostly free of aquatic vegetation, near its shoreline *Brasenia* (a small water lily), bladderwort and several species of pondweed (*Potamogeton* spp.) occur.

20. Hemlock.

21. Similar to 14 but hemlock more common.

22. Big-toothed aspen widespread and approximately 25 years old, 60' high. Also present are white oaks, mountain laurel, some red maple, witch hazel and a rocky, intermittent streambed full of cinnamon ferns.

23. Mixed forest with sugar maple, red maple, white pine, hemlock, American hazelnut, witch hazel, ground pine, wintergreen and partridgeberry. The up-and-down upland terrain contains a temporary stream drainage surrounded by hemlock.

24. Hemlock-dominated, rocky area with an understory thicket of mountain laurel and white pine. Witch hazel is thickest along old skid roads. Sugar maple and white ash also present.

25. Lots of hemlock and ash fill a low-lying rocky area. Also present are red maple, New York fern, Lady fern and some white oak. The trail in this stretch is quite muddy and rocky.
26. Hemlock zone.
27. Transitionally wet area characterized by rocks, red maple, red oak, sugar maple, black birch and mountain laurel. Some cutting historically. Most of the hemlocks have been nibbled on by porcupines.
28. Cut-over, young black birch/witch hazel/red maple/mountain laurel area. Rocky.
29. Scrubby in some areas with dense shrubs including witch hazel, young red maple, to a sugar maple/green ash/red oak mix. Rocky jumble.
30. Boulder zone that slopes into a wetland/mesic forest characterized by red maple, sugar maple, white oak, red oak, black ash and swamp white oak. Some striped maple and cinnamon fern, as well as in the center an open area where sedges, grasses, arrowwood, and common winterberry grow. Other typical wetland plants in this area include: sensitive fern, mad-dog skullcap, golden alexanders, *Rubus pubescens* and a variety of asters. Poison ivy also present. Nearby is an old cut-over area where black locust, a species that colonizes after disturbance, dominates the canopy.
31. Red maple/oak mix but laurel understory.
32. This area burned in the late 1980's and is now characterized by many dead oaks and lots of resprouting oak, red maple, and American chestnut. There is very little mountain laurel, but lots of huckleberry, lowbush blueberry, late sweet blueberry, dangleberry and sweet fern. Most of the oaks are either red or black; few white oaks are present.
33. Rocky slope with black birch, red oak and scattered pine (some giant) and hemlock. On the slope there is mountain laurel and striped maple. Near the hemlock (chewed by porcupines) are more red maples and sugar maple and scattered chestnut oak. Also present in this area is a small vernal pond (150' x 20'). Below 4" of poorly decomposed organic soil is more than a foot of clay. In summer, marsh fern grows in the dried up pond. Surrounding this pond are clusters of meadowsweet, common winterberry and hemlocks.
34. An abandoned telephone right-of-way with a mix of saplings. Species vary according to the wetness of the soils and proximity of bedrock. In wetter areas, speckled alder dominates, while in droughty, rocky soils, the vegetation is characterized by sweet fern, mountain laurel, huckleberry, blueberries and occasional patches of wintergreen and trailing arbutus. In deeper soils, young oaks and black birches (approx. 15' high) have colonized.

- 35.** Low-lying, wet area with hemlock and a mix of green ash and red maple. Christmas fern, New York fern, violets, cinnamon fern, winterberry, shagbark hickory, and black ash present.
- 36.** Similar to 16, but more sugar maple and less oak. Mountain laurel understory with some wet sloughs with wetland vegetation. The roots of overturned trees provide nesting sites for winter wrens.
- 37.** Near stream and wetland margin where hemlock is abundant. Plenty of red maple, ironwood, arrowwood and species that can tolerate temporary flooding. Hooked crowfoot and various buttercups along wet margin.
- 38.** A slope forested with yellow birch, white pine, sugar maple, gray birch, white oak and red oak. Understory is composed of maple-leaved viburnum and patches of mountain laurel. Wild sarsaparilla common.
- 39.** Steep sandy slopes along rocky stream. Hemlocks dominant. Rocks along stream mossy. Woodland aster (*Aster divaricatus*), marginal fern, wood fern, Christmas fern common. Some yellow birch near stream.
- 40.** A large vernal pond with lots of wood frogs, spring peepers, and some spotted salamanders. Tupelo, pin oak, buttonbush and common winterberry along borders. On south side the slope is thick with mountain laurel. When filled with water, this area is used by wood ducks and mallards. By late summer it is dry (although in early spring at least waist-deep!) and low grasses cover the soils. Appears to be a bedrock depression that fills with water. Lots of deer tracks in the ground in the fall. Examined for marble salamanders; none in 1993. The "pond" was still dry in late October.
- 41.** Hayfields with drainage ditches.
- 42.** Open oak/sugar maple forest. Some cut stumps.
- 43.** Cut within the last 10 years.
- 44.** Sandy-gravelly ridgetop dominated by hemlock and uniformly aged pines, suggesting that the area was cleared 55 years ago. This is the only known site in town for the orchid *Goodyera tessellata*. Some old borrow pits. Maple-leaved viburnum, hazel nut, partridgeberry, pipsissewa and Canada mayflower common.
- 45.** Old campsite showing signs of a small fire that burned the area within the last 10 years.
- 46.** Swamp with clusters of alder and winterberry below a thin red maple canopy. Cinnamon

fern, grasses sedges, occasional elm, elderberry, arrowwood, sensitive fern, foam flower and *Solidago patula* abundant. A rich (12") organic layer over sands.

47. Intensively logged in 1990. Presently lots of slash, raspberry, blackberry, cleavers, hay-scented fern, wild sarsaparilla, fireweed (*Erechtites hieracifolia*), maple-leaved viburnum, dewberry, hazelnut and wintergreen in the understory. Scattered white oaks in the canopy, but mostly red maple and pine (less than 16" diameter) remaining. This forest had not been cut in 80 to 120 years. Rocky.

48. Open, sunny marsh area created by beavers. Diverse with grasses, sedges, monkeyflower, beggar's ticks (3), violets, boneset, meadowsweet, silky dogwood, burreed, alder, rice-cut grass, some cattails and many clumps of winterberry. Many grasses, some bulrushes, and scattered duckweed and wolffia on the sluggish surface of the brook. Royal fern frequent.

49. Rocky hemlock woods.

50. Beaver pond (temporarily occupied in 1993). Dead hemlock and other trees extend near the middle of the open water. Two great blue herons nests were built in 1993, and at least two young fledged successfully. The pond is surrounded by some big boulders which are good for watching wildlife. Wood ducks, kingfishers, mallards and a resident pileated are frequent visitors at and around the pond. Near the mouth of Broad Brook there are many clusters of alder, silky dogwood and winterberry, plus many dead hemlock. Sugar maple and yellow birch on drier margin. Cattails grow around the margin in many areas. A rich, wonderful area. Outstanding for wildlife. Otter, bear, muskrat, coyote, raccoon, beaver and porcupine sign are easy to find in this area.

51. A rich, seepy swamp forest with braided streams. Lush vegetation here provides outstanding bear habitat. Bear sign is widespread, particularly in springtime when the bears are foraging on the lush, abundant beds of skunk cabbage. Another beautiful area worthy of further studies.

52. Red maple margin of marsh. Many spring wildflowers. The presence of barbed wire in this section and the nearby uplands is evidence that this area was formerly pastured.

53. A small colony of *Phragmites*. This aggressive wetland grass grows up to 10 feet in a single season and has become a nuisance species in many disturbed wetlands. It is less valuable to wildlife and some management may be necessary in the future.

54. The former Cooke's Pasture, now a rejuvenated marsh characterized by tussock sedge, meadowsweet and scattered red maple and cattails. Rushes, bulrushes, steeplebush, marsh fern, sensitive fern, swamp milkweed, joe-pye-weed and other sedges present.

- 55.** Red maple, shagbark hickory, ironwood, winterberry, swamp white oak, New York fern and lots of quaking aspen characterize this area. There is an open 40 foot margin with a variety of grasses and sedges. A band of vegetative cattail is approximately 15 wide. Also present are tangles of arrowwood and scattered young white pine.
- 56.** Abundant red maple, hemlock, ironwood and species that can survive in inundated soils.
- 57.** Seepy soils with wetland plants, hemlock, red maple and abundant cinnamon fern, Christmas fern and grasses and sedges.
- 58.** Belt of mountain laurel and oaks at the top of the slope. Below a hemlock zone and below that, a blend of white pine and hemlock. Wintergreen and partridgeberry common.
- 59.** Gradually sloping to a moister, low-lying area dominated by hemlock and infrequently scattered with oak and white pine. Well-shaded.
- 60.** Oak/white pine woods with many of the pine less than 20 years old.
- 61.** Hemlock.
- 62.** White pine and oak uplands with hay-scented fern, New York fern, and Maple-leaved viburnum in the understory. Witch hazel is scattered as is big-toothed aspen. Other herbs include various grasses, partridgeberry and *Lycopodium obscurum*. White pines increase as near barbed wire and fence line. This area includes a nice look-out over the marsh with nearby otter scat.
- 63.** Former Cooke's Pasture. Dramatic change in vegetation after barbed wire. Now mostly pine (largest " 25 years, but most around 15 years old), scattered red maple and young ironwood. At the wetland margin clusters of alder, winterberry, red maple and silky dogwood. Ironwood drops out. Herbs absent below pines.
- 64.** Cluster of quaking aspen.
- 65.** Thin strip along pasture edge with young white pine, scattered pitch pine and quaking aspen.
- 66.** West of the barbed wire and the old cow path is a relatively steep hillside with red oak, white oak, hickory and red maple mix. The understory is rocky and open with hazelnut, maple-leaved viburnum and wintergreen. Ruffed grouse seen here.
- 67.** Old field that has grown in with grasses, goldenrod, asters, dewberry, meadowsweet and big clusters of panicked dogwood and lots of young (15" year old) white pine. Along old roads clumps of winterberry and speckled alder. Throughout this old pasture are scattered

apple trees.

68. Mostly open area with knapweed, goldenrod, asters and grasses. Some Asiatic bittersweet and encroaching pine, scarlet oak and woody plants. An ATV trail runs through this section. May be okay for bluebirds, but more likely a nest box would be used by house wrens.

69. Black birch, white pine hemlock and a few scattered pitch pine. This area was cut within the last 10 years. Near intersection with Boggy Meadow Rd. several large white oak.

70. Swampy border with mini-up and down topography that provides conditions that are very wet and somewhat dry. Vegetation includes red maple, hemlock, white pine, alder, cinnamon fern, wood fern and meadowsweet. Goldthread and sphagnum common. Some Christmas fern present.

71. Like 70 but few white pine in section beyond conservation area. Evidence of cutting. Near dam the vegetation on the drier slope is dominated by white pine, hemlock and hickory. Some red maple is present. Winterberry is very common in the understory. There are many old stumps and threads of logging roads. Hay-scented fern and partridgeberry common.

72. Cut over upland forest with pine, hickory, occasional oak and lots of saplings and ironwood shrubs.

73. A white pine/oak/hickory mix with lots of young black birch because it was historically logged.

74. Dam for Fitzgerald Lake. Grassy top and cleared of black locust and other vegetation during 1993. Goldenrod common.

75. Vegetation includes white pine, red oak, some red maple and ironwood. Herbs are abundant here and include hay-scented fern, wintergreen, fringed polygala, partridgeberry, trailing arbutus, Christmas fern, sedges (*Carex pennsylvanica*) and *Lycopodium obscurum*. Hemlock fringe along edge of rocky knoll. Some fire damage in the area surrounding a small campsite/picnic area near the dam. Some cut stumps of pine (probably cut 5-15 years ago).

76. Very open with red maple, white oak, and ironwood. Some hop hornbeam, pin cherry, witch hazel and gray birch. Hay-scented fern and Christmas fern very common; New York fern also common. Few rocks. White pine, quaking aspen and shadbush occasional. Near the wood road there are older red maple and yellow birch. Overall forest age in this section is probably under 30 years.

77. Disturbed, level wetland area with yellow birch, black birch, gray birch and pin cherry along bermed edges. In low spot a diverse mix including quaking aspen, cottonwood, big-

toothed aspen, elm, goldenrod, cinquefoil, meadowsweet, blackberry, silky dogwood, arrowwood, multiflora rose, willow, gray birch and dewberry. Occasional young pine.

78. Thin zone beyond disturbed area where white pine, white oak, red maple grow. Ironwood and witch hazel are the most common shrubs; hay-scented fern is the most common herb. Alder grows in a small swale that leads down to the water's edge. Also present: Christmas fern, wintergreen and partridgeberry.

79. Hemlock zone on a rocky slope. Few herbs. In swale, maidenhair fern, cinnamon fern and abundant spinulose wood fern.

80. Cut-over white pine, hemlock, oak forest. Many cut stumps; some red maple and lots of hay-scented fern. Rocky outcrop present, but generally level grade or gently sloping.

81. Gently sloping hillside. Red maple, sensitive fern, cottonwood, royal fern, high-bush blueberry. Beyond drainage swale shifts to a slightly older forest. Red maple still common, but more pine. Some multiflora rose.

82. Old abandoned pasture/hayfield now grown in to a tangle of white pine (10-15 year old), red maple, scarlet oak, black cherry, pin cherry, paniced dogwood, alder and invasive non-natives: Asiatic bittersweet, glossy buckthorn, European buckthorn and multiflora rose. Grasses and goldenrod abundant. The non-natives in this area, in particular glossy buckthorn, threaten to degrade the integrity of a much wider area at Fitzgerald Lake Conservation Area. Controlling these aggressive non-natives should be a high-priority.

83. Open marsh dominated by grass (*Calamagrostis*). Also present: silky dogwood, willows, alder, joe-pye weed, virgin's bower. At back edge grades into old field with arrowwood, high-bush blueberry, red maple, white pine, paniced dwood and both buckthorns.

84. Cut over white pine and red maple area. Some mountain laurel, goldthread, and many ferns. Seepy, low-lying area. Lots of bear sign in this area during springtime. Deer sign abundant.

85. Beautiful rocky knoll with signs of fire damage. *Polytrichum* moss abundant, some pitch pine and scrub oak present. Also nearby are hemlock, black birch and lots of mountain laurel.

86. Isolated peat wetland perched in bedrock. Sheep laurel surrounds nearby uplands. Scattered tupelo and swamp white oak ring margin and 2 pitch pine grow in swamp. Along wetland border is willow herb and one cluster of Virginia chain fern, only the second known location in town. Growing on the peat are: leatherleaf, high-bush blueberry, mountain holly.

Beyond peat pocket are rocky uplands dominated by chestnut oak. There is at least 4' of peat

here. It would be worthwhile to study this area during the growing season and determine exactly how deep the peat layer is.

AN ECOLOGICAL ASSESSMENT OF THE INDIAN HILL AQUIFER AREA

A few hundred feet northwest of the Brookwood Conservation Area is a relatively small (7.0 acre), crescent-shaped parcel known as the Indian Hill Conservation Area. Surrounded by dense residential development and crossed by utility easements, this area of degraded uplands and wetlands is a good example of the type of property donation that the Conservation Commission should not accept in the future.

Unlike most of the Commission's other conservation areas, this site is designed to protect a water supply area, not provide wildlife habitat or recreation. There is currently widespread dumping of yardwastes and debris on the perimeter of the property and along the sewer easement. Since its location is within an aquifer recharge area, the latter problem is not only an eyesore but also a potential health hazard.

Donated to the City in 1985 as part of a so-called "cluster" development, the conservation area consists of the unbuildable perimeter--wetlands, powerline R.O.W., and steep slopes--of what was formerly a 20 acre block of forest. On the basis of hydrology, vegetation and past land use, the area can be separated into six different "zones": (1) the powerline uplands; (2) the powerline wetlands; (3) the Florence Road slope; (4) sewer line easement; (5) the brook and its floodplain, and (6) surrounding upland woods (Map 17).

The Powerline Uplands and Wetlands

Actively maintained, the powerline is a one hundred foot wide swath that crosses the brook and then continues upslope toward the Brookwood Conservation Area. Along the driest upland sections of the powerline is a mix of bluestem grasses, goldenrods, young birches, and large patches of fragrant, leathery-leaved sweetfern (*Comptonia peregrina*) (Map 18).

Heading downslope to the wetter areas, these species give way to others which favor a higher watertable, including blueberries (*Vaccinium corymbosum*), virgin's bower (*Clematis virginiana*), and in the wettest spots, speckled alder (*Alnus rugosa*) and orange-blossomed touch-me-nots (*Impatiens capensis*). This open wet area was created when the powerline was constructed. In the process, the stream channel was obliterated and now the water sheets across a broad (approximately 50 feet) area before regaining its channel a little further downstream.

The Florence Road Slope

From the powerline wetland, the east arm of the conservation area is a narrow, wooded strip which ascends gradually and then more steeply before reaching Florence Road.

This 140 foot wide piece is bounded by shrubby fields and forest on its north side and by an extensive berm of rocky fill on the other.

Underlain by sandy stony sediments deposited as glacial outwash, the transect from the wetland to Florence Road passes through seven different plant communities. As with the broader habitat boundaries, these plant communities reflect the interplay between hydrology and land use history (Map 18).

Just above the powerline wetland is a dense white pine (*Pinus strobus*) stand. Except for Virginia creeper (*Parthenocissus occidentalis*), cinnamon fern (*Osmunda cinnamomea*), and touch-me-not, few herbs survive in the deep shade of the pines. Not far away, a band of pin cherry (*Prunus pennsylvanica*) and several rotting stumps are evidence of the logging activities that took place prior to the construction of the Indian Hill development. The slope climbs gradually and on these better drained soils is an even-aged stand of more white pine, most 25-30 years old and approximately fifty feet tall. The slope levels off and the pines mix with red oak (*Quercus rubra*) and blueberry (*Vaccinium vacillans*, *V. angustifolium*). Tall canopy trees drop out and expose a small grassy spot. A little higher on the slope is another denser stand of 25-year old pine. The understory is mostly bare, save for a few isolated partridgeberries (*Mitchella repens*) and Canada mayflower (*Maianthemum canadense*). Nearing Florence Road, the pine is replaced by a mix of black cherry (*Prunus serotina*) and black locust (*Robinia pseudoacacia*), a species which readily colonizes disturbed soils. Below the locust's thin canopy, panicked dogwood (*Cornus racemosa*) and non-natives Morrow's honeysuckle (*Lonicera morrowii*) and Asiatic bittersweet (*Celastrus orbiculatus*) dominate the understory.

The Sewer Easement

At the western end of Indian Hill Road is a thirty foot wide sewer easement, which serves as an access route to the conservation area. The sewer easement zigzags its way through woodlands and then across Sandy Hill Brook to Sandy Hill Road. At the wetland crossing, the sewer line is a steep, twenty foot high berm. The top of the sewer line is grassed and contains a small footpath, which some neighbors use to dump their yardwastes (Map 18).

Sandy Hill Brook and its Floodplain

The most interesting area within the conservation area is Sandy Hill Brook and its floodplain. Piped for most of its upstream length, the brook emerges from Brookwood Road in the southwest corner of the property. After a fifty foot stretch, it flows under the sewer easement and then continues relatively uninterrupted until it enters the Mill River, half a mile downstream, opposite the Maines Field Recreation Area.

Within the conservation area, the brook is shallow and sandy-bottomed. In the seepy floodplain, the forest is dominated almost exclusively by red maple (Map 18). The understory is diverse. False hellebore (*Veratrum viride*), skunk cabbage (*Symplocarpus foetidus*), tall cinnamon fern (*Osmunda cinnamomea*), and dozens of wildflowers, including wood anemone (*Anemone quinquefolia*), trout lily (*Erythronium americanum*), wild oats (*Uvularia sessilifolia*), and red trillium (*Trillium erectum*) thrive in the wet, rich soils along the stream. By late summer, many of these plants have been overtopped by touch-me-not (*Impatiens capensis*), pink-purple blossomed joe-pye-weed (*Eupatorium* spp.), and the white and lavender blossoms of various wetland asters (*Aster* spp.).

Surrounding Upland Woods

On the higher, drier ground near the stream, mountain laurel (*Kalmia latifolia*) and red oak are the dominant plants (Map 18). Further upslope, old cut stumps and clusters of pin cherry and young red maple document the area's logging history. Large patches of hay-scented fern (*Dennstaedtia punctilobula*), cinnamon fern (*Osmunda cinnamomea*), and Canada mayflower survive below the mix of pine, oak, and red maple. Along the conservation area's southern border near the houses on Brookwood Drive is a large stand of 30-year old pine, with a few much older seed trees and even a few pitch pine (*Pinus rigida*).

Summary

In spite of the area's value for aquifer recharge, it is too small, too narrow, and too oddly configured to be used by many birds and mammals. It is an isolated patch, crisscrossed by right-of-ways, surrounded by a sea of houses, and used as a yardwaste dump. Moreover, it is not within easy walking distance to a school, it does not have easy access for the public, and parking is only available along the street.

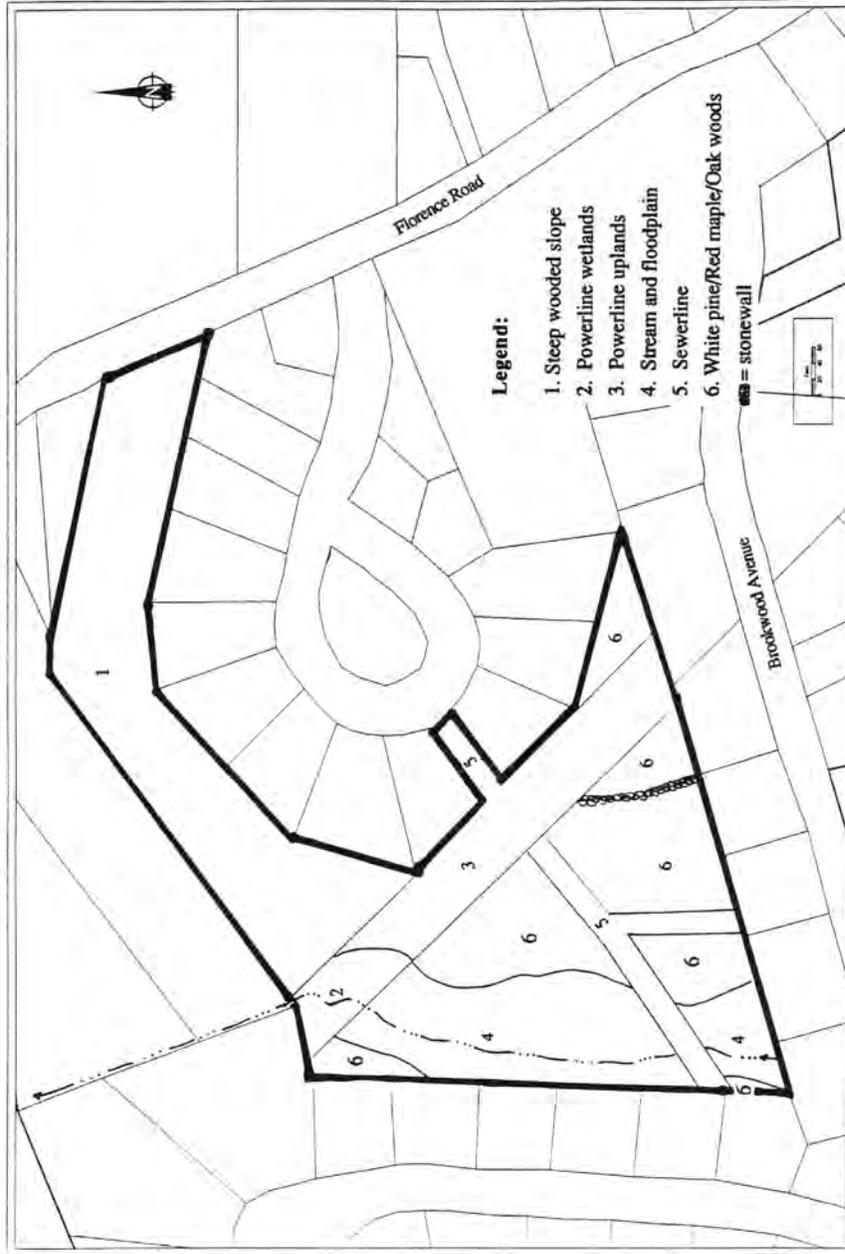
Map 17. Major Communities

INDIAN HILL AQUIFER AREA

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Major Communities at the Indian Hill Aquifer Area



Map 17

Map 18. Detailed Vegetation Map

Map 18

Detailed Vegetation Map of Indian Hill Aquifer Area



THE INDIAN HILL AQUIFER AREA

Legend for the Detailed Vegetation Map

1. Red oak, white pine and gray birch
2. White pine
3. Young white pine and occasional gray birch overtop hay-scented fern, abundant sweet fern, meadowsweet, whorled loosestrife, *Rubus*, and sedges
4. White pines (mostly 35-40 years old, but a few much older wolf pines), three pitch pine, and scattered red oaks and red maple
5. Young black cherry, red maple and pin cherry now grow where large pine, now stumps, once stood. The herb layer is absent aside from Canada mayflower. Exposed rocks are present.
6. Sewer line is full of grasses and bordered by young gray birch, black cherry, oak, black locust, and goldenrod
7. Like 5, but also present are young oaks, pin cherry and clusters of bracken fern
8. Red maple and green ash surround the stream, which is bordered by touch-me-not and coltsfoot
9. This tiny slice contains an abundance of cinnamon fern, touch-me-not, goldenrods and asters.
10. The stream is shaded by a red maple canopy. Below there is a relatively dense herb layer composed touch-me-not, cinnamon fern and sensitive fern.
11. Formerly cut over, this area now contains primarily red maple in the overstory. Pin cherry, black cherry and white pine are also present in the overstory. Canada mayflower, dewberry, hay-scented fern, and cinnamon fern comprise the understory. Numerous stumps and cut logs are present.
12. Yard waste
13. Many smaller (20 year old) pines are present. Red maple is also frequent.

14. The powerline right-of-way contains goldenrod, steeplebush, touch-me-not and abundant virgin's bower
15. An open swampy-marsh with dense thickets of silky dogwood, winterberry, touch-me-not and virgin's bower.
16. A zone of dead red maple and cut stumps. Obviously flooded much of the year, the muds are exposed by mid- to late summer. Hummocks of meadowsweet nearby.
17. A small triangle of upland woods dominated by white pine and red maple. In spite of its proximity to the stream, the herb layer is composed of plants that are more typical of well-drained uplands. Included among them are Canada mayflower, partridgeberry and ground pine.
18. White pine dominates, but red maple is also present. The understory contains cinnamon fern, virginia creeper and touch-me-not.
19. Pin cherry marks this area where cutting took place six to seven years ago. The understory is almost solid touch-me-not.
20. White pine (25-30 years old and 50' tall) only.
21. A mix of oak and white pine.
22. A small area of open grass with young (4 year old) pine, black oak and black cherry.
23. A formerly cleared area now containing gray birch, goldenrod, silky dogwood, Asiatic bittersweet and Canada mayflower.
24. A dense stand of 25-year old white pine. Mixed in are occasional gray birch. Herbs, except for scattered Canada mayflower and partridgeberry, are absent.
25. Black locust and black cherry are the principal overstory species, while panicked dogwood, ironwood, dewberry, false solomon's seal and Morrow's honeysuckle are the chief constituents in the understory.

A CLASSIC SOUTHERN NEW ENGLAND LANDSCAPE

The Natural History of the Marian Street Section, Fitzgerald Lake Conservation Area

Not far from Route 91, in the northeast corner of town, is this 12-acre tract of forest known as the Marian Street section of Fitzgerald Lake Conservation Area. Purchased and subsequently donated by concerned neighbors in 1984, the area serves as an access to the eastern half of the Fitzgerald Lake Conservation Area.

Although the Marian Street Section includes wetlands, approximately 90% is uplands (Map 19). Rocky and relatively level, its open, dry oak woods are a near classic example of a southern New England forest. Below the thin canopy, the shrub layer is thick but not diverse. Large clusters of huckleberry (*Gaylussacia baccata*) mingle with late sweet blueberries (*Vaccinium angustifolium*), low bush blueberries (*Vaccinium vacillans*), and much less frequently sheep laurel (*Kalmia angustifolia*) and mountain laurel (*Kalmia latifolia*). The sparse herb layer includes mostly leathery, evergreen plants like wintergreen (*Gaultheria procumbens*), pipsissewa (*Chimaphila umbellata*), and partridgeberry (*Mitchella repens*). Much less common are the patches of wild sarsaparilla (*Aralia nudicaulis*), sedges, grasses, and ferns that push up through the rotting layer of oak leaves.

Compared to the nearby slopes, the vegetation in the wetland portion is very diverse. Dominated by red maple (*Acer rubrum*) in the canopy and skunk cabbage (*Symplocarpus foetidus*) in the understory, this half-acre section supports a large number of plant species. Spicebush (*Lindera benzoin*), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), and spotted touch-me-not (*Impatiens capensis*) are just a few of the three dozen plus species growing in this wetland area.

The small brook that flows through the wetland originates about two kilometers north, in a large, hummocky red maple swamp just west of Laurel Park. South of Laurel Park, its channel becomes well-defined and runs almost due south until just before it reaches Marian Street. At that point the stream loses its definition and meanders across a 15-meter wide bottomland. Once beyond Marian Street, the stream curves sharply to the east and flows under Route 5 and Route 91 before cutting through a steep, sandy ravine to the Connecticut River.

Uphill and to the west of the conservation area's wetland is a damp, east-west drainage swale, sections of which are owned by three different home owners. The swale follows the southern edge of the conservation area's bedrock outcrops. From a botanical perspective, the narrow interface between the uplands of the conservation area and this wetter portion of private land is quite interesting. Several species that are less common in Northampton occur in this area; there is leatherwood (*Dirca palustris*), with its wonderfully thick leaves and bendable branches, wild honeysuckle (*Lonicera dioica*) with its perfoliate leaves and trumpetlike flowers, and even a few clusters of maidenhair fern (*Adiantum*

pedatum), easily recognized by its lacy, delicate-looking fronds.

Down in the swale proper, on private land, there are waist-high clumps of cinnamon fern (*Osmunda cinnamomea*), poison ivy (*Toxicodendron radicans*) and broad patches of sensitive fern (*Onoclea sensibilis*). Scattered young elm (*Ulmus rubra*) extend sprawling branches toward the red maple canopy.

Unlike many of our familiar local landscapes, the Marian Street Section differs in that it hasn't been greatly modified by human activities. Although previously logged and used for grazing (barbed wire tells us this), its thin, dry, rocky soils provide marginal pasture land, slow-growing wood lots, and make home construction very difficult.

The structure and composition of the underlying bedrock at Marian Street are clues to the fascinating geologic history of this part of New England. From 450 to 350 million years ago, the eastern edge of North America underwent two major mountain building episodes. An island arc collision and finally a continental collision compressed, heated and deformed the rocks in our area, transforming them into new types and thrusting up whole mountain chains. Sandy beaches became hard to erode quartzite ridges; shallow, carbonate-rich seafloor metamorphosed into the band of dolomites and marbles that extends from western Massachusetts to northern Vermont, and deep ocean muds and volcanics recrystallized into the schists, gneisses, and granites that make up parts of the Berkshires and the Green Mountains.

Over the last several hundred million years, chemical and physical weathering has eroded away those ancient mountains--once Himalayan-sized peaks--, and exposed their underlying cores. The exposed bedrock found throughout the area is part of the extreme eastern edge of these ancient Berkshire rocks. This bedrock core, which is always at or near the surface, controls the area's drainage patterns, soil types, and plant communities.

In the last million years, four separate glaciations occurred in New England. The glaciers modified the landscape by smoothing and rounding the bedrock surfaces and depositing boulders, rocks, cobbles, and an assortment of sandy-grained sediments across the landscape. As the last continental glaciers retreated from Massachusetts 15,000 years ago, a glacial debris dam formed near what is now Rocky Hill, CT. Meltwater backed up behind this dam and created an enormous, linear lake that extended from Connecticut to northern Vermont. Known as glacial Lake Hitchcock after Edward Hitchcock, a nineteenth century geology professor at Amherst College, the lake had a dramatic effect on this section of the Connecticut Valley. If we could travel back twelve to fifteen thousand years ago and visit the Marian Street Conservation Area, we'd find ourselves along the lake's rocky shoreline. Just a little way into the water, a few of the Marian Street Conservation Area's taller bedrock

outcrops would poke above the water's surface, forming miniature islands. Because the level of the lake fluctuated, it's likely that the conservation area was sometimes below the icy waters and at other times, formed a rocky shoreline. The extensive sand deposits to the east, below the Hebrew Cemetery and east to the Connecticut River, were beaches and deltas modified by the waves of the glacial lake.

As the climate warmed, the tundra reinvaded. Mastodon, muskox and caribou followed, feeding on the mosses and lichens and cold-tolerant plants that survived in and around extensive forests of spruce. Following these large mammals were native American hunters. During the next 10,000 years, the climate warmed and other plants and animals that had been pushed south during glaciation reinvaded their former ranges.

By the time the first Europeans arrived in the 1650's, a well-developed oak-chestnut (*Castanea dentata*) forest dominated the conservation area. Due to the accidental importation of the Chestnut blight fungus (*Chryphonectria parasitica*) in 1904, American chestnut--formerly one of the most important forest trees--has been reduced to resprouts that usually die back before setting seed. The abundance of chestnut resprouts in the Marian Street Conservation Area attest to its former dominance.

Another imported pest that affects this conservation area is the gypsy moth (*Lymantria dispar*). Accidentally released in Medford, Massachusetts in the late-1800's, the gypsy moth caterpillars feed preferentially on oak, but also nibble on American chestnut, red maple, and many other tree species. In 1993, the infestation was fairly heavy in the Marian Street Conservation Area. By mid-June, pieces of oak leaves littered the ground like the aftermath of a ticker tape parade and caterpillar droppings could be heard falling like light rain.

Wildlife and Beyond

The Marian Street Section is a good place for birds and mammals, not because of any special quality of these 12 acres but because this parcel is contiguous with several hundred acres of uninterrupted forest that includes the Fitzgerald Lake Conservation Area. Without question, the reason why black bear sign can be found in the wetland, coyote scat in the forest, and ovenbird nests in the leaf litter is because this conservation area connects with such a large chunk of wild habitat. Aside from a few wood roads, there are no houses, no yards, and no farm fields that break up this large, relatively intact forest.

Much of this surrounding forest is similar to the Marian Street Section with red oaks, huckleberry thickets, and hundreds of rocky outcrops. Wood roads lead to Fitzgerald Lake, the Pine's Edge Section. It's not difficult to reach the recently protected beaver ponds in the

lower drainage of the Fitzgerald Lake Conservation Area.

To get to the beaver ponds from the Marian Street Conservation Area, take the right fork off the grassy wood road that passes through the west end of the conservation area. After half a mile, bushwack downslope on your left to find the wetland and ponds.

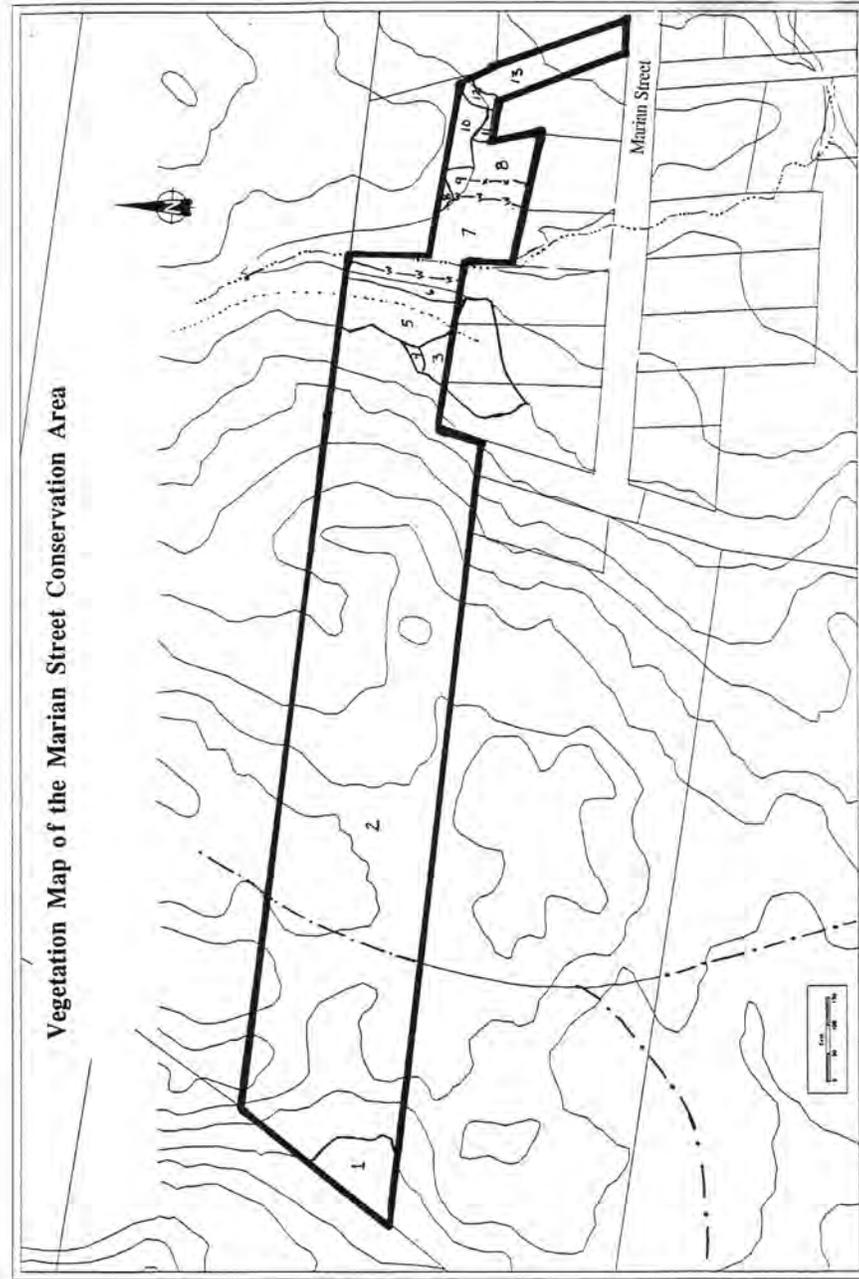
On your way, you will have passed the tongue of another extensive wetland, undoubtedly one of the largest tracts of swamp forest in Northampton. Wet throughout the year, this area is a favorite haunt of black bears, particularly in the spring when they feed heavily on skunk cabbage. In this seepy area, spring wildflowers-- early blue violets (*Viola cucullata*), false hellebore (*Veratrum viride*), marsh marigold (*Caltha palustris*) and dozens of others--carpet the forest floor. The overstory contains red maple, black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), and yellow birch (*Betula lutea*). Along the drier, rocky margins, hemlock forms dense stands.

The braided watercourses from this large swamp eventually form a single stream, which becomes more and more rocky before emptying into the slow-moving Broad Brook below the beaver ponds. From here Broad Brook continues through Cole's Meadow into Hatfield where it joins Hatfield's Mill River.

As the Conservation Commission considers important linkage lands, this rich and wild area deserves to be among its top priorities for land conservation.

Map 19. Vegetation Map

Map 19



THE MARIAN STREET SECTION, FITZGERALD LAKE CONSERVATION AREA

Legend for the Detailed Vegetation Map

1. Mountain laurel, huckleberry, red oak
2. Red oak (dominant), white oak, American chestnut, white pine, occasional red maple; huckleberry, low bush blueberry, late sweet blueberry, maple-leaved viburnum, wintergreen, partridgeberry, many lichen-covered boulders
3. Swale with white oak, hickory, white ash, wild sarsaparilla, interrupted fern, and New York fern
4. Mountain laurel
5. Red oak, occasional red maple and sugar maple, with mountain laurel and a thick tangle of maple-leaved viburnum and witch hazel. Common wintergreen frequent.
6. Hemlock, red oak, and occasional witch hazel
7. Red maple overstory with abundant skunk cabbage, New York fern, spicebush, broad swaths of spotted touch-me-not and occasional hemlock.
8. Red maple and red oak overstory with mountain laurel and Canada mayflower in the understory. Pine, ironwood, witch hazel and New York fern frequent. Mixed and brushy.
9. Young white pine with an understory of Pennsylvania sedge and Canada mayflower
10. Red oak, quaking aspen, bracken fern, Pennsylvania sedge, Canada mayflower, and occasional red maple
11. Hemlock bordering a low swale
12. Leaf dump
13. Japanese knotweed; leaf dump and conservation area sign near Marian Street
 footpath
 grassy wood road
 wetland border
 barbed wire fence

A FORGOTTEN SPOT: The Natural History of Mary Brown's Dingle

Not far from downtown Northampton, near the edge of one of the City's densest residential areas is a small, open wetland carpeted in early spring with the giant, green leaves of skunk cabbage (*Symplocarpus foetidus*). By mid-summer, the skunk cabbage--once so obvious--is almost completely hidden under thick clusters of straight-stemmed turtlehead (*Chelone glabra*), watery-stalked touch-me-nots (*Impatiens capensis*), tall joe-pye-weed (*Eupatorium maculatum*) and the graceful, spreading vines of virgin's bower (*Clematis virginiana*) (Map 20, 21). A gentle rise leads out of the wetland, past young silver maples (*Acer saccharinum*) and black locusts (*Robinia pseudoacacia*), to a sewer line right-of-way (30' X 150'), which is full of asters, grasses, sedges and dense clumps of Japanese knotweed (*Reynoutria japonica*) and multiflora rose (*Rosa multiflora*).

Known as Mary Brown's Dingle, this two-acre conservation area is not really a "dingle"--which means a "small wooded valley"--but actually part of a large, gently sloping swale that drains all the land from the northwest side of Round Hill to the southeast edge of Childs Park. Underlain by impervious clays from glacial Lake Hitchcock, the rich black muck of the conservation area is moistened by close-to-the-surface ground water. From the conservation area, this water is piped under Prospect Street, through a series of pipes and an artificially constructed drainage channel into the Barrett Street Marsh Conservation Area where it joins King Street Brook. From the marsh, the water flows through more ditches and pipes, until it eventually makes its way into the Connecticut River.

Over the last two hundred years, the types of plants and animals found in the "dingle" area have undoubtedly changed as the land was cleared, homes were built, and streets were constructed. These activities in the upper watershed of the conservation area and around its margins have altered light levels, drainage patterns and erosion rates--all changes which influence the kinds of species that live there.

The most recent, large scale change to this area came in the mid-1980's with the installation of the sewerline. Its construction affected the entire eastern half of the "dingle". Fill was brought in and the original soils altered. These alterations, plus periodic mowing maintenance, explain why the plants that dominate this section of the conservation area are both light-loving and disturbance tolerant.

Today, the "dingle" is the largest remaining wild patch in the Round Hill area. With its present day mix of plant communities, the conservation area provides a small but suitable

habitat for a variety of animals. Raccoons, opossums, skunks, shrews and a nearly a dozen birds are among the larger animals to use the area (Table 1). Mary Brown's Dingle also fulfills all the requirements for other creatures that need only a small area to survive. For instance, in this small patch of "wildness", you can search the leaves of turtlehead for the red-and-black spined caterpillars of the Baltimore Checkerspot butterfly, watch spiders weave their webs, listen to the crickets' songs, find assassin bugs on goldenrod, plus discover a wide assortment of common wetland plants. And all just a few minutes walk from dozens of homes and the Clarke School for the Deaf.

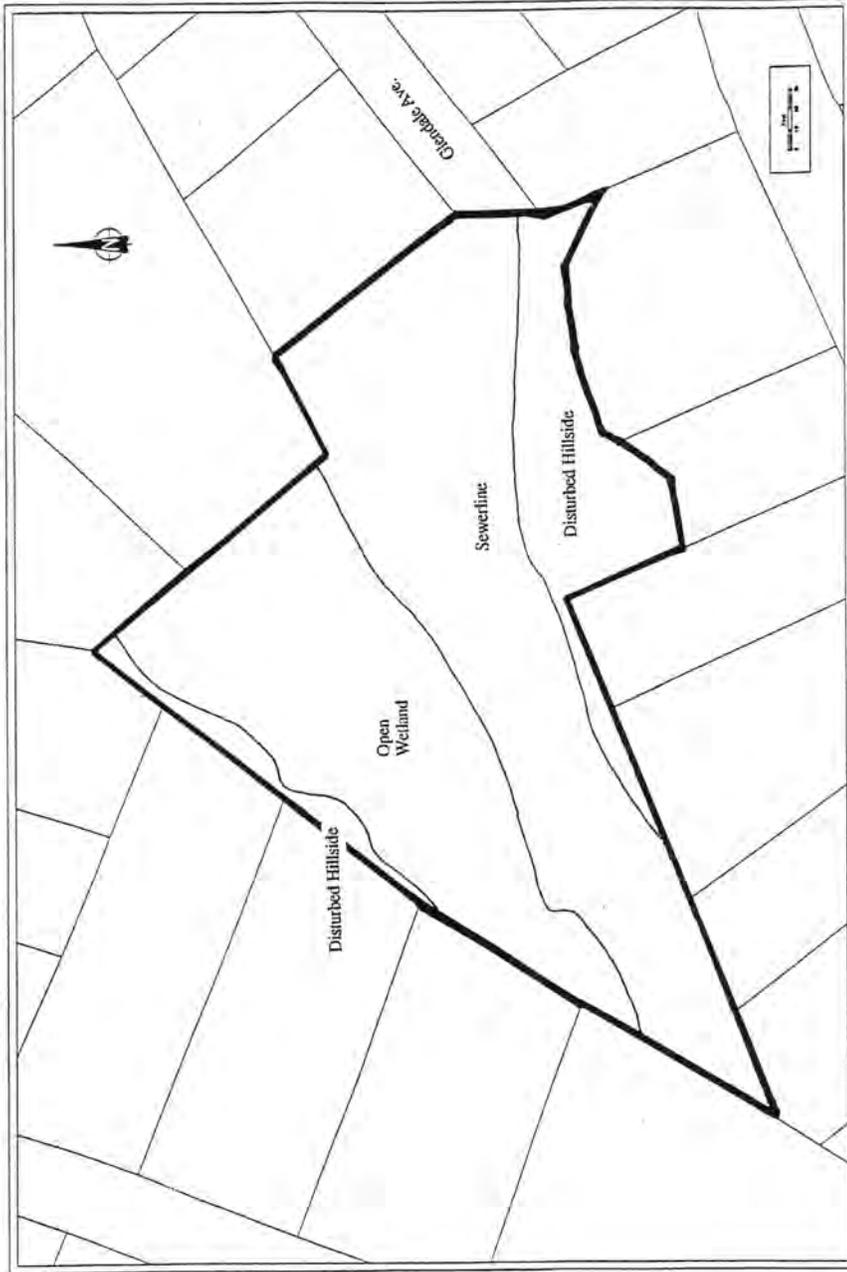
Table 1. A preliminary checklist to the animals at Mary Brown's Dingle.

Mammals	Birds	Reptile
raccoon	blue jay	garter snake
skunk	cardinal	
opossum	cowbird	
gray squirrel	English sparrow	
meadow vole	house finch	
starnosed mole	house wren	
	mourning dove	
Amphibians	starling	
spring peeper	titmouse	
red-backed salamander	common yellowthroat	
pickerel frog		

Map 20. Major Communities

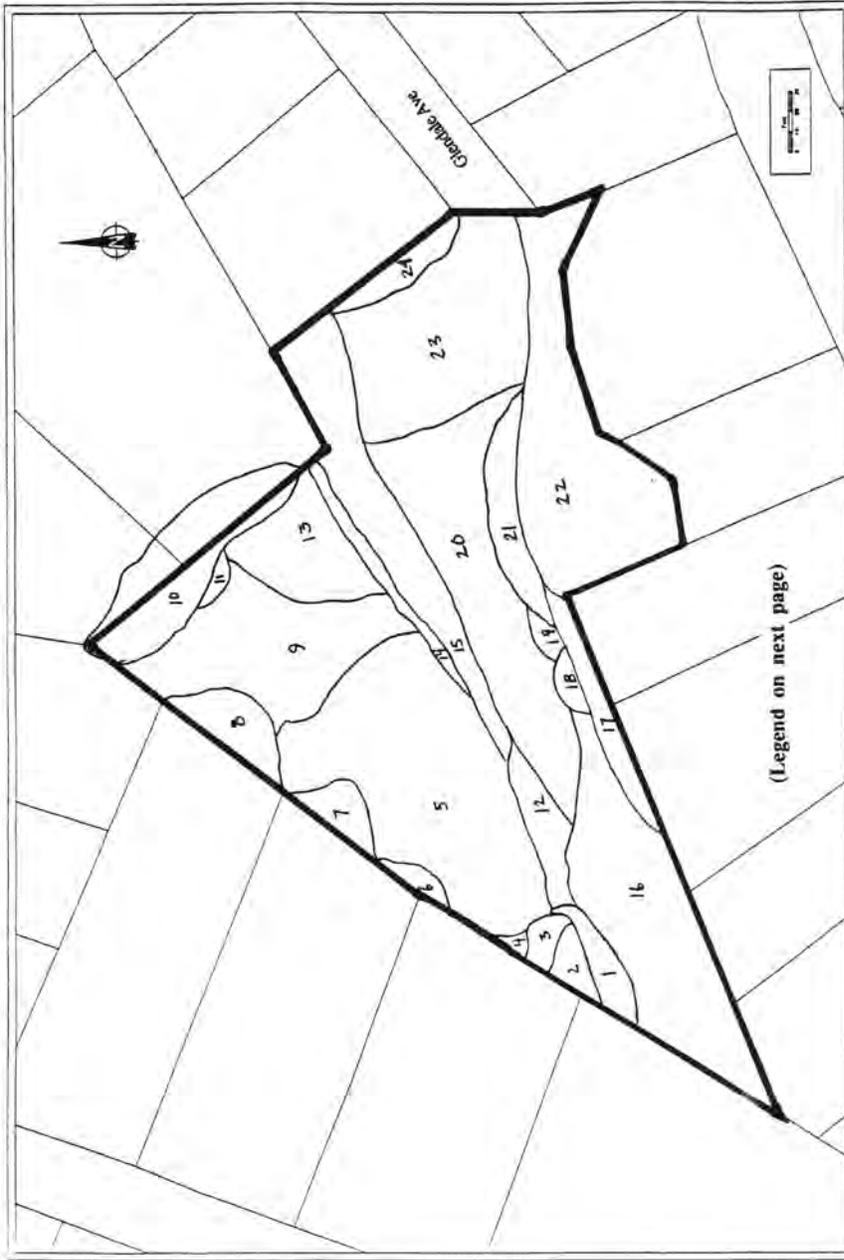
Map 20

Major Communities at Mary Brown's Dingle



Map 21. Detailed Vegetation Map

Detailed Vegetation Map of Mary Brown's Dingle



Map 21

Legend for the Detailed Vegetation Map of MARY BROWN'S DINGLEWetland

1. Rice cut grass, spotted touch-me-not
2. Black willow, staghorn sumac, multiflora rose
3. Multiflora rose
4. Staghorn sumac
5. Skunk cabbage, turtlehead, virgin's bower, sensitive fern, swamp candles
6. Butternut
7. Multiflora rose
8. Yardwastes, spotted touch-me-not
9. Joe Pye weed, spotted touch-me-not, lady fern, turtlehead, tussock sedge
10. Silver maple, touch-me-not, sensitive fern
11. Alternate-leaved dogwood
12. Multiflora rose
13. Black willow, multiflora rose, occasional catalpa
14. Silver maple

Sewer Line and Nearby Uplands

15. Black locust, multiflora rose, privet
16. Sugar maple, red maple, Japanese knotweed, spotted touch-me-not
17. Box elder, Norway maple

18. Japanese knotweed
19. Spotted touch-me-not (seepy area on sewer line)
20. Boneset, goldenrod, common plantain, red clover, queen Anne's lace, field horsetail, fringed loosestrife, grasses (primarily *Calamagrostis* sp.), sedges (*Carex crinita*), rushes (*Juncus effusus*)
21. Japanese knotweed
22. Japanese knotweed, Asiatic bittersweet, catalpa, sugar maple, slippery elm
23. Vegetable garden
24. Cottonwood, goldenrods, jumpseed, Japanese knotweed, joe pye weed, giant ragweed, multiflora rose, catalpa

SALAMANDERS AND SWAMP WHITE OAKS

Explorations of the Pines Edge Section, Fitzgerald Lake Conservation Area

A cool April rain drizzles down as a small group of amphibian watchers shuffles into the nighttime forest. Their flashlights glow eerily red and footsteps are muffled against wet, rotting leaves. Their reward for venturing out on such a soggy night will be a chance to watch the courtship and egg-laying behavior of some of our most fascinating but seldom seen wildlife.

Their destination is a group of vernal ponds, temporary wetland pockets that play a critical role in the lives of many Massachusetts' amphibians, including tonight's quarry, spotted salamanders. This species and their rarer cousins--marbled salamanders and the genetically complicated blue spotted/Jefferson's salamanders--depend on these ephemeral, fish-free environments for breeding and larval development.

Each spring, spotted salamanders migrate to ponds like these at the Pines Edge Section. Over a period of two weeks (or less), courtship, fertilization and egg-laying occur. When these activities are complete, the 8-inch adult salamanders return to the surrounding uplands where they live underground the rest of the year, feeding on grubs and worms. Their offspring will join them a few months later, emerging from the ponds just before the remaining water dries up.

The dependency of spotted salamanders and many other creatures on wetlands and uplands illustrates why it's important to protect land that contains both habitat types. This kind of protection is in essence what was accomplished when the developer of the Pines Edge Condominium Complex donated the 15-acre Pine Edge Conservation Area to the Northampton Conservation Commission in 1989. Although some uplands and a fringe of wetlands were developed, by clustering the condominium units on the most buildable land, the developer was able to make a profit and at the same time protect two vernal pools, a large swamp, and several acres of surrounding rocky woodlands.

The success of this approach is obvious back at the vernal ponds where the group of amphibian admirers has discovered several spotted salamanders, wood frogs and spring peepers.

Located north of the Moose Lodge at the end of Cooke Avenue, the Pine Edge Section is roughly J-shaped, running along Boggy Meadow Road and then wrapping around

the backside of the condominiums (Map 22). To the north and west of the conservation area are 1000+ acres of undeveloped land. Of these, over 500 acres are already protected, as conservation land (Fitzgerald Lake Conservation Area and the associated Lathrop Community conservation restriction). The nearness of this large and important piece of wild land, with its rocky knolls, abandoned pastures, marshes, streams, swamps and extensive woodlands, adds to the value of the conservation area as wildlife habitat. For instance, in addition to gray squirrels, raccoons, red fox and opossums, the conservation area is occasionally visited by larger mammals like black bears, coyotes and deer. Birds also benefit from the nearness of such an extensive natural area. Scarlet tanagers, ovenbirds, wood thrushes, northern orioles, red-eyed vireos and a dozen others are all commonly seen and heard here.

In addition to providing decent bird habitat, the Pines Edge Section also functions as a buffer zone, helping to protect birds nesting in the interior forest. Research has shown that the nest success of many forest interior species is declining due to rising nest parasitism by brown-headed cowbirds. Cowbirds lay their eggs in the nests of other birds, who mistakenly raise the young cowbird as if it were their own offspring. The large, aggressive cowbird chick runs its foster parents ragged, while their own chicks starve. Cowbird populations have soared because of: 1) the conversion of forests to agricultural lands which has provided outstanding feeding grounds for cowbirds (and starlings); and (2) increased forest fragmentation, which multiplies the amount of forest edge, giving cowbirds more access points. A female cowbird typically ventures only 300 feet into the forest to find a nest to parasitize. By not developing the land now known as the Pines Edge Conservation Area, forest fragmentation was reduced, which probably safeguarded more of the interior forest from the negative effects of cowbird parasitism.

Within the boundaries of the Pines Edge Section are a variety of habitats: vernal pools, swamps, muddy patches, bedrock outcrops and areas with well-drained soils (Map 23). The transition from one habitat to another can be rather abrupt and in just a few steps, you can pass from sneaker-soaking wetlands to dry, rocky uplands.

Most of the uplands are covered with a mix of red oak (*Quercus rubra*), scarlet oak (*Quercus coccinea*) and white oak (*Quercus alba*), with some shagbark hickory (*Carya ovata*) and red maple (*Acer rubrum*). Charcoal in the soil indicates that fires have swept through in the past, and tree stumps and the presence of many relatively young trees (less than 60 years old) confirms past logging activity. Near the beginning of Boggy Meadow Road and the Moose Lodge, American chestnut (*Castanea dentata*) resprouts are common, a sad reminder of what this forest was like before the chestnut blight (*Endothia parasitica*) (Map 23).

The soils of the upland oak woods vary from a thin organic layer over bedrock ledges to soils with a foot of rich black organics on top of at least three feet of yellow-brown, loamy sands. These loamy-sands are sediments that were deposited just off the western shore of glacial Lake Hitchcock, a long, linear lake that filled much of the Connecticut Valley from 15,600 to 12,400 years ago. Digging down through these sandy sediments, glacially rounded cobbles, probably once carried by ice rafts, can occasionally be found.

Supported by these well-drained soils are broad patches of huckleberry (*Gaylussacia baccata*), low bush blueberries (*Vaccinium vacillans*; *V. angustifolium*) and common wintergreen (*Gaultheria procumbens*). Other associates include leathery, drought tolerant species like pipsissewa (*Chimaphila umbellata*), spotted wintergreen (*Chimaphila maculata*), partridgeberry (*Mitchella repens*) and sheep laurel (*Kalmia angustifolia*). Bracken fern (*Pteridium aquilinum*), hay-scented fern (*Dennstaedtia punctilobula*) and ground pine (*Lycopodium obscurum*) are also widespread.

Another common, but often overlooked shrub throughout the well-drained uplands is witch hazel (*Hamamelis virginiana*). The last shrub to bloom in our area, it has spidery, yellow flowers, with petals that resemble thin strips of crinkly, shaved wax. At the flowering time, the plant also has miniature, acorn-shaped capsules that contain last year's seeds. When these capsules dry, they split open explosively, firing their contents as much as nine feet away!

In the northwest corner of the conservation area, the number of white pines increases and occasional clusters of hemlock (*Tsuga canadensis*) occur. There is also a noticeable shift in the understory vegetation in this section. Although many of the upland species persist, wetland species like witherod (*Viburnum cassinoides*), sheep laurel, winterberry (*Ilex verticillata*) and even mountain holly (*Nemopanthus mucronata*) show up. This appearance of wetland plants seems to be a function of changes in soil composition, which here is characterized by silts, clays, and a small percentage of sand. Hardpacked silt lenses limit the ability of water to percolate quickly through the soil, and oxidized streaks are a clue that the water table in this section slowly rises and falls.

Walking east from this corner of the property, the landscape is relatively flat, with gently rolling humps and isolated bedrock outcrops. The bedrock that underlies this area formed more than four hundred million years ago when a volcanic island arc in the Proto-Atlantic Ocean collided with the North American plate. During this collision, intense heat and pressure deformed and recrystallized rock into the monzodiorites⁶ that form the bedrock in this area.

⁶ Monzodiorites are metamorphosed intrusives containing quartz, hornblende and augite.

A ledge of this bedrock, covered with lichens and polypody ferns (*Polypodium virginianum*), marks the boundary between the uplands and a large wetland area. Covering almost half the conservation area, this wetland is underlain by a layer of virtually impervious clays that were deposited by the milky waters of glacial Lake Hitchcock. Because of these clays and the surrounding topography, the wetland acts much like a catch basin. The water that collects here stays for a long time; only a small portion of it flows south out of the conservation area as an tiny, intermittent stream.

During the year, the wetland changes dramatically, shifting from shallow, tree-filled ponds in spring to a wet swamp in mid-summer. Red maple (*Acer rubrum*) and swamp white oak (*Quercus bicolor*) are the two most common trees in the overstory, but white oaks and red oaks can also be found creeping in along its margins (Map 23).

The extent and large size of the swamp white oaks at the Pine Edge Section is relatively uncommon in Northampton. Restricted to wetland soils, swamp white oak is distinguished from other oaks by its pale bark, shallowly lobed leaves, and beautifully fringed acorn cups. The leaves, which are deep green and shiny above, are whitish below.

Below the oaks and maples grow a wide assortment of shrubs and herbs. Along the wetland's margin and throughout its sinuous swales are thick patches of waist-high, deer-nipped arrowwood (*Viburnum recognitum*). Nearby grow clusters of winterberry and on higher hummocks, high-bush blueberry (*Vaccinium corymbosum*) and mountain laurel (*Kalmia latifolia*). Below the shrubs are watery-stalked touch-me-nots (*Impatiens capensis*), swaths of sensitive fern (*Onoclea sensibilis*), clusters of pale blue violets (*Viola cucullata*), plus poison ivy (*Toxicodendron radicans*), willow herb (*Epilobium* sp.), smartweeds (*Polygonum* spp.), beggar's ticks (*Bidens cernua*; *B. vulgata*) and a few clumps of burreeds (*Sparganium* sp.).

Summary

With nearly three square miles of uninterrupted wild land to the north, the 15-acre Pines Edge Section seems like a pretty tiny piece of natural habitat. It is nevertheless an interesting piece, worthy of exploration and appreciation. The conservation area is used by the Broad Brook Coalition for natural history programs and probably just as important, by neighborhood children, who have outdoor adventures catching tadpoles, building forts and exploring the surrounding wild lands.

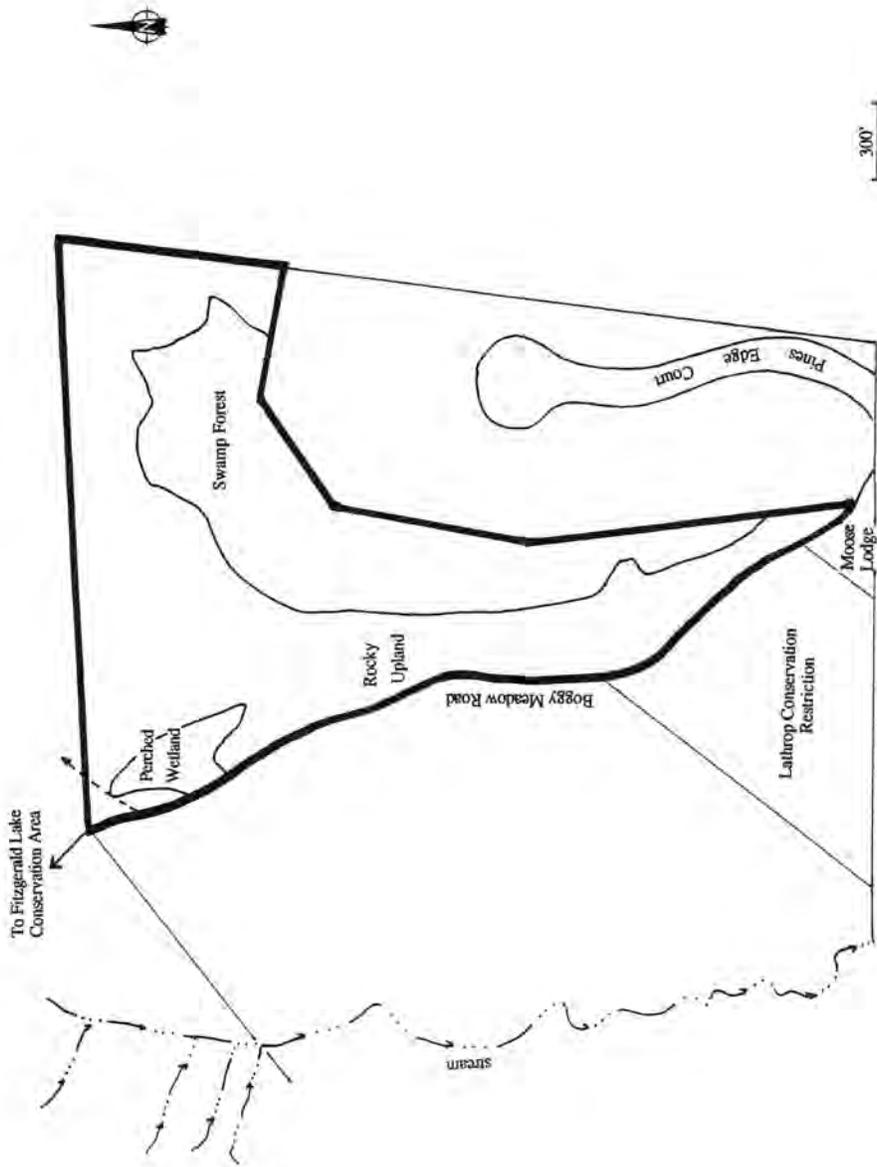
Through a network of wood roads and footpaths, the Pines Edge Section is another access point to Fitzgerald Lake Conservation Area and the rest of this undeveloped section of Northampton.

Map 22. Major Communities

PINES EDGE CONSERVATION AREA
100
100
100

110

Major Communities at the Pines Edge Conservation Area

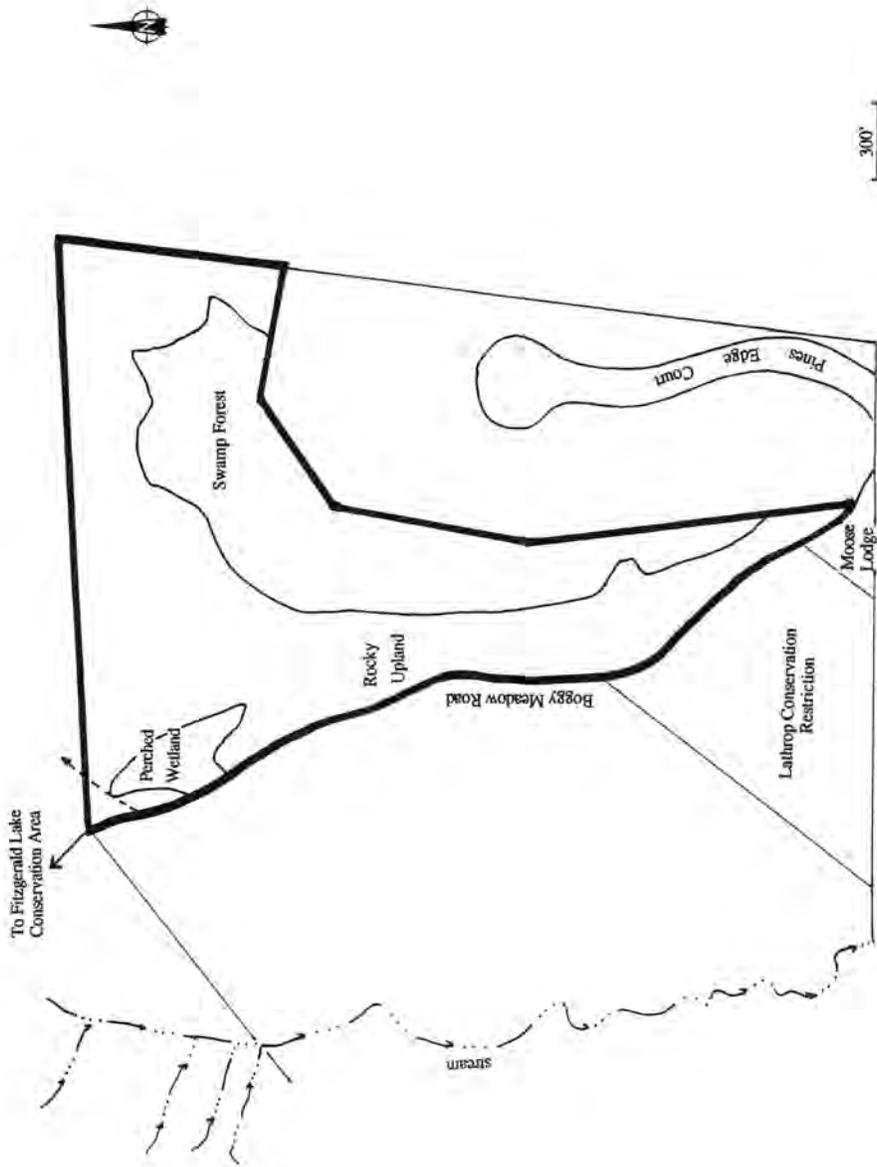


Map 22

Map 23. Detailed Vegetation Map

Major Communities at the Pines Edge Conservation Area

Map 22



THE PINES EDGE CONSERVATION AREA

Legend for the Detailed Vegetation Map

1. Hemlock with a few oaks; understory absent
2. White pine (30-40'); forest floor open save for scattered wintergreen and ground pine
3. Mix of shallow, seasonally flooded depressions and slightly higher uplands. Depressions contain cinnamon fern, witherod, and sheep laurel, while surrounding uplands are vegetated with red oak and blueberry (*Vaccinium angustifolium*)
4. Young white pine with dense hayscented fern in the understory
5. Red oak forest with scattered red maple, hickory (*Carya* spp.), white oak, black oak, and sprouts of American chestnut. The shrub layer is typically dense and shifts from witch hazel and hazelnut to lowbush blueberries (*Vaccinium angustifolium*; *V. vacillans*) and huckleberry. Wintergreen, bracken, ground pine and sedge (*Carex pennsylvanica*) scattered. Rocky outcrops numerous. Many of the oaks are large (3' diameter).
6. Cut over forest with young oak (15'), gray birch, red maple and stumps.
7. Young white pine, red oak, sugar maple and red maple forest with little understory except a thick leaf litter.
8. Red maple-hickory overstory with a dense witch hazel understory. Herb layer nearly absent. Occasionally wintergreen and low blueberries.
9. Red oak and black oak dominated with scattered red maples below. Herb layer entirely absent or dense with hayscented fern and wintergreen.
10. Red maple, red oak and hickory with a thick understory of beaked hazelnut, witch hazel, low bush blueberry, maple leaved viburnum. Thick leaf litter. Wintergreen, hog peanut, hayscented fern, ground pine, partridgeberry and patches of round-leaved pyrola frequent.
11. Bulldozed and wet wood road with dense growth of winterberry, black cherry, arrowwood, various sedges, bulrush, *Juncus effusus*, and New York fern on the drier berms
12. White pine dominated with a mix of red oak, black oak, red maple and hickory. Understory shrubs frequent and relatively diverse. Witch hazel is most common, but also present are blueberries (*Vaccinium vacillans*; *V. angustifolium*), mountain laurel, and many

sprouts of American chestnut. Herbs scant.

13. Rock outcrop with a diverse collection of plants: chokecherry, virginia creeper, false solomon's seal, true solomon's seal, partridgeberry, maple-leaved viburnum, Canada mayflower, wild columbine, plus two goldenrods and three different ferns.

14. Low-lying area beyond rock outcrops with abundant New York fern, interrupted fern, lady fern, arrowwood, winterberry and witch hazel. Red maple is most abundant in canopy but hickory, green ash and scattered oaks present.

15. Red maple swamp with abundant winterberry (*Ilex verticillata*), arrowwood (often low to ground and nipped by deer), marsh fern, and scattered tussock sedges. A rich area.

16. A mix of large white oak (*Quercus bicolor*) and red maple. Understory dominants sensitive fern, poison ivy, asters, and touch-me-not. This is the largest, densest stand of white oak presently known in Northampton.

17. Vernal pools used by spotted salamanders, wood frogs, and spring peepers. Tussock sedge, mud plantain, and beggar's tick abundant.

18. Wet low spot that was cleared in the past. Now contains a red maple canopy with an understory where interrupted fern and dewberry are most abundant.

19. Thick belt of mountain laurel below red oak-red maple overstory. Small stand of hemlock nearby.

NEW LAND FROM FLOODING WATERS

A Natural History of the Rainbow Beach Conservation Area

A cloud of fine dust billows up behind my car as I drive down the bumpy farm road on my way to Northampton's Rainbow Beach Conservation Area. On either side are fields of tomatoes, potatoes, pumpkins, butternut squash and lots and lots of corn. Above a field of broccoli, dozens of cabbage white butterflies flutter in the wind.

A mile further the road bends close to the Connecticut River and soon after I reach a fork in the road. I pull in and park near one of the two gated entrances to Rainbow Beach. The conservation land is just a few minutes walk from here, and its boundary is obvious--it's where the farm fields end and the trees begin.

At eighty acres plus, the Rainbow Beach Conservation Area is the largest remaining tract of uninterrupted floodplain forest on the Connecticut River in Hampshire County. Floodplain forests once covered hundreds of acres in Hampshire County, but most of them were converted to agriculture by Europeans and before them, by Native Americans. Evidence of Native American use of the area is unearthed every spring when plows turn up thousands of bits of worked flint and quartz fragments and even an occasional arrowhead.

Unlike the adjacent farm fields, most of the Rainbow Beach Conservation Area has never been plowed or logged. This is because most of the conservation area is new land that was deposited by the Connecticut River over the last hundred or so years. In fact, so much land has accumulated on this side of the river that Shepherd's Island, once near the middle of the river, is now connected to the mainland and a basalt piling that stood on the river's edge is now 100 feet inland. A second piling that used to be on the Hadley side of the river is now located a third of the way into the river's main channel.

The phenomenon of cutting on one side and depositing on the other is typical of meandering rivers like the Connecticut. Relatively unimpeded by mountains or rocky cliffs, the river began snaking back and forth across the broad valley floor when glacial Lake Hitchcock drained 12,400 years ago. Since then, the river has carved down through 80 feet of lake deposits, working and reworking the landscape, sculpting river terraces, creating islands, forming oxbows, and developing extensive floodplains and wide loops like the one that frames the Rainbow Beach Conservation Area.

Because of the river's dynamic nature, it's easy to find dramatic habitat variations within the Rainbow Beach Conservation Area. At one extreme are its well-drained, nutrient poor sands, and on the other its water-saturated, nutrient rich mudflats. Such shifts in soil composition and moisture level profoundly affect the distribution of plant species. By considering these combined differences along with changes in light levels, the Rainbow

Beach Conservation Area can be divided into five main communities--floodplain forest, mudflats, sandy deposits, flood channels, and a long inlet that lies between Shepherd's Island and the mainland (Map 24). In spite of their differences, all of these communities have at least one thing in common: They all contain perennial plants that can withstand periods of flooding that lasts for weeks.

The Floodplain Forest

Of the five communities, the floodplain forest is by far the largest, covering nearly 90% of the conservation area. As is typical of floodplain forests, there is no shrub layer, only a canopy layer and a lush herb layer. In this case, the forest is dominated by silver maple (*Acer saccharinum*) in the canopy and an herb layer of wood nettle (*Laportea canadensis*) (Map 25). Actually the amount of wood nettle can best be described as superabundant; it covers approximately 60 acres and by mid-summer forms a chest-high stinging sea. An itchy, stinging sensation may be your first clue that you've found wood nettle, but to confirm your discovery, look for alternate, long petioled leaves that are just a little bigger than the palm of your hand.

Despite the abundance of wood nettle in summer, there is hardly a trace of it left the following spring after floodwaters have swept away its stems. This is one advantage to visiting this conservation area in the spring. Another plus is that it's easy to see the dramatic effects of flooding. Flood-borne plant debris dangles from the lower branches, and the first six feet of the tree trunks is covered with a fine wash of silt, giving the floodplain forest a muted gray-brown, hazy look.

By the first week in May, yellow-rumped warblers, redstarts, prairie warblers and black-and-white warblers flit through the treetops, feeding on young caterpillars and other insects in the newly developing leaves. Brown creepers sing their melodic song as they scale up the tree trunks in search of food in the bark's nooks and crevices. Below, pushing up through a thick layer of newly deposited silts, are ostrich fern fiddleheads (*Matteucia strutiopteris*). Although less common at the Rainbow Beach Conservation Area than in some floodplain forests, ostrich ferns number in the hundreds, growing on the river terrace that borders the farm fields, on Shepherd's Island and in isolated clusters in the main floodplain forest. By the end of August, many of these waist-high fronds--particularly those growing closest to the river--are brown and withered. This premature death is due to a moth larva that bores into the base of the frond.

On the west side of the conservation area is a small trail that leads from the edge of the field through the floodplain forest to the river's edge. Less than ten years ago, this trail was heavily abused by 4-wheel drive and all terrain vehicles. In 1988, the Northampton

Conservation Commission put an end to this by installing two heavy, locked gates on the farm roads, about a mile from the trailhead.

Near its beginning, the somewhat overgrown trail is surrounded by cottonwood (*Populus deltoides*), staghorn sumac (*Rhus typhina*) and a mix of goldenrod (*Solidago canadensis*), wood sorrel (*Oxalis europea*), and asters (*Aster* spp.). The trail then passes through a mixed forest dominated by box elder (*Acer negundo*) and less frequently, silver maple. The abundance of box elder and the brushy nature of the understory suggests that this area was cleared in the past.

Box elder is a low statured maple which, because of its compound, 5-parted leaves looks, at first glance, more like an ash. However, unlike ash, the young branches of box elder are purplish green and its seeds are large versions of the classic winged maple seeds. Another helpful way to recognize box elder is that its seeds remain on the tree through much of the winter.⁷

Beyond the small section of box elder, the forest shifts to silver maple and then, as one nears the river's edge, a silver maple/cottonwood mix. Along the way are wide swaths of wood nettle, clusters of touch-me-nots (*Impatiens pallida*; *I. capensis*), white snakeroot (*Eupatorium rugosum*), woodland sunflower (*Helianthus* sp.), ostrich fern and small patches of virginia creeper (*Parthenocissus quinquefolius*). Grape vines (*Vitis riparia*) climb high into the canopy, while in sunny spots, vines of wild balsam apple (*Echinocystis lobata*) and bur cucumber (*Sicyos angulatus*) drape over the herbs.

Where the trail finally joins the river, the current has carved a steep bank. Downstream, the trail passes a strip of young willows, marking the boundary between the floodplain forest and the open beach. From this point, if you walk straight back into the forest you pass through a series of plant associations that get progressively older. Beyond the young willows is a willow/cottonwood belt. A few feet further this belt is replaced by a zone of cottonwood with a thick understory of silver maple. And beyond this strip is the dominant plant community--the silver maple forest, with scattered large cottonwoods, and its carpet of wood nettle. The gently curved rainbow shape of the beach is repeated in its bands of vegetation--younger to older, willow to silver maple (Fig. 3). An excellent place to view these vegetation arcs is from the Summit House at the top of Skinner Mountain State Park.

⁷ Box elder can be either male or female. Therefore, you'll see some trees (the females) loaded with seeds and others (the males) with none.

Figure 3. A stylization of the vegetation bands at the Rainbow Beach. 1= willows; 2= willow/cottonwood; 3= cottonwood/silver maple sapling; 4=silver maple.

Rainbow Beach

Between the young willows and the river is a broad sand beach. Curved and roughly 300 feet wide by a quarter mile long, this site consists of newly deposited sands. Few plants can survive here, and those that do must withstand conditions that range from weeks of drought to weeks of flood, from burial in new sand layers to having the ground swept out from under them.

Nevertheless a few species are adapted to these harsh conditions. On the higher margins of the sandy point bar, a mixture of cocklebur (*Xanthium strumarium*), smartweeds (*Polygonum* spp.), and grasses grow in abundance (Map 25). Close to the water, an occasional, depauperate beggar's tick (*Bidens vulgata*) can be found. These plants help stabilize the sands and establish the necessary preconditions for the future development of the floodplain forest.

Their ephemeral nature and patchy distribution make these point bars rare habitats. To date, two state-listed species are known to live on this one. Sandbar willow (*Salix exigua*), identified by its long, linear leaves and slender, reddish branches, grows six to fifteen feet in height. The other species of concern is a tiger beetle (*Cicindela puritana*) which breeds in the sands not far from the willows.

Unfortunately for the tiger beetles, Rainbow Beach is also a very attractive area for boaters and campers. Although most visitors behave responsibly, there is a subset which does not and because of them, this stretch of the conservation area is suffering. People are constructing seasonal camps, cutting down trees, trampling native plants, building fires, and leaving behind broken grills and chairs, cans, bottles and paper. An even more serious problem is the issue of improper sewage disposal.

Although use of the area will continue, it is critical to repost the area because the old signs have become obscured by vegetation. In addition, a new sign describing the rarity and importance of the tiger beetle could be installed and the most vulnerable area could be restricted during critical periods, much as tern nesting areas are cordoned off along the seashore. Already spread thin, the environmental police need support from the Conservation Commission to help protect this site from further degradation.

A different category of concern along the beach is the spread of non-native plants that include Japanese knotweed (*Reynoutria japonica*) and purple loosestrife (*Lythrum salicaria*). These aggressive exotics degrade natural areas by readily outcompeting the native plants, which are more valuable as food and cover for wildlife. At this stage, the invasions are still manageable, but a work crew is needed to eliminate these undesirable, nuisance species.

The Mudflats

Covering little more than an acre, mudflats are found near the junction of Shepherd's Island and the mainland. In spite of their small area, these sunny, muddy zones contain the most diverse plant assemblage within the conservation area. There are broad patches of grasses, umbrella sedges (*Cyperus* spp.), touch-me-nots (*Impatiens capensis*), young willows (*Salix* spp.), grape, silky dogwood (*Cornus ammomum*), arrowhead (*Sagittaria latifolia*), mud plantain (*Alisma subcordatum*), and both bur cucumber and wild balsam apple (Map 25).

These plants and the sprawling shrubs that grow on their drier margins provide food and cover for a wide range of animals, from midges and spiders to raccoons and shorebirds. Besides spotted sandpipers and lesser yellowlegs, red-winged blackbirds, grackles, robins, catbirds, and common yellowthroats all frequent the mudflats' brushy borders.

The Inlet

Although now a quiet backwater, the inlet was once one of the main channels that looped around Shepherd's Island (Fig. 4). Today, this calm, silty bottomed inlet provides ideal growing conditions for aquatic plants like coon's tail (*Myriophyllum* sp.), water starwort (*Callitriche* sp.), eelgrass (*Valisneria americana*), waterweed (*Elodea canadensis*) and at

least two species of pondweeds (*Potamogeton* spp.) (Map 25). Great blue herons and green herons wade in its shallows, kingfishers chatter and dive for fish, and wood ducks feed on the submerged plants.⁸ During migration season, mallards, black ducks, blue-winged teal, ring-necked ducks, ruddy ducks, common mergansers and American widgeon also use these private backwaters. Pickerel frogs, American toads and painted turtles are the amphibians and reptiles most commonly seen here.

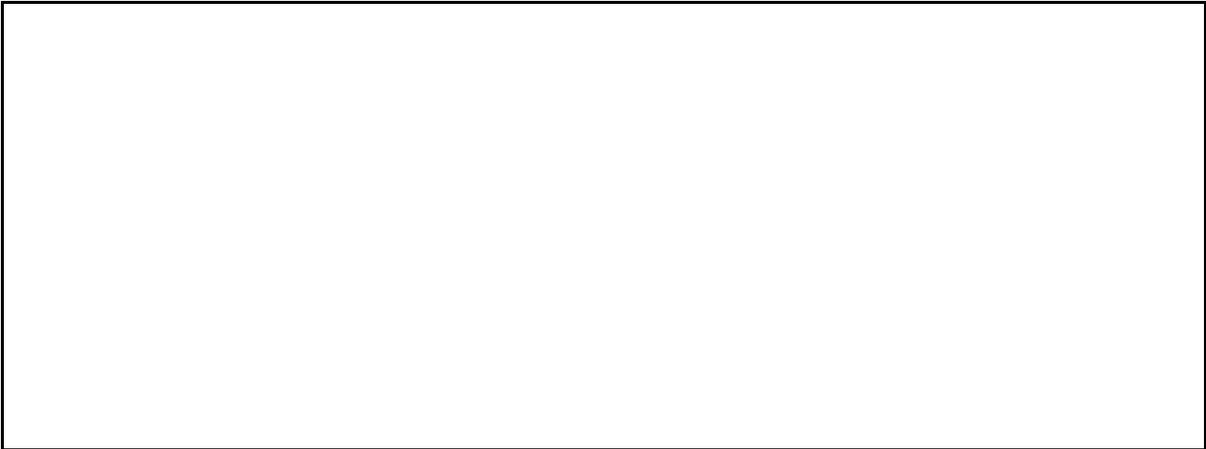


Figure 4. The development of the inlet at Shepherd's Island.

Flood Channels

Within the Rainbow Beach Conservation Area are two easy-to-find flood channels. The smaller of the two channels runs north-south on Shepherd's Island, the larger channel runs north-south on the mainland. Located just inside the boundary of the conservation area, this large swale parallels the farm fields for most of its length. Gouged by floodwaters, this channel helps drain the farm fields and extensive floodplain nearby. As you head south, this channel gets gradually broader and deeper. So deep, in fact, that even during the driest part of the year, it contains water. Just before reaching the inlet, the channel narrows abruptly. A large amount of flood debris has accumulated at this narrow outlet.

By mid- to late summer both channels contain lush plant communities, which are dominated by either touch-me-not or the non-stinging false nettle (*Boehmeria cylindrica*). Patchily distributed within these channels are beggar's ticks (*Bidens cernua*; *B. vulgata*), mud plantain, several different grasses, and a mix of plants that tolerate wet, poorly oxygenated soils.

⁸ These inlets might be good locations to install wood duck nesting boxes.

Shepherd's Island

Islands are common, ephemeral features on meandering rivers like the Connecticut and Shepherd's Island is no exception. Like Elwell Island a mile upriver, Shepherd's is a relatively recent addition to the Connecticut River.

Now owned by the Massachusetts Division of Fisheries and Wildlife, Shepherd's Island began forming in 1729. By 1754, just twenty-five years later, the island had grown to six or seven acres and was already under cultivation. In 1770 the island became the property of Solomon Stoddard, and for the next thirty years the land was known as Stoddard's Island. In 1803, Levi Shepherd purchased the island for \$1200 and it became known, as it is today, as Shepherd's Island.

The island's rather rapid initial growth didn't last and by 1904, when Northampton celebrated its 250th anniversary, the island measured only 15 acres. By then, the land had switched hands again and was owned by the Mount Tom Lumber Company.

At that time, the Connecticut River was still an important logging river and the Mount Tom Lumber Company had purchased the island in order to construct a series of basalt pilings that would span the river and with a chain, catch logs moving downriver. The logs were slowly released and allowed to flow down to the mill, which was located on Route 5 where the Packaging Corporation of America now stands. Extra logs were stored in the Oxbow, which used to be called the "Old Bed of the Connecticut River". After processing, the pulp was sent to Holyoke's paper mills.

By the 1950's, logs were no longer being sent down the river and Shepherd's Island was abandoned by the Mount Tom Lumber Company. An aerial photograph taken in 1965 clearly shows a small cleared area on the east side of Shepherd's Island and Northampton native, Ed Gross, recalls that a small cottage had been built in this vicinity. This building is long gone, and the formerly cleared area has now grown up into a mix of staghorn sumac (*Rhus typhina*), goldenrod (*Solidago canadensis*), white snakeroot (*Eupatorium rugosum*), touch-me-not, grape and the sun-loving bur cucumber and wild balsam apple.

Further west on the island is a row of large silver maple and cottonwood where ostrich fern is dominant. The land dips down into a shallow flood channel and then to a level plain with young cottonwood and willows. In this section, the forest floor is covered by dense patches of touch-me-not, false nettle, and virginia creeper (*Parthenocissus quinquefolius*). As one heads downriver the land becomes sandier and there are numerous

small, open areas with few or no herbs. At present, the river is eroding the east side of Shepherd's Island, creating a steep bank. But while it's disappearing in this area, new sands are being deposited at its south end as well as on its west side.

Looking Ahead (or in this case, downriver)

The Rainbow Beach Conservation Area is one of only four large tracts of floodplain forest in Northampton. Three of the areas, including Rainbow Beach, are protected: Elwell Conservation Area is owned by the City of Northampton and Ned's Ditch is owned by Massachusetts Audubon Society's Arcadia Wildlife Sanctuary.

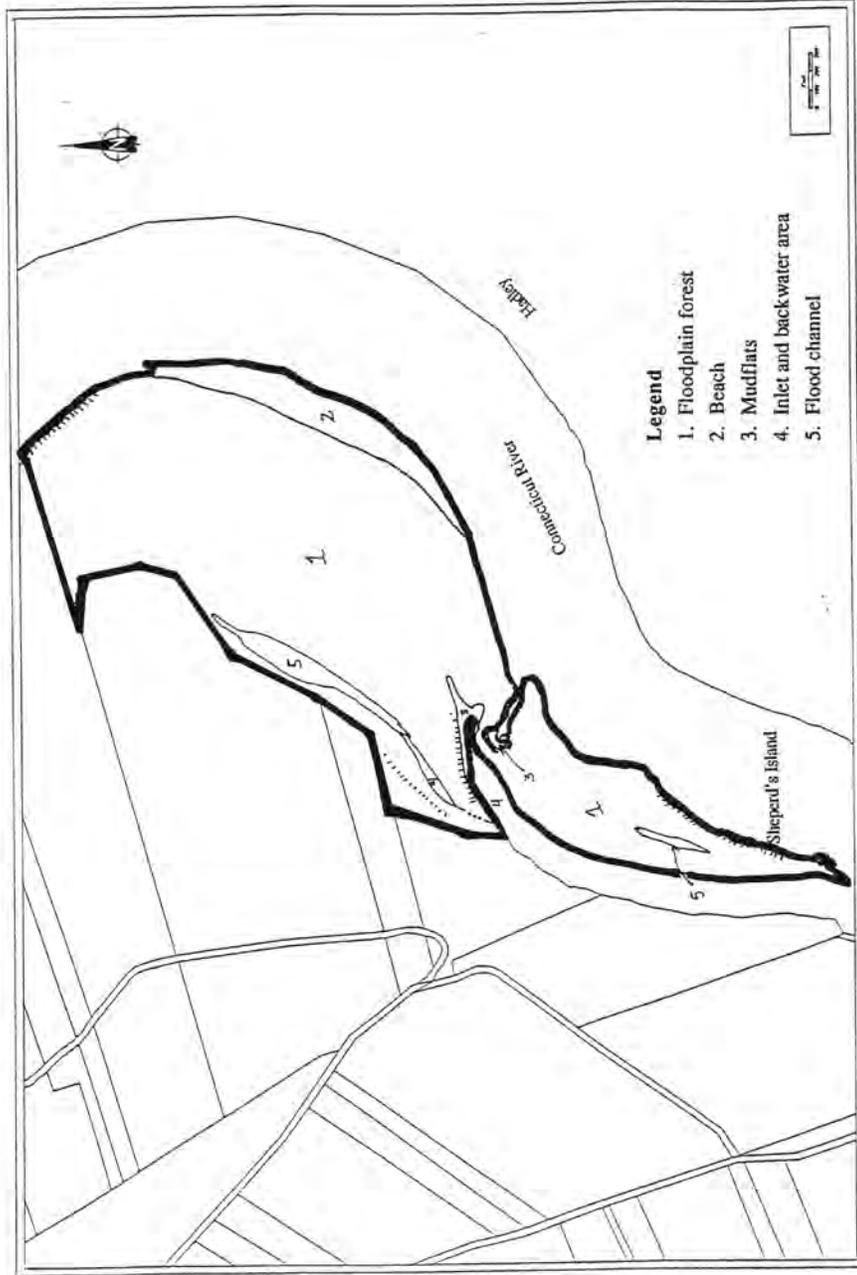
The fourth area is located in the vicinity of the Route 91 pits, about 1 1/2 miles downriver from Rainbow Beach. In this section, fragments of floodplain forest cover between 70 and 80+ acres. One long ribbon runs along the abandoned channel of the old Mill River diversion and several smaller patches are located near the Route 91 pits. In between these patches is active and abandoned agricultural land.

Frequented by fisherman, hunters, walkers and four-wheel drive enthusiasts, the area--in spite of its patchiness and trash problems--provides quality habitat for some of our rarest species. On a long tongue of newly deposited land, a pair of bald eagles nested in 1992 and reared their first offspring in 1993. In this same area are four other state-listed plant species, one of which is endemic to Northampton.

Long coveted by the conservation community, negotiations to protect this special area have stalled repeatedly in the past. Nevertheless, this area should remain one of the City's highest priorities for protection.

Map 24. Major Communities

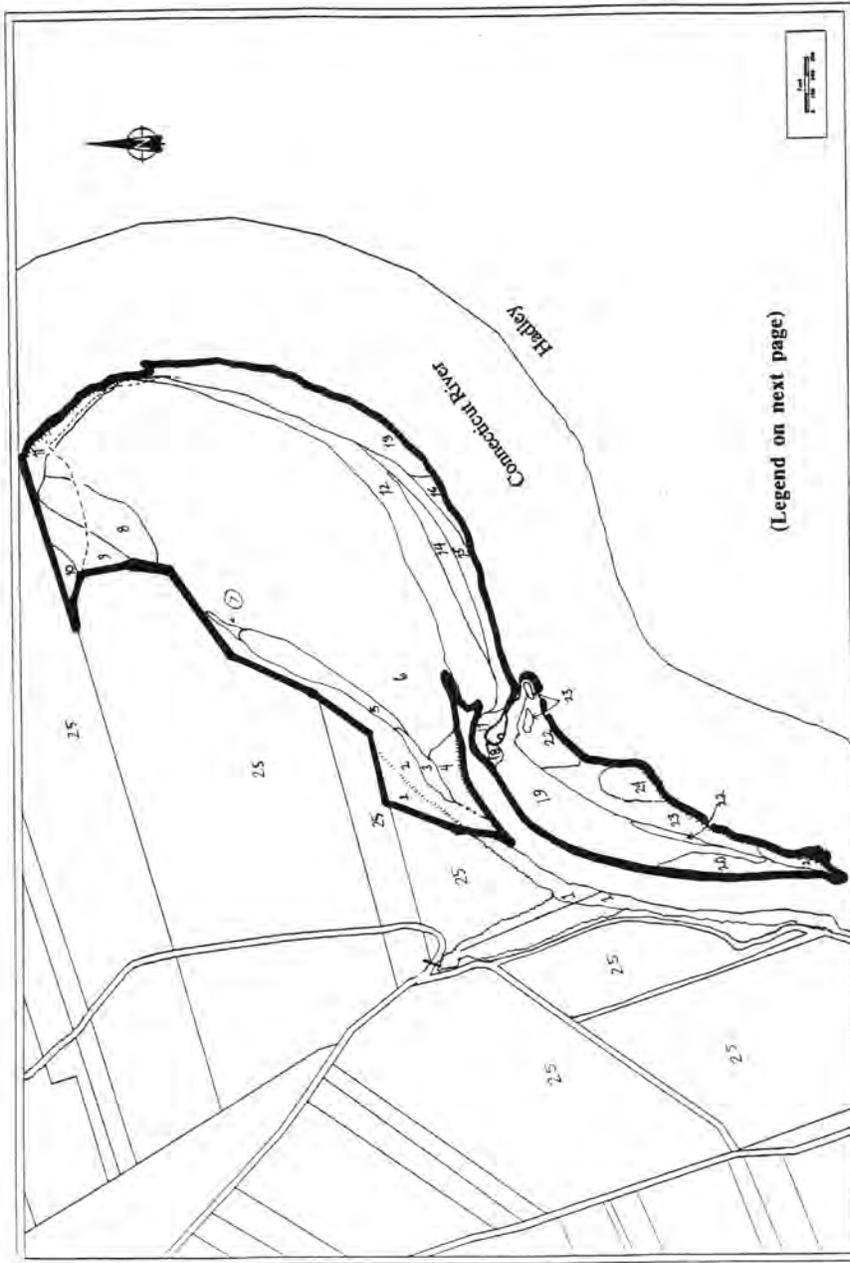
Map 24
Major Communities at Rainbow Beach Conservation Area



Map 24

Map 25. Detailed Vegetation Map

Detailed Vegetation Map of Rainbow Beach



Map 25

THE RAINBOW BEACH CONSERVATION AREA

Legend for the Detailed Vegetation Map

1. Silver maple with occasional cottonwood in the canopy. A mix of hog peanut, ostrich fern, Asiatic bittersweet, poison ivy, virginia creeper, white snakeroot and sensitive fern below.
2. Cottonwood and silver maple with ostrich fern or wood nettle understory.
3. Open water frequented by wood ducks, great blue herons, and sand pipers. Inhabited by painted turtles.
4. Silver maple canopy with ostrich fern. At the base of the steep bank are open mudflats with grasses (*Echinochloa* & *Leersia*), bur cucumber, sparganium, touch-me-not, silky dogwood, and willows.
5. Extensive mudflats that contain beggar's ticks (*Bidens tripartita*; *B. vulgata*), mud plantain, touch-me-not, various grasses and increasingly, false nettle. On surrounding ridges the forest is composed of silver maple with an understory of ostrich fern, or most common on the river side, wood nettle.
6. Extensive silver maple floodplain forest with wood nettle understory. Small islands of ostrich fern infrequently encountered.
7. Gradual replacement of false nettle to wood nettle.
8. Silver maple forest mixed with abundant, smaller statured box elder. Understory remains almost exclusively wood nettle. Near the field, occasional patches of white snakeroot and *Helianthus*.
9. Box elder dominated forest with wood nettle and touch-me-not understory.
10. Young cottonwoods with mixture of goldenrod, garlic mustard and *Oxalis*. Trail, now infrequently used, begins here.
11. Young cottonwood-box elder forest with understory of wood nettle, white snakeroot, and *Helianthus*. Touch-me-not and clearweed also common. Ostrich fern occasional.
12. Mix of older cottonwood (20" diam.) and silver maple in canopy. Understory absent or wood nettle.

13. Open sand (point bar) that is absent of vegetation except along the margin where Chinese cocklebur and grasses form the outermost edge of plants. Behind these grow willow, and behind the willow, young cottonwoods. This area is the nesting site for a rare tiger beetle and also contains a rare willow.
14. A transition zone of young cottonwood with sapling silver maple. Also present are older willows.
15. Willows and cottonwoods most abundant. Along the shore, smartweeds, grasses and cocklebur abundant.
16. Sandy area thickly vegetated with cottonwood seedlings and an extensive bank of willows.
17. Strip of land that connects the former Shepherd's Island with the mainland. Vegetated by willows and ringed with tangle of smartweeds, grasses, pimperl, and *Cyperus*. Below willows are field horsetail, asters, false nettle, and wood nettle. Frequented by raccoons.
18. Small mudflat with sparse vegetation. Plants include mud plantain, asters, bur cucumber, and beggar's ticks.
19. A long row of large, mostly cottonwood defines the eastern boundary of this plant community. This area is characterized by silver maple, occasional elm and box elder. The ground is covered with extensive patches of touch-me-not (*Impatiens capensis*; *I. pallida*), false nettle, and asiatic bittersweet. Many areas are completely free of herbs.
20. Zone of young cottonwoods.
21. Sandy soils with young silver maple and cottonwood. Often free of herbs, but in sunny locations dominated by goldenrods, ostrich fern, Virginia creeper, bur cucumber and white snakeroot.
22. River channel dominated by false nettle.
23. Like 19 but ostrich fern dominates the understory.
24. Open area with staghorn sumac, touch-me-not and bur cucumber.
25. Cropland

A NATURAL HISTORY OF THE ROBERTS HILL CONSERVATION AREA

From the highest ridge of the Roberts Hill Conservation Area, the surrounding woodlands glow with oranges, reds, yellows and greens in the mid-October sunshine. There is so much forest to see from here that it's hard to imagine that only 150 years ago this area and, in fact, most of Massachusetts, was nearly treeless. Cut for timber and firewood, the forests had been converted to scrubby pasture for sheep and cows.

Going back yet another 150 years would bring us to the era of Robert Lyman⁹, the avid hunter after whom Roberts Hill and Roberts Meadow are named. During Lyman's lifetime, the hills in western Northampton were still covered with virgin forests--massive oaks and chestnuts, towering sugar maples and hickories. Timber wolves and mountain lions still roamed the woods, and the ancient footpaths of the Nonotucks threaded through the surrounding countryside.

Going back much further, to 15,000 years ago, we would again have seen a treeless region, this time the result of the last in a series of continental glaciations that modified and shaped the New England landscape. To the north, south and west, tundra grasses, mosses and stunted balsam fir and spruce covered the freshly deposited glacial debris. But to the east, instead of tundra, we would have seen the milky green waters of a great glacial lake, dotted with icebergs and a few rocky islands.

Fed by the meltwaters of the last receding glacier, Lake Hitchcock filled the Connecticut River valley from northern Vermont to what is now Rocky Hill, CT. It existed for more than 3000 years (15,600-12,400 before present), and for much of that time, its shoreline matched our current 300' contour line.

The glacial outwash dam at Rocky Hill eventually breached, Lake Hitchcock drained and as the climate gradually warmed, plants and animals from the south began to recolonize the region. By six thousand years ago, most of the trees that we're familiar with--the oaks, hickories, pines, and maples--were well established in New England.

Today, more than half of the Roberts Hill Conservation Area's 104 acres is dominated by oaks (Map 26 and 27). There are red oaks, white oaks, black oaks and even a few chestnut oaks. (*Quercus rubra*; *Q. alba*; *Q. velutina*; *Q. prinus*). Hickories (*Carya ovata*; *C. ovalis*) and red maple (*Acer rubrum*) are also abundant, and in certain areas, there are almost pure stands of white pine (*Pinus strobus*) and hemlock (*Tsuga canadensis*).

⁹ Lyman is also credited with finding the lead desposits in Loudville. He and others formed a small mineral company and began the first leadmining operation in the country.

Below the oak canopy is an abundant shrub layer composed of only a few species. Where the bedrock lies close to the surface, there are broad, knee-high patches of huckleberry (*Gaylussacia baccata*), low-bush blueberry (*Vaccinium vacillans*), and late sweet blueberry (*V. angustifolium*). In deeper, moister soils, witch hazel (*Hamamelis virginiana*), resprouting American chestnut (*Castanea dentata*), and acres and acres of mountain laurel (*Kalmia latifolia*) form a dense, hard-to-walk-through understory.

The number of species in the herb layer is similarly low. The two most common wildflowers are wintergreen (*Gaultheria procumbens*) and partridgeberry (*Mitchella repens*). Both have evergreen leaves and red fruits, but are easily distinguished. Wintergreen is a short (5"), upright plant with leathery, aromatic leaves and urn-shaped flowers. Partridgeberry, a relative of coffee, is a prostrate plant with fleshy, four-petaled flowers that blossom in pairs. Its two flowers fuse and form one fruit, and because of this, the plant is occasionally called "two-eyed berry". Other herbs in the upland soils include wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), indian pipe (*Monotropa uniflora*) and in rocky areas, polypody (*Polypodium virginianum*) and marginal fern (*Dryopteris marginalis*).

The remaining habitat diversity at the Roberts Hill Conservation Area is largely the result of changes caused by people. All told, eight human-disturbed areas can be identified: 1) the quarry; (2) the ice pond; (3) the old field; (4) the "muckhole" pond; (5) the abandoned powerline right-of-ways; (6) the sewer line; (7) the burned area; and (8) the recently logged forest patches (Maps 27).

The Quarry

Among the oldest of the disturbed areas is the quarry. Located near the summit of Roberts Hill, the quarry is now only a jumble of rocks, its surrounding cliffs marked by dynamite bore holes. The quarried stones were probably used locally, possibly in the construction of the reservoir dam or in Cooke's dam on the Mill River.

Today, many of the rocks are covered with lichens, including a leafy variety known as rock tripe, which can change from brown and brittle to green and fleshy after just an hour or two of rain. Among the rocks, one also finds young black birch (*Betula lenta*), marginal fern, polypody and a few sedges (*Carex* spp.) (Map 28). At the back of the quarry, near the rock wall, is a small bedrock hole (15' X 10') that collects rainwater and winter melt. In spring, this temporary "pond" serves as a breeding site for wood frogs (*Rana sylvatica*).

Howard's Ice Pond

An important modification to the southern end of the conservation area occurred early in this century when a dam was built near a little waterfall and Howard's Ice Pond was created. Used as a source of ice until the middle of this century, the 1/4 acre pond has been and continues to be a popular place for picnicking and relaxing. It's also a good spot to watch birds. Chickadees, nuthatches, tufted titmice, downy woodpeckers and brown creepers can be seen year-round, foraging in the hemlocks around the pond. From early spring through mid-October, eastern phoebes can be seen sallying out from their shoreline perches to snatch small flying insects in midair. One of the plants you'll see the phoebes on is speckled alder (*Alnus rugosa*). Growing in isolated clusters along the water's edge, this six to fifteen foot shrub is readily identified by its miniature pinecone-like fruits. Also found on these wet shorelines are beggar's ticks (*Bidens vulgata*), spotted touch-me-not (*Impatiens capensis*), asters (*Aster* spp.) and various grasses (Map 28).

On the higher and drier slopes around the pond, the vegetation is dominated by hemlock. An exception to this is on the north side where gray birch (*Betula populifolia*) and red maple have colonized an area that was open and grassy 25 years ago. Also on the north side is a tulip tree (*Liriodendron tulipifera*) that has a circumference of more than 10 feet, making it one of the fattest tulip trees in Northampton.

The pond is fed by a small, sandy-bottomed brook that cuts across the southern edge of the conservation area. After exiting the pond via the dam spillway, the little stream flows through a shady, hemlock forest where striped maple (*Acer pensylvanica*) and spicebush (*Lindera benzoin*) grow in the understory and migrating Louisiana waterthrushes hunt insects in spring. The stream passes the "muckhole" and then veers southeast, flowing out of the conservation area through a red maple swamp, past the Fairway Village Condominiums and into the Mill River.

The Old Field

Remnants of a barbed wire fence are evidence that the gently sloping land just north of the pond was once a pasture. Today, this former pastureland is fairly open forest with scattered oaks, hickory, hemlock and lots of white pine (Map 28). Several of these white pines are giants, and probably weren't cut in the past because they were multi-stemmed or crooked. These "wolf" pines are now the seed source for the hundreds of white pine seedlings and saplings in the understory.

For part of this century this area was kept open when the Roberts Hill area was owned and maintained as the private hunting grounds for a wealthy businessman from Springfield. Congressman Bowles married one of the Howard daughters and later built a small hunting cabin not far from a natural spring. Although the cabin is gone, the spring and some brickwork around it can still be seen along one of the trails (Map 29).

The Muckhole Pond

A few hundred feet in from Dimock Street is a half acre wetland, known locally as the "muckhole". Years ago, fill for an old wood road dammed what had probably always been a low wet spot and converted it into the year-round, shallow pond that we see today. This pond is probably a breeding site for wood frogs, spring peepers, gray tree frogs, American toads, spotted salamanders and red-spotted newts.

On either side of the "muckhole" is a narrow shoreline with a variety of wetland herbs and shrubs (Map 28). Immediately behind are rocky outcrops, which on the west side includes a small, well-shaded talus slope that supports a rich fern community as well as a porcupine or two.

The Sewerline Right-of-Way

Running along the western side of the muckhole is the sewerline right-of-way. Along this edge, high-bush blueberry (*Vaccinium corymbosum*), touch-me-not, swamp candle (*Lysimachia terrestris*), marsh fern (*Thelypteris palustris*), cinnamon fern and a wide array of wetland asters, smartweeds (*Polygonum* spp.) and sedges are well established (Map 28).

South of the pond, near Dimock Street, the soils are slightly higher and drier, and the sewer easement is dense with 12-foot high saplings of black birch, tulip tree, alder and willow (*Salix* sp.). This area, along with two tiny red maple swamps and nearby stream, is a good place to learn common wetland plants.

At the north end of the muckhole, the sewerline is crossed by an abandoned powerline right-of-way. In this moist, open area, the vegetation is dominated by cinnamon fern (*Osmunda cinnamomea*), hay-scented fern (*Dennstaedia punctilobula*) and groundnut (*Apios americana*).

The Powerline Right-of-Ways

Together with the sewerline, the abandoned powerline right-of-ways divide the

conservation area into five separate pieces. An east-west line runs from Dimock Street, across the rocks near the Mill River, over the sewerline, and then begins a long, nearly steady climb to the intersection with a second line. The second line runs roughly north-south and crosses Chesterfield Road and Reservoir Road (Map 26, 27).

Since their abandonment 20-plus years ago, these 50' wide easements, which were regularly brush-hogged and herbicided in the past, have been slowly recolonized by a variety of plants. Which plants grow in the easements depends in large part on the depth of the soil and the amount of recent use.

Near the Mill River section of the east-west powerline in a fire scarred area where bedrock is close to the surface, the most common plants are young pine, lowbush blueberry, mountain laurel and wintergreen (Map 28). Close by, the rocky banks of the Mill River are surrounded by hemlock and pine. In spite of the fact that this is a popular swimming spot, few trees have been damaged and trash is not a big problem.

Beyond the sewerline, the east-west right-of-way is dominated by hay-scented fern, young black birch and occasional blackberries (*Rubus* spp.). At the top of a steep rise, it intersects two trails, one of which parallels the powerline right-of-way for nearly 1/4 mile. With a well-maintained trail nearby, the powerline has not been used as a path and now contains a thick mix of gray birch, poplar (*Populus tremuloides*), occasional oak, low juniper (*Juniperus communis*), lowbush blueberry, sedges and mosses (particularly *Polytrichum*). The trail eventually hooks into the right-of-way, and soon after the vegetation shifts to a more open mix with mountain laurel and sweet fern (*Comptonia peregrina*).

Where this east-west right-of-way joins the north-south line, two trails split off: one continues west through the Department of Public Works land to Reservoir Road, the other heads north along the powerline and eventually loops to Reservoir Road. The latter trail, kept open by people on foot, mountain bikers, horseback riders and kids on ATVs, passes over rocky terrain where the soil is thin or absent. Here, the vegetation includes mosses, lichens, wintergreen, lowbush blueberries, huckleberry, sweet fern, mountain laurel, and young white pine (under 5' in height). Gracing the margin of the path are occasional patches of trailing arbutus, one of our earliest flowering and prettiest smelling wildflowers.

The Burned Area

Three trails lead to the lookout at the top of Roberts Hill; one leaves from Water Street, another opposite the Musante Recreation Area, and a third splits off the east-west powerline right-of-way. No matter which path you take, you'll notice that as you near the

summit the forest changes dramatically. Oak skeletons, some with charred trunks, stand eerily above young resprouts and a dense thicket of mountain laurel (Map 28).

Approximately ten acres in size, this hilltop area burned ten years ago when a fire started by children went out of control. After the fire, the area was completely blackened and most of the shrub layer was destroyed. Today, mountain laurel, witch hazel, American chestnut and hazelnut have sprouted to form a dense shrub layer. Come fall their yellowed leaves blend with the greens of mountain laurel and orangy-reds of the red maples to transform this area into a carnival of color.

Forest Cutting

In 1988, patches of forest were selectively cut along the east and south sides of the conservation area. The reasons for cutting were partly economic (to defray costs from a new land purchase at Roberts Hill) and partly an attempt to increase habitat diversity for white-tailed deer and ruffed grouse. Aesthetic considerations were taken into account, and most of the work is completely invisible from the trails. By following the old skid roads, however, the intrepid visitor will come across several patches with dense stands of black birch saplings, hay-scented fern and blackberries--three species that often sprout up after clearing (Map 28, 29).

Diversity at Roberts Hill Conservation Area

Considering the size of Roberts Hill, the area's plant diversity is actually fairly small. This is probably due to the conservation area's bedrock and glacial geology. In essence, Roberts Hill is a big bump of thick-bedded gneisses and mica schists covered with a relatively thin veneer of acidic, well-drained glacial till. These difficult habitat conditions are suitable to a relatively small percentage of plants. The species that can tolerate these conditions--oaks, huckleberries, mountain laurel, hickories--are the ones that we see prospering here.

It's important, however, not to interpret the relatively low diversity of plant species at the Roberts Hill Conservation Area as making the area "less valuable". Instead, one goal in conservation is the protection of as many different intact habitats as possible. By protecting distinctly different habitats, we can preserve a rich and diverse mosaic of conservation land. The habitat at Roberts Hill is just one of these.

In addition, this type of forest, which we might think of as depauperate in plant species, is the very one preferred by some animals. For instance, rufous-sided towhees and

black throated blue warblers are absent from most areas in town, but are common at Roberts Hill during the nesting season.

It's also important to consider the relationship of the Roberts Hill Conservation Area to several hundred acres of open space protected by the Department of Public Works as watershed. This land, together with the conservation land and the privately owned woodlands that form the north side of Roberts Hill, provide a large area for wildlife. In fact, thousands of animals live out their lives in the uplands and wetlands at the Roberts Hill Conservation Area. In addition to thousands of species of invertebrates, at least nine species of amphibians, dozens of bird species and nearly all the mammal species found in Northampton live or at least pass through the Roberts Hill Conservation Area.

Roberts Hill is also important because it fits into an even larger wildlife corridor that extends from Mount Tom to the northwest part of town and eventually to the Berkshires.¹⁰

Recommendations for Future Projects

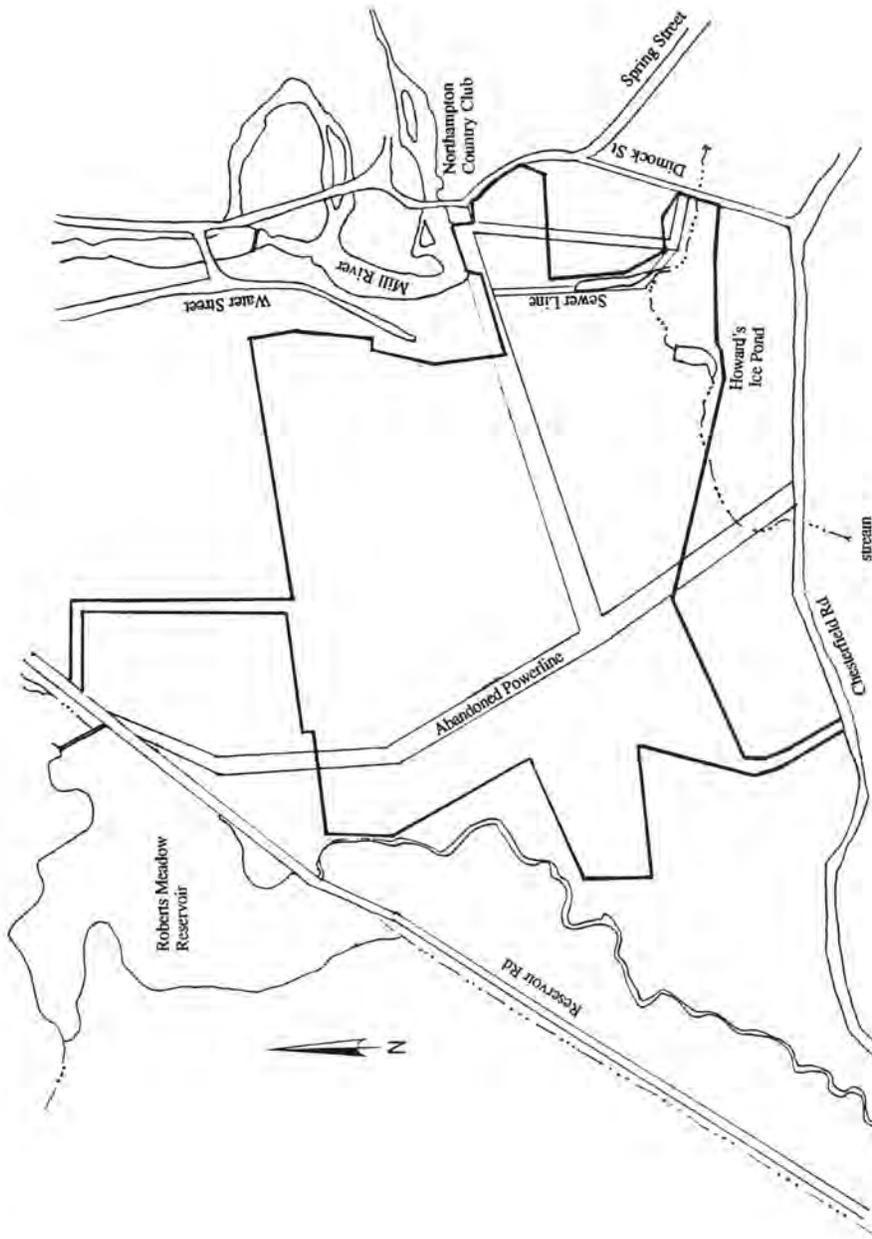
Although it's one of the City's largest conservation areas, Roberts Hill is infrequently used. This is because most people don't know of its existence, or if they do, aren't sure where the paths are. A new sign opposite the Musante Beach area would help. As part of a scout or service project, other signs showing the trail lay-out could be installed at one or two locations. In addition, natural history field trips for Leeds Elementary teachers and townspeople would help introduce many more people to this beautiful area.

¹⁰ The forested land between Arcadia Wildlife Sanctuary and Pine Grove Golf Course is a key piece in this corridor. Mammals, including bear, deer and coyote, are commonly seen crossing Rt. 10 in this last remaining forested stretch between Northampton and Easthampton. Ecological considerations must be taken into account when the development of this area (currently zoned industrial) is discussed.

Map 26. Roberts Hill Conservation Area

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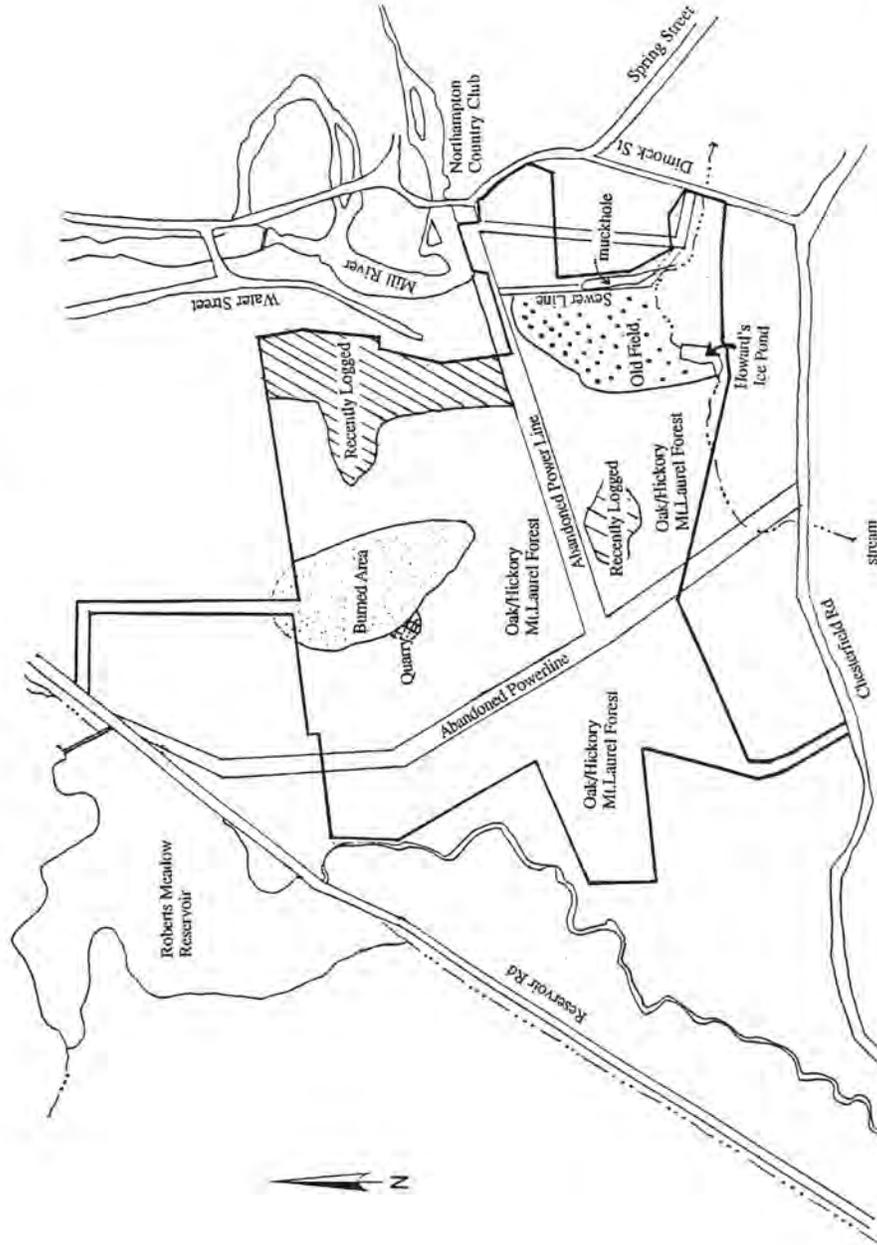
Roberts Hill Conservation Area



Map 26

Map 27. Major Communities

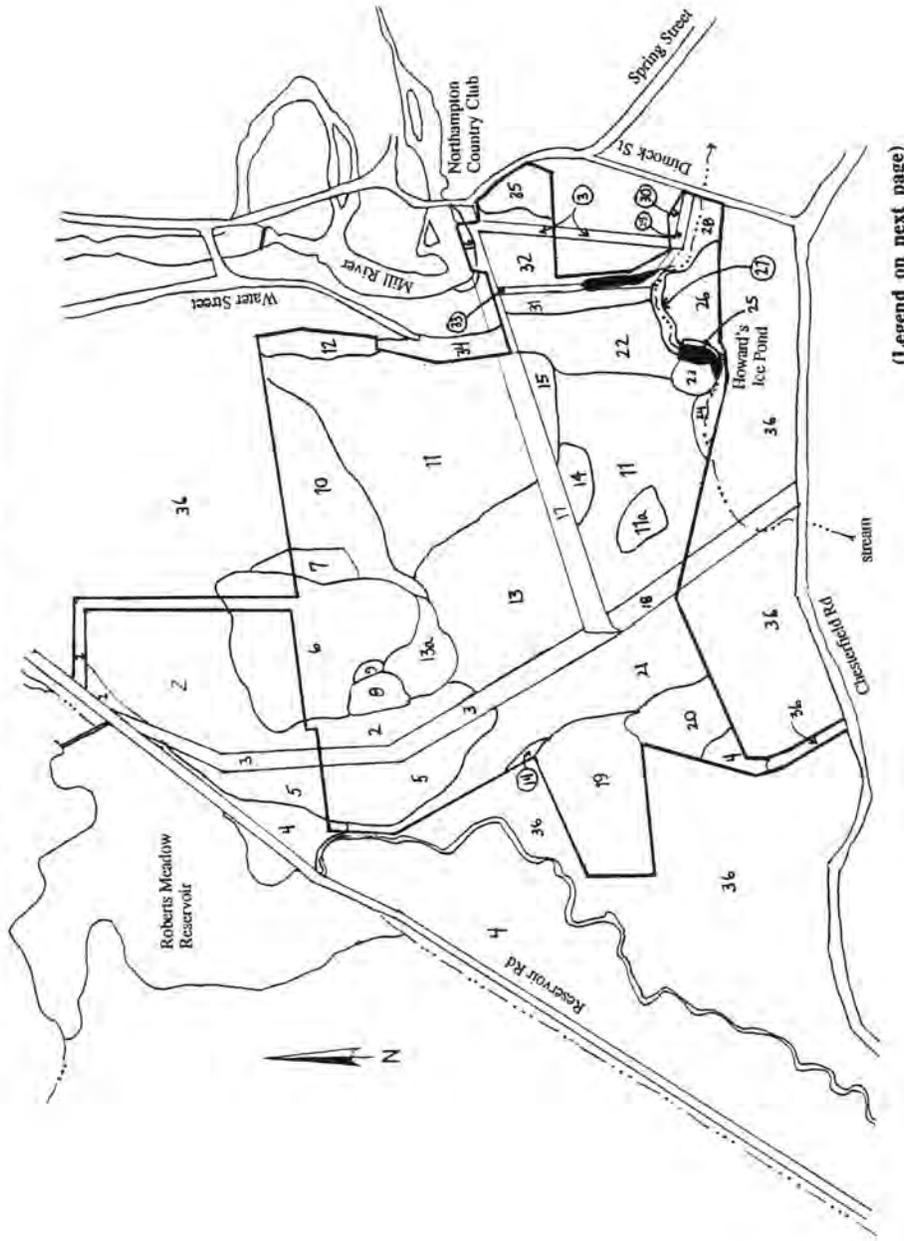
Map 27 Major Communities at the Roberts Hill Conservation Area



Map 27

Map 28. Detailed Vegetation Map

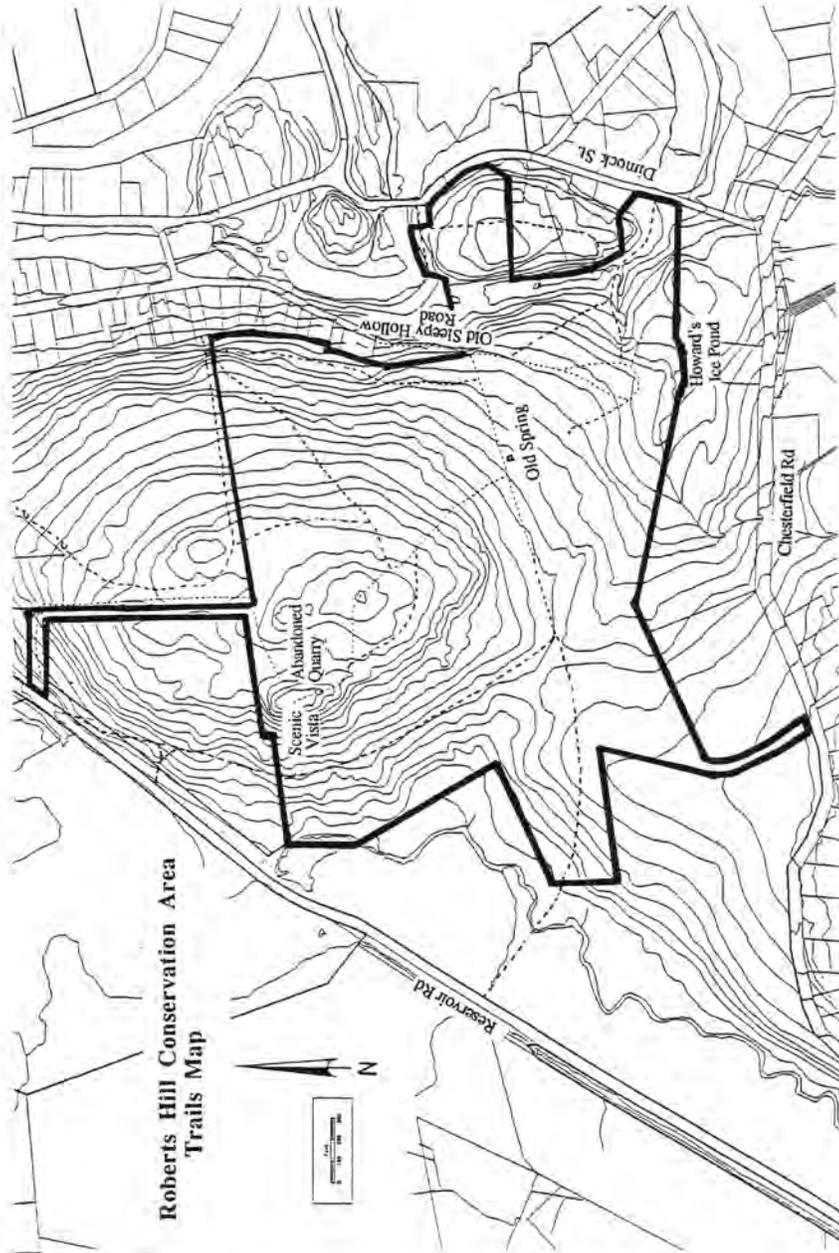
Detailed Vegetation Map of the Roberts Hill Conservation Area



(Legend on next page)

Map 29. Trails Map

Map 29



ROBERTS HILL CONSERVATION AREA
Legend for the Detailed Vegetation Map

1. A steep slope dominated by hemlock, ash and 45 year old white pine. Scattered yellow birch, red oak, red maple. Occasional hobblebush and woodfern. Shady.
2. Red maple, red oak, white oak, black oak and a mix of hickories overtop a dense understory of mountain laurel. Rock outcrops occasional. Not affected by the fire and not recently logged.
3. Abandoned telephone right-of-way now covered with sweet fern, young pine, lowbush blueberries, mountain laurel, wintergreen, bracken, common juniper, trailing arbutus, whorled loosestrife, fringed polygala, mosses (*Polytrichum*) and a handful of other species tolerant to open, rocky conditions. This section of R.O.W. is more open than the other stretches of abandoned R.O.W.
4. White pine
5. A red maple-red oak zone with a dense understory of mountain laurel. White ash, hickory, white oak, hemlock and pine are also present. In some areas, a few trees have been cut during the last five years.
6. This large zone was severely affected by a fire in the mid-1980's . Many of the oaks in the core area were killed, while at the outside edges the trees escaped with only charring on their trunks. The mountain laurel now forms a very dense thicket. Dozens of witch hazel and American chestnut have resprouted. In 1993, most of the witch hazel were flowering. Also present are patches of sweet fern, lowbush blueberry and wild sarsaparilla. Wintergreen and partridgeberry also occur in the understory.
7. Affected lightly by the fire. A level spot colonized by mountain laurel and gray birch with a few scattered hemlock.
8. Scenic vista that looks northwest across the Roberts Meadow Reservoir and on to Williamsburg. The slope was cut in winter 1993 to improve the view. On this rocky, dry hilltop are scattered chestnut and red oaks. Lowbush blueberry, goldenrod, grasses form the understory. A variety of lichens grow on the rocks.
9. Abandoned quarry.
10. Hemlock-dominated forest interspersed with logged areas. Red maple and sugar maple frequent. In the understory, Christmas fern and partridgeberry are common.

11. A large area, parts of which were selectively cut by students at the Smith Vocational School in 1988. Wood roads, now dense with sapling birch and blackberry, thread through the forest. Many areas dominated with red maple and black birch, in other hemlock and oak (red, black and white) were not cut. Hickories are common. One moves from blacks of forest that were not cut to others where several trees were removed and a dense thicket of saplings now grows. Aesthetic considerations were taken into account and little evidence of cutting is visible from the maintained trails.

11a. Partially cut, rocky, lowlying area with spicebush, witch hazel and ironwood in understory; bitternut, linden, shagbark hickory and green ash in overstory. Barberry common and many clusters of Christmas ferns. Obviously seepy in wet months.

12. Young, mesic forest with witch hazel and gray birch.

13. Open, red oak dominated forest with many exposed outcrops and clumps of mountain laurel. Occasional shagbark hickory, red maple and patches with maple-leaved viburnum and low-bush blueberry. Herbs are scant and most ground is covered with oak leaves. Some pennsylvania sedge, common wintergreen and Canada mayflower present. A few scattered pitch pines near the trail that leads from the powerline to the top of Roberts Hill and quarry.

13a. Similar to 13, but more pines, white oak, and lowbush blueberries (*Vaccinium vacillans*; *V. angustifolium*)

14. Hemlock grove.

15. Pine-hemlock mix with some oaks.

16. Grove of hemlocks and pines along steep rocky bank. Rock cliffs form border with Mill River. This area is a popular rope swing/swimming spot.

17. Abandoned telephone R.O.W. dense with black birch, young pine, hemlock, low juniper, and in more open areas, gray birch, big-toothed aspen, blackberry and goldenrod. Many young oaks growing with the birch poles. Hay-scented fern and Canada mayflower common.

18. Abandoned telephone R.O.W. Dense with 10-15' saplings of yellow birch, black birch, gray birch and scattered red maples, hickory, hemlock and pine. Witch hazel, cinnamon fern and Christmas ferns common in the understory.

19. Hemlock and pine dominated with an understory of yellow birch and striped maple.

Some red maple in the canopy, along with hickory and red oak. Hay-scented fern, partridgeberry, wild sarsaparilla and ironwood are abundant in the understory.

20. Upland woods dominated with black birch, red oak. More pine and hemlock than in unit

21. Mountain laurel, witch hazel, pipsissewa, wintergreen, lowbush blueberry and ground pine are common.

21. Low, rich woods dominated by red maple, with some large white pine, hickory and elm. Scattered clusters of hemlock grow below the red maple overstory. Spice bush, partridgeberry, and cinnamon ferns are common. Foamflower is also common in the southern half of this unit.

22. White pine-hemlock-hickory-red oak-chestnut oak-white oak mix. Understory shifts from open, barren areas to those with dense carpets of partridgeberry and/or Canada mayflower. Many pines about 35 years, with a few, much older and giant. The forest has an open quality of a former field now recolonized. Other herbs include indian pipe, spotted wintergreen, wild sarsaparilla, Christmas fern, wintergreen and patches of lowbush blueberries.

23. Mix of young white pine, young black birch, red maple and gray birch with an understory of Canada mayflower, partridgeberry, ground pine, wintergreen bracken and poison ivy. Some sedges present.

24. The trees along the stream are hemlock. In the shady, seepy soils below the hemlocks, the vegetation is a mix of touch-me-not, sensitive fern, cinnamon fern, false nettle, beggar's ticks, violet and spicebush. An enormous tulip tree is on the nearby peninsula and many young tulip trees grow in the vicinity. Not far from the stream, a limited amount of logging took place years ago and a blend of hemlock, pine and hardwoods have regenerated.

25. Grassy picnic area with gray birch, red maple, black birch.

26. Some sections dominated by hemlock, others by red oak. Sloping, rocky and mesic, with a rich fern component (Lady fern, woodfern, polypody, and Christmas fern). Although understory vegetation is scant, Christmas fern, Virginia creeper, mountain laurel, witch hazel, striped maple and Asiatic bittersweet are present. Along the streamside, canopy is exclusively hemlock.

27. A gravelly, sandy stream with mossy cobbles. Surrounded by a mix of plant species, including touch-me-not, serviceberry and American speedwell. Striped maple and spicebush common in understory below dam.

- 28.** A young red maple overstory with wild oats, asters, hog peanut, jack-in-the-pulpit, field horsetail and touch-me-not in the understory. Ferns (interrupted, sensitive, and cinnamon) are abundant.
- 29.** Sewerline with a diverse mix of shrubs and herbs. Typical associates include alder, willow, fringed loosestrife, blue vervain, staghorn sumac, young black birch and young tulip trees.
- 30.** Swampy ground with a red maple overstory and tussock sedge, meadow sweet, winterberry, field horsetail, touch-me-not, and a combination of royal, cinnamon, and sensitive ferns. Some young slippery elm also in the overstory.
- 31.** Bedrock cliff with talus. Overstory of hemlocks, black birch along rocks, above rocks the forest shifts to a red oak and mountain laurel blend. The fern community includes spinulose woodfern, polypody, marginal fern, and lady fern. Virginia creeper common. Barbed wire runs along one edge. Porcupine dens occur here.
- 32.** Level upland with bedrock outcrop that drops off to shallow, linear pond. Forest is a mix of hemlock, oak, and hickory.
- 33.** Open marshy edge of sewer line with marsh fern, winterberry, poison ivy, cinnamon fern, false loosestrife, beggar's ticks, golden rod, groundnut and a variety of sedges.
- 34.** Continuation of Sleepy Hollow Road, now lined with dense stand of hemlocks.
- 35.** Steep slope dominated by oaks and hickories. Several rock outcrops.
- 36.** Not yet examined

REDISCOVERING AN OVERLOOKED AREA

A Natural History of the Vistron Section, Mill River Greenway

Only half an acre in size, the triangular-shaped Vistron Section is the smallest parcel owned by the Conservation Commission. Located in Florence, the land is bounded by a rocky stretch of the Mill River, a private yard and a small parking area owned by one of the adjacent mills. Despite its riverside location, the site, when viewed from the adjoining parking area, looks like countless other neglected areas--shrubby tangles, thorny multiflora rose thickets, a jumble of roadside weeds, and a big pile of unwanted sand. The combination, all in all, is downright uninviting.

Over the last two hundred years, the site has suffered a long history of human abuse. The bank along the Mill River has been rocked, the vegetation has been cleared and recleared, the soils have been worked, reworked, dumped on, bulldozed, and leveled. There may even be heavy metal wastes from brass manufacturing buried on site.

Since it became a conservation area in 1975, the area has experienced a period of relative calm, with little human activity inside the conservation area. Tree ring counts reveal that even 25 years before receiving "conservation area" status the back border had been allowed to revegetate. The canopy is dominated by fifty foot black locust (*Robinia pseudoacacia*), a fast growing colonizer that is easily recognized by its heavily braided dark gray bark, pinnate leaves, and pea-pod fruits. Other overstory species include a few sugar maples (*Acer saccharum*), black cherries (*Prunus serotina*), and a lone sycamore (*Platanus occidentalis*) (Map 30).

Unlike the overstory species which are native to North America, the most common plants in the understory are species that have been introduced--accidentally or intentionally--from Europe and Asia. Of these, the most obvious is the shrub known as Morrow's honeysuckle (*Lonicera morrowii*). Between one and two meters in height, this species forms a nearly continuous understory. Nearby, other non-natives include privet, euonymus, barberry, multiflora rose, two old crab apples, and a large, uninterrupted clump of Japanese knotweed (*Reynoutria japonica*). The area has, in essence, become a reservoir for non-native species. This fact, along with its small size and urban setting, make the Vistron Section a poor habitat for wildlife, and, in its present state, almost useless to townspeople too.

However, with a little effort, the Vistron Section could become a much more pleasant and interesting place for local residents and wildlife. Working with a local organization or company, non-native plants could be removed and in selected areas, replaced with native species, such as jack-in-the-pulpit (*Arisaema triphyllum*), sensitive fern (*Onoclea sensibilis*), fringed loosestrife (*Lysimachia ciliata*), silky dogwood (*Cornus amomum*), elderberry

VISTRON SECTION, MILL RIVER GREENWAY 140

(*Sambucus canadensis*) and other species that are attractive to wildlife. Along with a bench or picnic table, a sign describing the history of the Mill River and importance of floodplain areas could be installed. Access to this parklet would be through the Braid Mill parking lot. In addition, because the area is level, well-drained, and infrequently flooded, a path could easily be made wheelchair accessible.

As a long term recreation goal, additional easements along this edge of the Mill river could connect the Vistron Section to Maines field. From an ecological perspective, this narrow stretch is very similar to the Vistron Section in that it has been seriously degraded by the aggressive invasion of several non-native plants. Restoring the ecological integrity of this downstream section is possible, but would require extensive work and at least initially, demand vigilant upkeep to protect against a reinvasion by non-native plants.

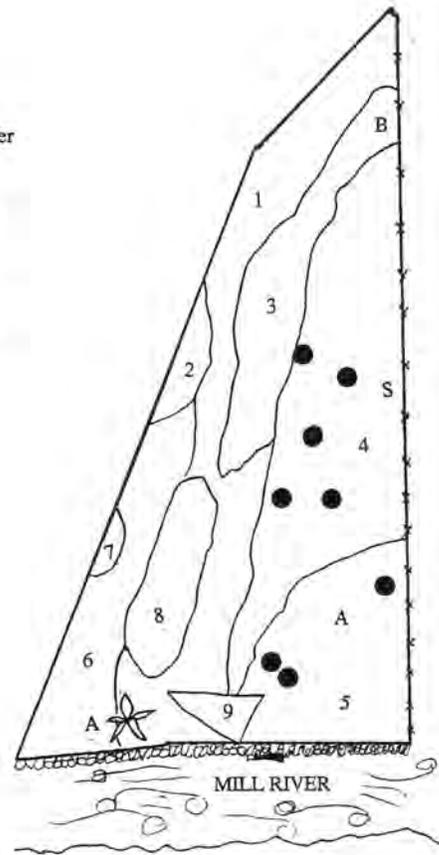
Map 30. Vegetation Map

Map 30. Vegetation Map of the Vistron Conservation Area



Legend:

- 1. Morrow's honeysuckle
- 2. Black cherry, Norway maple, box elder
- 3. Young staghorn sumac, raspberry, touch-me-not, Asiatic bittersweet, goldenrod, garlic mustard, barberry
- 4. Black locust, elm, butternut
- 5. Solomon's seal, wood nettle, touch-me-not, honeysuckle
- 6. Morrow's honeysuckle, gray birch
- 7. Sand pile
- 8. Japanese knotweed
- 9. Old block of cement
- = black locust
- A = crab apple
- B = butternut
- S = sycamore
- ★ = large patch of daylilies
- = fence
- ⊞ = rocked bank



THE YANKEE HILL SECTION AND THE MILL RIVER GREENWAY: Clement Street to Smith College

Half a mile downstream from the rebuilt Clement Street Bridge, the Mill River flows past a five-acre ribbon of conservation land known as the Yankee Hill Section (Map 31). The most striking feature of this greenway is its steep slopes, with the up-and-down, ridge-and-gully topography typical of an area governed by landslides. Just why this river's edge is so susceptible to landslides, which are relatively rare phenomena in Northampton, is a function of the area's glacial history.

For more than 3000 years the Connecticut Valley was covered by a large, post-glacial lake called Lake Hitchcock. Extensive delta deposits accumulated at the mouths of the various rivers that fed into the lake. One of these was our own Mill River, which carried down from the hills the sand and gravel deposits that underlie much of the land we now call Florence and Northampton.

When glacial Lake Hitchcock finally drained about 12,000 years ago, the Mill River began cutting into its own deltaic deposits. In the stretch between the Northampton Country Club and Maines field, the river meandered back and forth, easily cutting down through the accumulated sediments. Just below Maines Field, the river carved a channel south of the Baker Hill drumlin which funneled it into an area underlain by older, compact glacial tills¹¹. It is these till deposits that are landsliding as the river undercuts them.

Mainly composed of boulders, cobbles, gravels and sands, these tills also have impervious layers of clay. When groundwater reaches these clay seams, it follows the gradient and eventually emerges as seeps along the bank. In the process, the clay layers are lubricated, setting the stage for landslides on this slope of otherwise well-consolidated glacial till. After heavy rains, the earth above these slippery layers becomes waterlogged and the hillside gives way.

Landsliding in this area has created two very different microhabitats: ridges and slumps. On the relatively barren ridges, rainwater tends to carry away organic materials and in many areas, exposes the mineral soil. The extent of erosion is obvious when you look at the base of the trees. On the upslope side, the trunks are partially buried, while downslope,

¹¹ Till is unstratified glacial material deposited directly by the ice without reworking by streams. It contains a wide range of size classes (boulders, cobbles, gravel, sand, and clay). Drumlins are thought to be a combination of two tills deposited by two separate glaciations. The lower till, which is more compact and full of clay, was deposited by the Illinoian glaciation 140,000 years ago and the top layer was deposited 20,000 year old by the Wisconsin glaciation.

bare roots run along the surface.

Rainwater runs off so fast along these ridges that most of it never percolates into the ground, resulting in very droughty conditions. Overall, the effect is that the ridges are low in nutrients, humus, and water, creating conditions too harsh for most plant species to survive. Also restricting the number of plant species that can survive here is the presence of hemlocks (*Tsuga canadensis*), which tends to create a very shady environment.

Slumps occur when a section of the bank gives way, leaving a gully with a large flat plug of hillside at the base. The slump then acts like a dammed up catch basin, collecting rainwater, along with organic debris, nutrients and fine particles of mineral soil that erode off the ridges' steep slopes.

In contrast to the half a dozen species found along the ridges and in the upper portions of the gullies, the vegetation on the slump plug is typically diverse and varies according to the area's size, slope, age and underlying soils. The smaller slumps are cool and shady, and provide suitable growing conditions for shade-tolerant, moisture loving species like Canada yew (*Taxus canadensis*), striped maple (*Acer pensylvanica*), mountain maple (*Acer spicata*), red baneberry (*Actaea rubra*), gooseberries (*Ribes* sp.), jack-in-the-pulpits (*Arisaema triphyllum*), false spikenard (*Aralia racemosa*), more than half a dozen ferns, and many other woodland wildflowers (Map 32).

Large slumps receive more light and warmth, conditions which allow a different flora to establish. The largest slump found at the upstream end of the conservation area is roughly 150 feet wide by 100 feet long. Whether you're on the ridgetop trail above the slide or walking through it, the abrupt transition from dense hemlock to an open 15-20 year old sugar maple (*Acer saccharum*) forest is hard to miss. Below the surrounding hemlocks, herbs are scarce, but within the slide area the maple forest floor is covered with wildflowers and ferns.

Just downstream from this large slide is an area underlain with sandy soil that supports dense young hemlocks and a few white pines (*Pinus strobus*). Further downstream, in the vicinity of an old dam, is another section prone to slumpage. Near the hill's summit where the sandy soils are exposed, sun-loving, disturbance tolerant species, such as blackberry (*Rubus* spp.), goldenrods (*Solidago* spp.), grasses and black locusts (*Robinia pseudoacacia*) are well-established (Map 32).

The presence of the old dam in this section of the conservation area is a reminder of a

time in the mid-1800's when the Mill River was the most thoroughly dammed waterway in the United States, with 74 factories drawing power from the river. Many dams were destroyed in 1874 when a devastating flood roared down from Williamsburg, killing 140 people and causing millions of dollars in property damage to riverside factories, houses, and agricultural land.

This low dam once had baffle boards that increased its water holding capacity enough to power a sawmill. Although most of the logs brought to the mill probably came from elsewhere, the age of most of the trees on the nearby slopes of the conservation area suggests that this area, like most of New England, was cleared during the 19th century. A rusted strand of barbed wired, embedded in the trunk of a large hemlock, indicates that at some time in the distant past, farm animals grazed on the open slopes overlooking the sawmill.

Below the dam and another small, sandy landslide is a level, wooded area dominated by pine and hemlock. This spot is frequently used by picnickers, hikers, and an occasional bather. Nearby, the conservation area forms a narrow strip of rocky floodplain, dominated by sycamore (*Platanus occidentalis*) and red maple (*Acer rubrum*) and a wide array of herbs, including asters (*Aster* spp.), poison ivy (*Toxicodendron radicans*), white snakeroot (*Eupatorium rugosum*), touch-me-not (*Impatiens capensis*) and the non-native plants garlic mustard (*Alliaria officinalis*), bouncing bet (*Saponaria officinalis*) and Asiatic bittersweet (*Celastrus orbiculatus*) (Map 32).

Yankee Hill Conservation Area to Smith College

Downstream from the Yankee Hill Conservation Area is a section where a 300-foot wide island sits between the river and its former channel. Owned by the Northampton Manufacturing Company, this stretch contains a mix of (1) young forest near the old channel, (2) scrubby growth in an abandoned utility right-of-way, and (3) older forest closest to the river (Map 32).

Twenty-five years ago, the portion of the island near the abandoned channel was open and treeless. Since then a red maple forest has developed with an understory composed almost exclusively of wild oats (*Uvularia sessilifolia*) and ground pine (*Lycopodium obscurum*).

An abrupt end to the red maples marks the boundary of a 50" right-of-way, now grown in with a mix of hay-scented fern (*Dennstaedtia punctilobula*), blackberry (*Rubus*

spp.), honeysuckle (*Lonicera* spp.), goldenrod and young shrubs and saplings. Beyond the right-of-way is an older, red oak/red maple/hickory forest and the river. The vegetation in this section is variable: where floodwaters scour the ground, non-native plants are common and often more abundant than native species. In contrast, infrequently flooded areas contain mostly native herbs, with wild sarsaparilla (*Aralia nudicaulis*) and New York fern (*Thelypteris noveboracensis*) being two of the most common.

The end of the forest and beginning of a cornfield marks the boundary between the Northampton Manufacturing Company property and the former State Hospital land. Level and fertile, this cornfield was formed long before Europeans arrived in this area. The arrowheads and quartz and flint fragments that are occasionally found here are evidence that Native Americans knew the value of good floodplain farmland.

Hidden closeby in the woods is a former ice pond. Like the cornfield, the ice pond is also part of the Mill River floodplain (Map 31). A berm built decades ago on the eastern and northern sides of a low swale traps the water that emerges from the springs and seeps on the southwestern slope. Near the largest spring it's still possible to see the stonework that helped direct the flow of water into the pond. Today, this slope is dominated by red oak (*Quercus rubra*), red maple, hemlock and black birch (*Betula lenta*); in the seepy soils, cinnamon fern (*Osmunda cinnamomea*), skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*) and a variety of woodland and wetland species are common.

The pond itself has been filling in for decades and is surrounded by a soggy mat of rice cut-grass (*Leersia oryzoides*), beggar's ticks (*Bidens* spp.), touch-me-not and smartweeds (*Polygonum* spp.). By mid-summer, duckweed (*Lemna minor*) creates a green film that covers nearly the entire surface. On slightly drier ground is a thick tangle of silky dogwood (*Cornus amomum*) and fox grape (*Vitis riparia*), and on the berm, black locust, cottonwoods (*Populus deltoides*; *P. tremuloides*; *P. grandidentata*) and multiflora rose (*Rosa multiflora*) (Map 32).

Although some waterfowl--wood ducks, mallards, black ducks--use this pond for a temporary rest-stop during migration, it's too small and isolated to be good habitat for nesting ducks. More permanent residents include raccoons, muskrats, skunks, gray squirrels, chipmunks, red-spotted newts and a diverse assortment of aquatic creatures. It's also very likely that spring peepers and American toads use the pond to breed in the spring.

Back between the cornfield and the river, the forested strip narrows to just 50 feet and is composed of a mix of black locust, red oak, and linden (*Tilia americana*). This stretch has

a thick understory of raspberry, poison ivy and Asiatic bittersweet. The next bend in the river brings another shift in forest composition. Here, the banks are repeatedly scoured by floodwaters and non-native, disturbance tolerant species dominate the vegetation. Among the most common are Morrow's honeysuckle, barberry (*Berberis thunbergii*), and multiflora rose. Asiatic bittersweet is abundant here, coiling over the shrubs, up the trunks, and high into the black locust canopy.

A little further downstream, black locust drops out and red maple and sycamore form the overstory. The forested belt along the river widens in this area, but non-natives still make up the bulk of the understory. From here to the end of the large hayfield, 3/4 of a mile away, the composition of the forest strip is a hodgepodge of red oak, pignut (*Carya ovata*), shagbark hickory (*Carya ovalis*), black locust, hemlock, linden, paniced dogwood (*Cornus racemosa*), European buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Rhamnus frangula*), multiflora rose, and an even wider variety of herbs (Map 32).

The presence of this tree-lined river edge helps mitigate the effects of flooding by reducing erosion and floodwater velocity. The benefits of this corridor to wildlife, however, are mixed. Although narrow wooded strips can act as corridors for some wildlife, they also provide a potential route for disease and predators and are fertile ground for aggressive non-native plants, which do well in disturbed, edge habitats. The narrowness of the vegetated zone increases the chance that bird nests will be parasitized by cowbirds, that English sparrows and starlings will compete with native species for nesting cavities, and that all of them are more likely to be gobbled up by animals that do well in association with humans, like cats, opossums, raccoons and skunks. For most animals, the habitat is so fragmented and degraded that it would be impossible for them to live here full-time. However, these drawbacks are lessened by the fact that this land is still open and undeveloped and offers valuable agriculture and recreation opportunities.

Beyond the large (10+acre) hayfield, the river bends northeast and the land is forested again. Close to the river are three separate mini-plantations of white pine, red pine (*Pinus resinosa*) and spruce (*Picea rubra*). Growing near the patches of younger forest are light-loving, disturbance tolerant species like honeysuckle, bittersweet and privet (*Ligustrum* sp.) as well as the native plants Canada goldenrod (*Solidago canadensis*), touch-me-not, sensitive fern and jack-in-the-pulpit (Map 32).

In contrast to the land closest to the river, the slopes and the level plateau above are dominated by hemlock. Open and easy to walk through, the forest floor is essentially free of

herbs. Among the hemlock are a few scattered red oak, white oak (*Quercus alba*), red maples and at the toe of the slope, dozens of black birch.

The hemlock forests continue for another quarter mile before they end at the Smith College athletic fields, where the width of the vegetated corridor along the Mill River tapers to less than fifty feet.

Upstream from the Yankee Hill Conservation Area

Between the Yankee Hill Conservation Area and the Clement Street Bridge, the steep, rugged hillsides are covered almost exclusively by hemlock. A few scattered red oak and black birches can also be found in the overstory, and hobblebush (*Viburnum alnifolium*), witch hazel (*Hammamelis virginiana*), and clusters of lady fern (*Athyrium felix-femina*) and spinulose wood fern (*Dryopteris spinulosa*) occur occasionally in the understory. Most of the forest floor is covered with a thin layer of dry oak leaves and hemlock needles, or nothing at all (Map 32).

Most of the landslides in this section are quite old and have revegetated with hemlock. Two landslides, however, have occurred within the last five years. The larger of these is a V-shaped area some 30 feet across and 40 feet long. Here, exposed gray clays, soft with moisture even in the driest part of the summer, support a few plant species that colonize and thrive on wet, disturbed, mineral soils. The most abundant colonizer is a member of a primitive plant family. Known as field horsetail (*Equisetum arvense*), this plant, with its whorled, jointed branches, resembles a floppy, green bottle brush. Other common species include coltsfoot (*Tussilago farfara*), which has a flower similar to dandelions, hundreds of weak-stemmed spotted touch-me-nots, and down near the base, a few dozen willows (*Salix* spp.).

Not far from this fresh slide is an exposure of 200 million year old (Triassic) sandstone called Sugarloaf arkose. Known locally as red beds, these sedimentary rocks were deposited when the Connecticut Valley was a minor tear in the breaking apart of the supercontinent of Pangaea. Sugarloaf arkose forms much of the bedrock below Northampton but is a rare sight here because it's typically buried below tens or hundreds of feet of glacial till or Lake Hitchcock deposits.

Also of interest along this stretch is a section of hillside covered with hundreds of boulders. Rather than some aberrant glacial boulder train, this appears to be the result of two

hundred years of stone dumping by local farmers in an attempt to clear their fields.

Summary

From Clement Street to Smith College, a walk along the Mill River will surprise you. Bordered by trees and largely out-of-sight of houses and factories, the Mill River is beautiful and accessible. Below the shallow dam at the southeast end of the Yankee Hill Conservation Area, the river is full of 20 to 100 pound rocks. Further downriver, the rocks grade into the "boulder" category, some them half as big as a volkswagen and weighing in at over 1000 pounds. As you might imagine, during floodstage, the rapids in this area are very impressive.

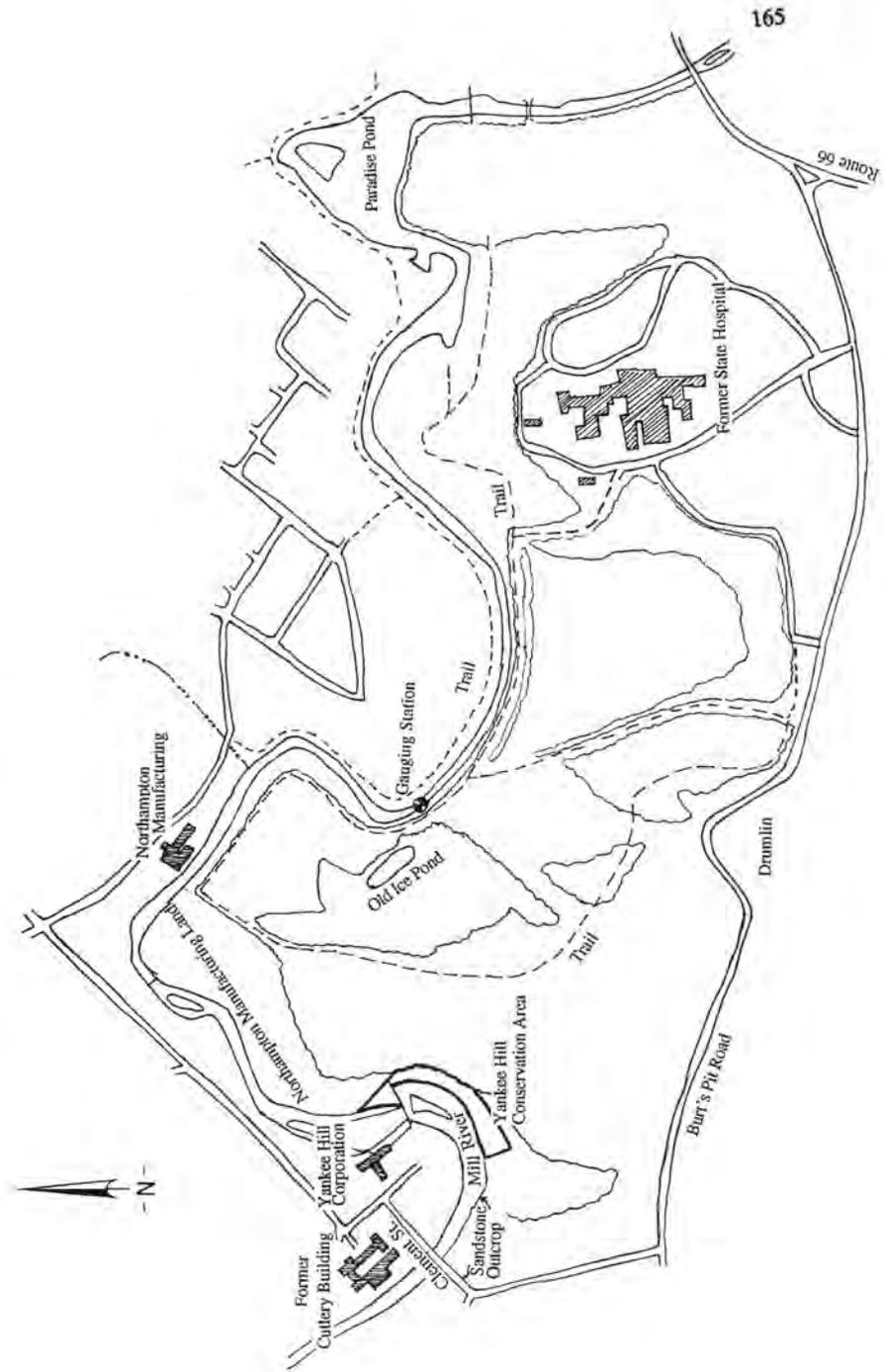
Still further downstream, the size of the rocks decreases back to a foot or so and for another half mile, the river drops through a series of small rapids. Near the gauging station, the river slows down and another three quarters of mile of gentle flow brings the river to Paradise Pond.

On a hazy, humid summer afternoon, as you hop from boulder to boulder, wade through the shallows and pick your way along its borders, you'll find yourself wondering: why haven't I taken advantage of this beautiful area before?

Map 31. Mill River Corridor: Clement Street to Smith College Land

Map 31

Mill River Corridor: Clement Street to Smith College Land

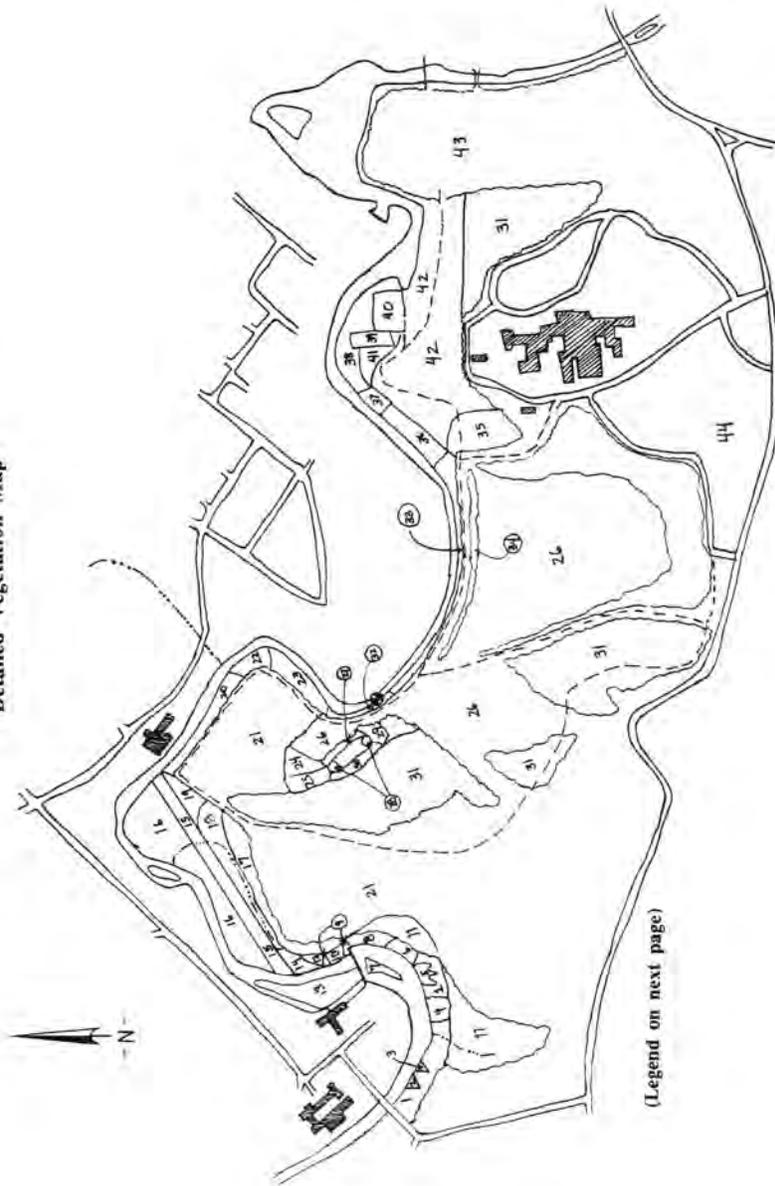


Map 32. Detailed Vegetation Map

Map 32

Mill River Corridor: Clement Street to Smith College Land

Detailed Vegetation Map



THE YANKEE HILL SECTION AND THE MILL RIVER GREENWAY

Legend of the Detailed Vegetation Map

1. A steep, northfacing slope that drops 150' to the Mill River. Covered by dense hemlock forest with occasional red oak, black birch, and few herbs. Herbs present include lady fern, Christmas fern, spinulose wood fern, purple trillium, enchanter's nightshade and wild sarsaparilla. Hobblebush and witch hazel infrequent.
2. A fresh landslide (2-3 years) with exposed clays now vegetated with coltsfoot, field horsetail, touch-me-not and a few willows and purple-flowering raspberries.
3. An older landslide with a rich moist seep with abundant ferns, touch-me-not, jack-in-the-pulpit, Canada yew and false solomon's seal.
4. Still a hemlock dominated slope, but here it is littered with dozens of boulders and large cobbles pushed over the hillside by farmers. Leaves and pine needles form thin soil covering.
5. A large, wonderful seep with touch-me-not, big toothed aspen, maple, oak and hemlock mix. Lots of woodfern, broad beech fern, false spikenard, wild ginger, hooked crowfoot, hog peanut, barberry and scouring rush.
6. A large open landslide with sugar maples and rich understory of scouring rush, lady fern and asters. Christmas fern, red baneberry, and jack-in-the-pulpit are also present on this rocky, moist slope.
7. A small island dominated by red maple with a grassy understory and scattered herbs.
8. A mix of younger hemlocks, beech, pine and red oak. The slope is steep with few herbs and scattered large trees. A few naturalized spruce; in the more open areas, asters, Christmas fern, lady fern, Canada mayflower and false solomon's seal are common.
9. Small land slides dominated by raspberry, goldenrod, grasses. Sandy.
10. Very open and light with young elm, Japanese knotweed, black locust, blackberry, goldenrod, and a mix of grasses. Quite sandy with a few large boulders. Hemlock growing along upper slope.

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11. Level, upland forest of sugar maples, hemlocks and oak. A footpath follows the ridgeline and joins with the cornfield and main trail that returns to the parking area near the community gardens. Mountain laurel common in the understory.
12. Pine, hemlock dominated area where people picnic. A trail from the corn field leads to this frequently used area. Canada mayflower common in understory.
13. A thin rocky island covered with red maple, Japanese knotweed, joe-pye-weed, alder and a mix of grasses and sedges.
14. Cobbly, treed floodplain forest within the Yankee Hill Conservation area. A diverse mix of understory plants, including poison ivy, lady fern, white snakeroot, common woodland aster, barberry, hog peanut and grape. Sycamore, red maple, linden are the most common overstory trees.
15. Abandoned (100' wide) utility right-of-way with abundant raspberry, staghorn sumac, jumpseed, meadowsweet, golden rod and young paper birch and black birch seedlings.
16. A mix of forest types. Where scoured by floodwaters many non-native species are frequent, while in other areas, native species dominate. Ironwood, black cherry, black locust, many large red oak, sugar maple and hickories are common. Yellow birch and sycamore are occasional, while witch hazel, ironwood and maple-leaved viburnum are common in the understory. River is fast-flowing with large boulders and cobbles (1-3' diameter). An old river channel crosses this area.
17. A steep, northfacing slope dominated by a mix of hemlock, red oak, yellow birch, striped maple and a few large black birches. Ferns (particularly spinulose woodfern, cinnamon, interrupted, and New York) common; witch hazel abundant. Many glacially rounded rocks exposed.
18. A level section of formerly cleared forest, now grown into red maple of approximately 20 years of age. Understory open with sedges, wild oats and princess pine (*Lycopodium obscurum*).
19. Thin strip of mature forest with red oak and sugar maple.
20. Infrequently flooded forest with mix of red oak, linden, and some red maple. Lots of raspberry, honeysuckle and some Japanese knotweed. Near the northwest corner of the

cornfield, this unit has shifted to hemlock and linden with very little honeysuckle.

21. Cornfield

22. Curve in river that is frequently scoured by floodwaters. The disturbed, gravelly substrate supports dense tangles of Asiatic bittersweet, barberry, black locust, and some red maple. River flows faster here.

23. Sycamore dominated with an understory of raspberry and honeysuckle. Along the river edge, red maple common. The understory is mixed with wood nettle, Virginia creeper, lady fern, wild sarsaparilla, poison ivy. Also present slippery elm, hop hornbeam and a few large cottonwoods.

24. Quaking aspen, hickory, pin oak, red oak, 3 larches and red maple in the overstory. Poison ivy, chokecherry are abundant, but most abundant is honeysuckle, which in some areas forms a nearly impenetrable thicket.

25. A low swale with false nettle, moneywort, clearweed, and sensitive fern, marsh fern, silky dogwood, ditch stonecrop, three species of smartweed and *Carex* are common. Nearby hillside contains black birch and hemlock.

26. Hayfields

27. A man-made berm now dominated with black locust and staghorn sumac. Black cherry and ash are occasional. Honeysuckle is common in the understory. Few herbs, infrequent clusters of Christmas fern and lady fern.

28. Wet grassy areas with abundant rice cut grass, purple nightshade, beggar's ticks. The pond in summer is covered with duckweed and *Wolffia*.

29. Open, grassy with silky dogwood and fox grape borders. Smartweed, touch-me-not, and rice cut grass common. In the nearby forest, red maple and black birch are common.

30. Rich border along ice pond and the seepy slope with broad patches of Christmas fern, lady fern, interrupted fern, false solomon's seal, spicebush, ash, sugar maple and hickory. Also common is bloodroot, ironwood, wood aster, and New York fern and in seepy places, skunk cabbage. Honeysuckle grows near the old spring.

- 31.** Unexamined forest type
- 32.** Near gauging station forest shifts to red oak-hemlock mix. Clusters of staghorn sumac also present. Beyond gauging station, river is slower moving with few exposed cobbles.
- 33.** A narrow (15-25 foot) strip along the river which has a mix of native and non-native species. Silky dogwood, alder shifts to red oak (most common), linden, pignut and bitternut mix. Also present sycamore, box elder, glossy buckthorn, European buckthorn, black birch, ironwood, burning bush, black cherry, staghorn sumac, red maple and thick growth of Asiatic bittersweet.
- 34.** Hedge row of the non-native Russian olive.
- 35.** Formerly cleared now grown up into a dense tangle of rose, grasses, wildflowers and young saplings.
- 36.** A stand of white pine (approx. 20 years) along hemlock border when the land rises. Between the pine and hemlock is a strip of scrubby growth with honeysuckle, black locust, Norway maple and box elder.
- 37.** Back from river, black locust and black birch dominate the overstory in most areas. Occasionally there is a small grove of hemlocks. Black cherry, Morrow's honeysuckle, and some sugar maple grow in the understory.
- 38.** Along river edge, red maple in overstory. The understory is open and sunny with abundant Virginia creeper, Asiatic bittersweet, Japanese barberry, white snakeroot, poison ivy, honeysuckle and daylilies.
- 39.** Red pine planting (approx. 20 years); choke cherry and jack-in-the-pulpit common.
- 40.** Red spruce planting with black locust around edge.
- 41.** Level, open lush floodplain area with touch-me-not, goldenrod and blackberry, and sensitive fern. At the toe of the slope and near the old access road, black locust, red maple, black birch, Norway maple, Morrow's honeysuckle, Asiatic bittersweet and other non-natives abundant.

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42. Very shady, part level, part steep slope with dense hemlock forest. Black birch, red oak, white oak red maple are also occasional. In the understory, scattered witch hazel, hay-scented fern, poison ivy. In general, understory is very open with few herbs.

43. Smith College athletic fields

44. Community gardens

A Preliminary Ecological Overview of the MARBLE BROOK WATERSHED

Preface

Located in the northwest corner of Northampton, the Marble Brook watershed covers roughly five square miles and includes extensive woodlands, agricultural land, an abandoned hayfield, a beaver meadow, a glacial kettle and, of course, Marble Brook itself. This north-south trending watershed is an important part of the drainage that flows into the Roberts Meadow Reservoir, and via Department of Public Works land, is contiguous with Roberts Hill Conservation Area. Its large size, relatively gentle terrain, accessibility and extensive system of wood roads make it ideally suited for various types of recreation (hunting, hiking, mountain biking, horseback riding, cross-country skiing and nature study.) It's also decent wildlife habitat and part of a forest corridor that extends from Mount Tom to the Berkshires.

However, it's missing something. That something is a lack of diversity of forest types. The Marble Brook drainage has been cut again and again, and the overall "sameness" of much of the forest makes it, from my perspective, a little disappointing. However, if the land were protected and no more cutting occurred, all of this would change over time.

If a large piece of this valley becomes available in the future, my suggestion, even in light of the preliminary nature of my investigation and the temporarily disappointing forest diversity, is to protect it.

The remainder of this text takes you on a tour of the major habitats in the Marble Brook drainage in Northampton.

The Marble Brook Watershed

Fed by several small, mostly intermittent streams, Marble Brook drains the southeastern end of Unquomunk Mountain and flows south for two miles before it joins Roberts Meadow Brook near Chesterfield Road. Along the way, the brook meanders through a broad (300+/- feet), wooded floodplain dominated by red maple (*Acer rubrum*) and clusters of hemlock (*Tsuga canadensis*) and scattered yellow birch (*Betula lutea*), sugar maple (*Acer saccharum*) and green ash (*Fraxinus pensylvanica*). In most places the seepy, organic soils

support a lush array of plants, including Canada yew (*Taxus canadensis*), swamp saxifrage (*Saxifraga pensylvanica*), swamp dewberry (*Rubus pubescens*), marsh blue violets (*Viola cucullata*), golden ragwort (*Senecio aureus*), red trillium (*Trillium erectum*), poison ivy (*Toxicodendron radicans*), four different ferns (cinnamon (*Osmunda cinnamomea*); interrupted (*O. claytoniana*); lady (*Athyrium felix-femina*); and sensitive (*Onoclea sensibilis*) and dozens of mosses.

As the beautiful little brook heads south, the bottom shifts from sands and gravels to rounded stones and cobbles. Where until the brook crosses a rich, marshy beaver habitat the stream channel is lost and the underlying soils are soft and organic. After the beaver dam, the water begins a fast-paced run down a rocky, hemlock-lined channel.

On joining Roberts Meadow Brook, the flow cascades east down a steep, rocky course to the quiet waters of the Upper Reservoir. From the Upper Reservoir, the water flows via a mile-long, rip-rapped channel into Roberts Meadow Reservoir and eventually joins the Mill River in Leeds. Back near the intersection of Marble Brook and Roberts Meadow Brook, the shaded ravine and pools are popular fishing and picnicking spots. Nearby is a parking pull-off and the entrance to a long, level dirt road that parallels Marble Brook. The road heads north past rolling pasture and cornfields where wild turkeys are often seen.

At the end of the cornfield, the road enters the woods and soon passes a 2-acre circular wetland. Located on the west side of the road, this area is one of the few Northampton wetlands that contain deep, poorly drained soils composed of highly decomposed organic material.¹²

Sometimes in the past, farmers tried to drain this “unusable muckhole” by digging a ditch along its western edge. Their efforts paid off (at least to some extent) because the water level dropped enough for white pine (*Pinus strobus*) to establish. In the last few years, these pines were harvested and the effect of the drainage ditch was eliminated, thanks to the dam-building activity of a family of beavers.

The circular shape and unusual soils of this wetland are indicators that this feature

¹² This soil is classified as Freetown Muck. The Hampshire County Soil Survey lists the soil type as Freetown Muck in three other Northampton sites: the Burt’s Pit Bog near the Brookwood Conservation Area; a site off Route 66 near an abandoned pig farm, and a wetland near the intersection of Chesterfield Road and Spring Street. All of these areas show evidence of drainage efforts over the last fifty years.

may be a glacial kettle hole, possibly Northampton's only kettle hole. Glacial kettle holes form after a large block of ice becomes stranded and buried beneath glacial outwash. When it finally melts, the ground caves in, leaving a gently sloping depression.

Because the base of the kettle hole intercepts groundwater, conditions favoring the growth of bog plants developed. Sphagnum moss along with decaying plants produce hydrogen ions and organic acids, making the water acidic. The underlying sands are poor in nutrients and buffers, and the only other source of water - - precipitation - - is also naturally acidic. Growing in this waterlogged, acidic, nutrient poor environment is a sometimes soupy, sometimes firm mat of sphagnum moss and isolated hummocks of sheep laurel (*Kalmia angustifolia*), leatherleaf (*Chaemadaphne calyculata*), mountain holly (*Nemopanthus mucronata*) and high-bush blueberry (*Vaccinium corymbosum*).

West of the kettle hole is a narrow ribbon of red maple swamp, which leads north to a former hayfield, now full of waist-high sedges (*Carex* sp.) in its wetter spots. Cutting across the open meadow is a snowmobile/ATV trail, which leads up a small feeder brook into the woods to the northwest. In addition to humans, bear, deer, coyote, and red fox take advantage of this trail as a way to cross the small brook and return to the dirt road.

On the east side of the main wood road is a beaver meadow and pond. Open and full of grasses, with islands of winterberry (*Ilex verticillata*), alder (*Alnus rugosa*) and willow (*Salix* spp.), this marsh is a wonderful place to observe wildlife. In addition to beavers, this wetland also supports painted turtles, wood ducks, kingfishers, and thousands of red-spotted newts. Raccoon tracks follow the muddy margins, and from April to early September, tree swallows fly back and forth across the open marsh feeding on insects. Dragonflies join in the hunt during daylight hours and bats take their place once the sun goes down. Sitting quietly along the edge, it's hard to imagine you're just a fifteen minute drive from downtown Northampton.

The woods near the beaver dam contain patches of mountain laurel (*Kalmia latifolia*) and hobblebush (*Viburnum alnifolium*) in the understory and white pine, red oak (*Quercus rubra*), hemlock, red maple, black birch (*Betula lenta*), sugar maple and hemlock in the overstory. This section of woodland has been recently logged, and in the disturbed soils, young black birch, beaked hazelnut (*Corylus cornuta*), common hazelnut (*Corylus americana*), witch hazel (*Hamamelis virginiana*) and red maple have sprouted. Herbs are common; among the most frequent are partridgeberry (*Mitchella repens*), wild sarsaparilla (*Aralia nudicaulis*), whorled loosestrife (*Lysimachia quadrifolia*), ground pine (*Lycopodium obscurum*) and princess pine (*Lycopodium flabelliforme*).

West of the beaver meadow, the road passes former pastures, crossed with stonewalls, and now forested with a mix of white pine, sugar maple and red oak. A few old stone foundations provide further evidence that this flat land was, like most of Massachusetts, completely deforested less a century and half ago.

A mile more and the main road passes another small wetland with hummocks of sphagnum and a mix of high-bush blueberry, marsh violets, cattails (*Typha latifolia*), sedges and stunted red maples. Spring peepers chorus here so loudly that your chest cavity reverberates and your ears tingle. This small, diverse wetland is worthy of additional investigation.

Beyond this wetland, a newer logging road branches to the west but the main road soon peters out. Preliminary outings in the woodlands to the west revealed little variation in species composition, but more studies may uncover variations in topography and hydrology that create more unusual habitats.

Map: Marble Brook Watershed

A Preliminary Ecological Overview of MINERAL HILL AND THE ORCHID SWAMP

Unlike a street map, a topographic map reveals the lay of the land. With a careful read of its contour lines, wetland symbols, threads of blue and patches of pale green, hundreds of acres that are seldom explored but potentially quite interesting can be easily identified. Topo maps show us the locations of hidden wetlands, steep cliffs, narrow ravines, forgotten ponds, floodplain forest fragments and upland woods.

A quick study of the topographic map that covers most of Northampton reveals several square miles of undeveloped, forested uplands in the western third of town. Known as the Mineral Hills, Sawmill Hills, and Marble Brook watershed, these Berkshire foothills are too rocky to be easily developed. Even logging, their chief use during the last few hundred years, has been somewhat limited by the hillsides' rocky character and steep slopes.

While scrutinizing this western section of the map, I noticed several wetlands, perched close to the summits of some of the hills. One of the largest of these wetlands lies at the south end of the Mineral Hills, just north of Route 66, between West Farms Road and the Westhampton townline. Isolated wetlands like this always intrigue me; they promise rare plants, vernal pools, and often beautiful, under-appreciated natural areas.

On a Saturday afternoon in early May, 1993, I made my first foray to the area. My intention was to head right up the drainage and into the heart of the swamp. An accidental turn up the wrong drainage led me not to the swamp, but instead to a large hill to the north, known to some as Mineral Hill. Very soon I realized that this was one of the best wrong turns I could have made. Mineral Hill is like no other in Northampton. It is botanically very rich, with many Northampton rarities and a unique combination of forest types. It provides excellent wildlife habitat and exceptional views, and the combination of the hill and the swamp (which I later found) has drawn me back to the area over and over during the last several months.

Mineral Hill covers some 150 acres, much of it forested slopes of hemlock (*Tsuga canadensis*) and mixed hardwoods. On the western side, broad slabs of lichen-covered bedrock and rocky outcrops offer impressive views into Westhampton and beyond. In these rocky, open sections, soil is only found in narrow crevices and shallow depressions where it supports half a dozen of the hardest, most drought tolerant plants in our area: red cedar (*Juniperus virginiana*), blue curls (*Trichostema dichotomum*), Pennsylvania sedge (*Carex*

pensylvanica), little bluestem (*Andropogon scoparius*) and several species of panic grass (*Panicum* spp.). Among the most notable botanical finds on these rocky barrens are two little ferns, rusty woodsia (*Woodsia ilvensis*) and ebony fern (*Asplenium platyneuron*), both rarely encountered inside Northampton's borders.

A little further to the north, the outcrops are smaller and more scattered, the soils are deeper and there is a dramatic and abrupt change in the vegetation. But the change is not only in terms of what's there and what's not. This place has a look and feel unlike any other in Northampton. Almost park-like in its appearance, the forest here is a mix of stunted hop hornbeams (*Ostrya virginiana*), hazelnuts (*Corylus cornuta*), hickories (*Carya* sp.) and red oaks (*Quercus rubra*). Below them is a thick carpet of Pennsylvania sedge and occasional grasses. In the springtime, isolated bunches of wild columbine (*Aquilegia canadensis*) and early saxifrage (*Saxifraga virginensis*) blossom along seepy rock crevices, and at the end of summer, the slopes are graced with the bright pink blooms of wild basil (*Satureja vulgaris*) and the yellow tops of three different types of goldenrod (*Solidago arguta*; *S. Bicolor*; *S. caesia*). The origin of this anomalous patch of forest was probably a fire, but whatever the cause, the result is aesthetically very pleasing.

Above this section, the slope ends and the hilltop has a gentle up and down topography, characterized by numerous outcrops, small depressions but generally level ground. The composition of the canopy trees shifts again. Chestnut oak (*Quercus prinus*), red oak, and black oak (*Q. velutina*) are the three most common overstory species, but red maple (*Acer rubrum*) and hickories (*Carya* spp.) are also fairly common. In the understory, the ground is covered with an irregular patchwork of low-bush blueberries (*Vaccinium vacillans*; *V. angustifolium*), huckleberry (*Gaylussacia baccata*) and near the north end of the hill, acres of mountain laurel (*Kalmia latifolia*). Herb-free expanses are not uncommon, but in other areas you can find wild sarsaparilla (*Aralia nudicaulis*), wintergreen (*Gaultheria procumbens*) and plenty of Pennsylvania sedge. Among the more unusual plants in sunny, rocky areas along the summit are bristly sarsaparilla (*Aralia hispida*) and pale corydalis (*Corydalis sempervirens*). Some of the greatest diversity found on Mineral Hill is in the primitive group known as lichens. A lichen is actually a unique combination of two separate organisms, an alga and a fungus, which have evolved together and are now inextricably linked, i.e. one cannot survive without the other. On the top of Mineral Hill, you can easily find more than a dozen different lichens growing on the rocks and tree trunks.

The summit and the western slope are also great places to find sign of turkey, deer and rabbit. Chickadees, robins, tufted titmice and juncos flit through the open canopy, and the "check please" and warble of the scarlet tanager, the police whistle of the great crested

flycatcher and the “here me, see me, watch me” tease of the red-eyed vireo are three of the most common summertime songs.

On the eastern side of Mineral Hill, the forest changes again. Unlike the western slope, this half is characterized by huge, fractured rocks and a small talus slope. The piled up rocks create hundreds of nooks and cavities that are used as denning sites by porcupines, racoons, red fox and coyotes. In addition, the aspect and moisture levels create conditions that support a very different assemblage of plants. In the sunniest patches, one finds several plants known from only one or two locations in Northampton: tick trefoil (*Desmodium paniculatum*), mountain mint (*Pycnanthemum incanum*), a native hawthorn (*Crataegus* sp.) and four-leaved milkweed (*Asclepius quadrifolia*). Nearby, in moister soil, grow four other Northampton rarities which are known only from Mineral Hill: woodland agrimony (*Agrimonia striata*) with its tiny yellow blossoms, herb robert (*Geranium robertianum*) with its redolent foliage, waxy meadow rue (*Thalictrum revolutum*) with its bluish-gray stems, and the lacy fronds of fragile fern (*Cystopteris fragilis*). In addition to these, the slope is also covered with great masses of white snakeroot (*Eupatorium rugosum*), clusters of wild sarsaparilla, panicked dogwood (*Cornus racemosa*), round-leaved dogwood (*Cornus rugosa*), and in the rocky soils, marginal fern (*Dryopteris marginalis*) and polypody (*Polypodium virginianum*).

Because of the rocks, the overstory is spotty. It consists of a mix of hardwoods, primarily linden (*Tilia americana*), pignut hickory (*Cornus ovata*), sugar maple (*Acer saccharum*), red oak and black birch (*Betula lenta*). Near the base of the slope, the moist, shaded soils support striped maple (*Acer pensylvanica*) and a rich diversity of herbs, including horse balm (*Collinsonia canadensis*), downy yellow violets (*Viola pubescens*), red trillium (*Trillium erectum*), round-lobed hepatica (*Hepatica americana*), solomon’s seal (*Polygonatum pubescens*), false solomon’s seal (*Smilacina racemosa*) and rattlesnake plantain (*Goodyera pubescens*). At least six different ferns are also found near the toe of the slope: Christmas fern (*Polystichum acrostichoides*), lady fern (*Athyrium filix-femina*), marginal fern, maidenhair fern (*Adiantum pedatum*), New York fern (*Thelypteris novaeboracensis*) and an occasional rattlesnake fern (*Botrychium virginiana*).

Moving downslope from the talus, the grade is gentle and few rocks are exposed. The overstory species remain the same, but the understory species change. Now, witch hazel (*Hamamelis virginiana*), maple-leaved viburnum (*Viburnum acerifolium*) and beaked hazelnut are common. The herb layer is well-developed, and includes, among the more unusual plants two that lack chlorophyll: squawroot (*Conopholis americana*) and autumn coralroot (*Corallorhiza maculata*). Squawroot, which grows in clusters of four to ten,

parasitizes beech and oak roots for its carbohydrate energy. The pine cone-shaped plants blossom in early spring, but their withered, reddish-brown stalks don't decompose until the following spring. The other chlorophyll-free plant is autumn coralroot, an orchid which relies on fungal mycelium to obtain its energy and nutrients. Widely scattered in Northampton, autumn coralroot is most often found in rich, moist woodlands, especially along streams or near the base of boulders. Another plant known in Northampton from this slope alone is ovate-leaved ragwort (*Senecio obovatus*). Unlike its more familiar relative golden ragwort (*S. aureus*), this plant does not grow in wetlands but instead on well-drained, wooded slopes.

On this eastern slope, not far from the base of the talus, is a small footpath which connects to a larger wood road to the north and a network of well-used trails to the south. Following these southern trails, it's possible to reach the isolated swamp that first prompted my explorations of this area. Several trails cross its outflow stream, which, although I missed it on my initial outing, is perhaps the best way to find the wetland on a first visit.

Following the intermittent, rocky stream, one passes through shady hemlock stands and mixed hardwoods. When the wetland is finally reached, the stream channel disappears and is replaced by a wide, 5+/- acre bottomland. The ground is seepy and covered with thick, soft layers of saturated sphagnum moss and muck. Mini-upland islands support yellow birch (*Betula lutea*), red maple, black ash (*Fraxinus nigra*), tupelo (*Nyssa sylvatica*), and lots of hemlock. As you explore, you must duck and maneuver around clusters of winterberry (*Ilex verticillata*), spicebush (*Lindera benzoin*), witherod (*Viburnum lentago*) and mountain laurel.

At least three orchids are found in this swamp. Early coralroot (*Corallorhiza trifida*), a diminutive, yellowish-green orchid, blossoms in early May. One month later, purple fringed orchid (*Platanthera grandiflora*) begins to bloom. Up to two feet in height and with a three inch flower spike composed of dozens of lavender blossoms, this unmistakable orchid is one of New England's most beautiful wildflowers. The last of the three to bloom is the green wood orchid (*Platanthera clavellata*). Also small and with greenish-white flowers, it grows in sphagnum mats and is easily missed.

In early spring, this large swamp fills with rainwater and snowmelt. Underlain by the 350 million year old schists and gneisses that compose the surrounding hills, this depression is a likely breeding spot for four-toed salamanders, currently listed as special concern in the state and so far, unknown from Northampton. As only two excursions were made to this area, it is very likely that repeated explorations will yield other species - both plant and animal - of interest.

Beyond the wetland, much of the land to the south, north and west has been recently logged, adding even more forage for the area's deer population. From the look of the flagging, more logging may soon occur east of the swamp.

Summary

The Mineral Hill area has high ecological value. The hill itself has a wide variety of habitats and rare plants. The nearby swamp and surrounding forests are relatively undisturbed and are contiguous with hundreds of acres of undeveloped land to the north. The protection of this site should be a high priority.

Map: Mineral Hill and the Orchid Swamp Trails Map

Map: Major Communities at Mineral Hill and the Orchid Swamp

A Preliminary Ecological Overview of THE SUMMIT SWAMPS AND THE SAWMILL HILLS

Behind the National Guard Armory at the end of Colonel Lavalee Lane is a long, well-maintained wood road that leads into Northampton's largest remaining tract of undeveloped land. Known as the Sawmill Hills, these rocky woodlands earned their local name during the 19th century when they were extensively logged. Today, most of the land is forested and it's easy to find sections that have not been cut for over a century.

The reason this land has been spared from development is that bedrock is always at or near the surface, making road construction, septic design, well installation and house construction difficult. The underlying bedrock in this part of New England formed more than four hundred million years ago during a major mountain building episode when a volcanic island arc in the Proto-Atlantic Ocean collided with the North American plate. Intense heat and pressure deformed the volcanic rocks and ocean sediments into the schists and gneisses that we see today. Another major mountain building collision occurred 100 million years later when ancestral Europe/Africa collided with North America to form the supercontinent Pangaea. The mountains created by these collisions rivaled the Himalayas, but today several hundred million years of erosion has reduced what were once impressive peaks to gently rolling hills. The Sawmill Hills are the eastern edge of that ancient but much reduced mountain chain we now call the Berkshires.

A small part of the wearing away of the Berkshires were the effects of four separate continental glaciations that covered our part of the world during the last two million years. In our area only the features of the latest (or Wisconsin) glaciation are well preserved, nearly all of the others were obliterated by the final surge of ice.

When the last continental glacier retreated, the Sawmill Hills were covered with a thin layer of glacial till, an unconsolidated, unsorted mix of boulders, cobbles, gravel, sand and clay. As the climate warmed, these tills developed into well-drained, acidic soils. It's in these rocky, shallow soils that oaks rule. There are red oaks (*Quercus rubra*), white oaks (*Q. alba*) and, upon the rocky summits, black oaks (*Q. velutina*) and chestnut oaks (*Q. Prinus*).

Below the oaks grow several members of the blueberry family. There are broad patches of huckleberry (*Gaylussacia baccata*), two kinds of low-bush blueberry (*Vaccinium vacillans*; *V. angustifolium*), carpets of wintergreen (*Gaultheria procumbens*) and dense

thickets of mountain laurel (*Kalmia latifolia*). Covering tens of acres, the mountain laurel tangles often make walking a struggle. In fact, the combination of mountain laurel thickets, few paths, and rocky topography makes this upland area a rather confusing place for the first time visitor.

Although rocky uplands form a major portion of the Sawmill Hills, the area also contains steep cliffs, gradually sloping hillsides, intermittent and permanent streams, large swamps, a few recently logged patches, and several isolated wetland pockets. This diversity enhances the value of the area as wildlife habitat. Coyotes and porcupines den in the rocky outcrops, black bears forage on the wetland's skunk cabbage, deer hide in the mountain laurel thickets and great horned owls hunt the extensive oak forests for flying squirrels.

Variability in the hydrology, aspect and slope of the area strongly influences the distribution of plants. A walk downslope from the oak-dominated rocky uplands reveals a rather rapid shift in forest composition. The black oaks and chestnut oaks drop out and are replaced by scattered red oaks, white oaks and a mix of red maples (*Acer rubrum*), hickories (*Carya* spp.) and tulip trees (*Liriodendron tulipifera*).

Some of the streams that drain the Sawmill Hills flow in broad, seepy valleys. Here, red maple dominates the overstory and a lush combination of mosses, ferns, wildflowers and shrubs carpet the damp understory. One of the more common shrubs found here is a member of the avocado family called spicebush (*Lindera benzoin*). Its citrus-smelling leaves and early flowering yellow blossoms make this plant easy to identify. Also found here are some of Northampton's less commonly encountered plant species, among them cardinal flower (*Lobelia cardinalis*), large purple fringed orchid (*Platanthera grandiflora*), and along one stream, the easy to miss dwarf grapefern (*Botrychium simplex*).

Following these streams to their sources, one finds wetland areas that have formed in impermeable bedrock depressions. To date, six so-called "summit swamps" are known; four are large forested swamps, two are vernal ponds. Further studies in this area will probably turn up several more.

Of these wetlands, the largest is located just off the wood road that leads up from the National Guard Armory. Approximately four acres in size, the swamp is a botanical treasure trove. There are hummocks of sphagnum moss (*Sphagnum* spp.), banks of water willow (*Decodon verticillata*), insectivorous sundews (*Drosera spatula*), two kinds of orchids (*Platanthera hyperborea*; *Corallorhiza trifida*), and eight species of ferns, including the largest of only two locations in Northampton of Virginia chain fern (*Woodwardia virginica*). On the

swamp's slightly elevated islands grow dense thickets of high-bush blueberries (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*) and its less common relative, mountain holly (*Nemopanthus mucronata*). Forming the canopy are warty barked black ashes (*Fraxinus nigra*), large yellow birches (*Betula lutea*), dozens of red maples and Northampton's largest tupelos (*Nyssa sylvatica*). Identified by its dramatic horizontal branching and shiny, almond-shaped leaves, tupelo (also known as black gum or pepperidge) is related to spicebush.

Throughout this large wetland are signs of deer, bear and coyote. Porcupines live in the jumble of rocks in the nearby cliffs, and winter explorations will probably turn up signs of fisher, weasel and maybe even bobcat.

To date, the Sawmill Hills area has yielded five species of snake (racer, red-bellied, milk, ring-necked and hognose) and three types of salamanders (two-lined, red-backed, and blue spotted/Jefferson's). Two of these - - the hognose snake and blue-spotted/Jefferson's salamander - - are state-listed species of special concern.

Hognose snakes, short and stocky with dramatic brown and orange banding, are most often found in sandy places (like the gravel pits east of the Sawmill Hills) where they feed exclusively on toads. They are famous for their elaborate bluffing behaviors. When first surprised, this snake, also called a puff adder, will inflate itself with air and pretend to strike. A hognose snake will actually never bite, but will only bump the intruder with its blunt nose. If this scare tactic doesn't work, it flips over, writhes on its back, vomits, defecates, opens its mouth wide, lets its tongue hang out and then abruptly plays dead. If it feels safe, the snake will slowly turn over and slither away, but if scared again it will resume its dead pose.

These dramatic performances have the desired effect on most would-be predators, but unfortunately some people misidentify this harmless creature and kill it. Worse than this misguided response is the large-scale destruction of the sandy habitat the hognose needs to survive. Housing projects, shopping centers, airports and gravel pits have all contributed to habitat loss and the species' rapid population decline.

The other state-listed species, the blue-spotted/Jefferson's salamander, offers no such drama when discovered. These slow-moving, five to six inch salamanders are brownish-black with enamel blue markings, making them unmistakable. Like many amphibians, these salamanders rely on vernal ponds, like the large summit swamps, for breeding. Other relatives that may also be found in the Sawmill Hills summit swamps are spotted salamanders, marbled salamanders, and possibly four-toed salamanders. These wetlands act

like catch basins, filling with winter runoff and spring rains. Although some of this water drains out and the remainder eventually evaporates, there is usually enough water and time for these salamanders to complete their aquatic larval stage.

Although no development projects are currently proposed for these wetland areas and the surrounding woods, their protection should be on the Conservation Commission's list of priorities. The wetlands are valuable for their plant diversity and the large tract of relatively undisturbed forest provides habitat for many species of mammals and quality nesting ground for warblers and other neo-tropical migrants. Black-throated blue warblers, rufous sided towhees and scarlet tanagers are among the most commonly heard summertime residents. In addition, this wild landscape, a portion of which falls within the aquifer recharge area, is less than a 15 minute drive from most of Northampton and has high recreation potential for walking, running, hunting, nature study and cross-country skiing. A final reason to protect this site is that the entire tract fits into a large wildlife corridor that runs from Mount Tom to the Berkshires.

Map: Sawmill Hills and the Summit Swamps

Appendix 1. A preliminary checklist to the reptiles and amphibians of Northampton, MA.

Amphibians		
<u>Common Name</u>	<u>Latin Name</u>	<u>Status</u>
Spotted salamander	<i>Ambystoma maculata</i>	P
Jefferson/Blue-spotted complex	<i>Ambystoma laterale</i>	SC
Marbled salamander	<i>Ambystoma opacum</i>	H;SC
Red-spotted newt	<i>Notophthalmus viridescens</i>	A
Redback salamander	<i>Plethodon cinereus</i>	A
Northern dusky salamander	<i>Desmognathus fuscus</i>	A
Two-lined salamander	<i>Eurycea bislineata</i>	A
Four-toed salamander	<i>Hemidactylium scutatum</i>	E;SC
American toad	<i>Bufo americanus</i>	A
Fowler's toad	<i>Bufo americanus</i>	P
Gray treefrog	<i>Hyla versicolor</i>	P
Spring peeper	<i>Hyla crucifer</i>	A
Bullfrog	<i>Rana catesbiana</i>	A
Green frog	<i>Rana clamitans</i>	A
Wood frog	<i>Rana sylvatica</i>	A
Leopard frog	<i>Rana pipiens</i>	SC
Pickerel frog	<i>Rana palustris</i>	A
Reptiles		
Snapping turtle	<i>Chelydra serpentina</i>	A
Painted turtle	<i>Chrysemys picta picta</i>	A
Wood turtle	<i>Clemmys insculpta</i>	SC
Spotted turtle	<i>Clemmys guttata</i>	SC
Eastern box turtle	<i>Terrapene carolina</i>	E;SC
Eastern garter snake	<i>Thamnophis sirtalis</i>	A
Ribbon snake	<i>Thamnophis sauritus</i>	E
Northern water snake	<i>Nerodia sipedon sipedon</i>	A
Northern ringneck snake	<i>Diadophis punctatus</i>	P
Redbelly snake	<i>Storeria occipitomaculata</i>	P
Brown snake	<i>Storeria dekayi dekayi</i>	P
Smooth green snake	<i>Opheodrys vernalis</i>	E
Black racer	<i>Coluber constrictor</i>	P
Eastern hognose snake	<i>Heterodon platirhinos</i>	P
Eastern milk snake	<i>Lampropeltis triangulum</i>	P

A= abundant; P= present; E= expected; H= historical; SC= state-listed special concern species

Appendix 2. A checklist to the birds of Northampton, MA.

A= Accidental	R= Resident (year-round)
B= Breeding (summer)	U= Uncommon (rare)
C= Common	V= Vagrant (wanders after breeding)
M= Migrant (spring/fall)	W= Winter visitor (non-breeding)
O= Occasional visitor	

Loons, Grebes, Cormorants and Herons

Common Loon	M
Pied-billed Grebe	M
Horned Grebe	W
Double-crested Cormorant	V
American Bittern	U
Great Blue Heron	UB
Great Egret	V
Snowy Egret	V
Cattle Egret	V
Green-backed Heron	B
Black-crowned Night Heron	U
Glossy Ibis	A

Swans and Ducks

Mute Swan	R
Snow Goose	M
Canada Goose	B/R
Wood Duck	CB
Green-winged Teal	M
American Black Duck	B
Mallard	CB
Northern Pintail	M
Blue-winged Teal	M
Northern Shoveler	A
Gadwall	UM
American Widgeon	M
Ring-necked Duck	M
Oldsquaw	UW
Common Goldeneye	W
Barrow's Goldeneye	UW
Bufflehead	UW
Hooded Merganser	UB
Common Merganser	W
Red-breasted Merganser	W
Ruddy Duck	M

Vultures, Eagles and Hawks

Turkey Vulture	M
Osprey	M
Bald Eagle	UR/B
Northern Harrier	U
Sharp-shinned Hawk	UB/CM
Cooper's Hawk	UB/CM
Northern Goshawk	M/UW
Red-shouldered Hawk	UB/M
Broad-winged Hawk	B
Red-tailed Hawk	B/CR
Rough-legged Hawk	M/UW
American Kestrel	B
Merlin	M
Peregrine Falcon	UM
Gyrfalcon	UW

Pheasants, Grouse and Turkey

Ring-necked Pheasant	UR
Ruffed Grouse	CR
Wild Turkey	CR

Rails

Virginia Rail	B
Sora Rail	B

Shorebirds

Black-bellied Plover	UM
Golden-bellied Plover	UM
Semipalmated Plover	M
Killdeer	CB
Greater Yellowlegs	M
Lesser Yellowlegs	M
Solitary Sandpiper	M
Spotted Sandpiper	B
Sanderling	M
Semipalmated Sandpiper	M
Least Sandpiper	M
Dunlin	UM
Common Snipe	M
American Woodcock	B

Gulls

Laughing Gull	O
Bonaparte's Gull	O
Ring-billed Gull	W

Birds of Northampton (cont.)

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Herring Gull	W
Iceland Gull	UW
Glaucous Gull	UW
Great Black-backed Gull	W

Doves

Rock Dove	CR
Mourning Dove	CR

Cuckoos

Black-billed Cuckoo	UB
Yellow-billed Cuckoo	U

Owls

Common Barn Owl	U
Eastern Screech Owl	R
Great Horned Owl	R
Snowy Owl	UW
Barred Owl	R
Long-eared Owl	UR
Short-eared Owl	UW
Northern Saw-whet Owl	UR

Goatsuckers

Common Nighthawk	B
Whip-poor-will	UB

Swifts and Hummingbirds

Chimney Swift	CB
Ruby-throated Hummingbird	B

Kingfishers and Woodpeckers

Belted Kingfisher	CR
Red-headed Woodpecker	O
Red-bellied Woodpecker	O
Yellow-bellied Sapsucker	B
Downy Woodpecker	CR
Hairy Woodpecker	CR
Northern Flicker	CR
Pileated Woodpecker	CR

Passeriformes

Eastern Wood Pewee	B
Yellow-bellied Flycatcher	M
Alder Flycatcher	UB
Willow Flycatcher	B
Least Flycatcher	B
Eastern Phoebe	CB

Birds of Northampton (cont.)

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Horned Lark		W
Purple Martin		UM
Tree Swallow		CB
Northern Rough-winged Swallow		B
Bank Swallow		B
Cliff Swallow		U
Barn Swallow		CB
Blue Jay		CR
American Crow		CR
Fish Crow		OM
Common Raven		U
Black-capped Chickadee		CR
Tufted Titmouse		CR
Red-breasted Nuthatch		R
White-breasted Nuthatch		CR
Brown Creeper		R
Carolina Wren		V
House Wren		CB
Winter Wren		B
Marsh Wren		UB
Golden-crowned Kinglet		W/M
Ruby-crowned Kinglet		M
Blue-gray Gnatcatcher		UB
Eastern Bluebird		B
Veery		B
Gray-cheeked Thrush		UM
Swainson's Thrush	M	
Hermit Thrush		B
Wood Thrush		B
American Robin		CR
Wheatear		AM
Gray Catbird		CB
Northern Mockingbird		CR
Brown Thrasher		B
Water Pipit		M
Cedar Waxwing		R
Northern Shrike		UW
European Starling		CR
Solitary Vireo		B
Yellow-throated Vireo		B
Warbling Vireo		B
Philadelphia Vireo		M
Red-eyed Vireo		B
Blue-winged Warbler		B
Golden-winged Warbler		U
Tennessee Warbler		M
Orange-crowned Warbler		UM
Nashville Warbler		UB

Birds of Northampton (cont.)

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Northern Parula	M
Yellow Warbler	CB
Chestnut-sided Warbler	B
Magnolia Warbler	M
Cape May Warbler	M
Black-throated Blue	B
Yellow-rumped Warbler	B
Black-throated Green Warbler	B
Blackburnian Warbler	B
Pine Warber	B
Prairie Warbler	B
Palm Warbler	M
Bay-breasted Warbler	M
Blackpoll Warbler	M
Black-and-White Warbler	B
American Redstart	B
Ovenbird	CB
Northern Waterthrush	B
Louisiana Waterthrush	B
Connecticut Warbler	UM
Mourning Warbler	M
Common Yellowthroat	CB
Wilson's Warbler	M
Canada Warbler	B
Scarlet Tanager	B
Northern Cardinal	CR
Rose-breasted Grosbeak	B
Blue Grosbeak	A
Indigo Bunting	B
Dickcissel	U
Rufous-sided Towhee	B
American Tree Sparrow	W
Chipping Sparrow	B
Field Sparrow	B
Vesper Sparrow	M
Lark Sparrow	A
Savannah Sparrow	B
Grashopper Sparrow	UB
Sharp-tailed Sparrow	A
Fox Sparrow	M
Song Sparrow	CR
Lincoln's Sparrow	M
Swamp Sparrow	B
White-throated Sparrow	W
White-crowned Sparrow	M
Dark-eyed Junco	R
Lapland Longspur	W
Snow Bunting	W

Birds of Northampton (cont.)

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Bobolink	B
Red-winged Blackbird	CB
Eastern Meadowlark	B
Rusty Blackbird	M
Common Grackle	CB
Brown-headed Cowbird	CB
Orchard Oriole	U
Northern Oriole	B
Pine Grosbeak	UW
Purple Finch	W
House Finch	R
Red Crossbill	UW
White-winged Crossbill	UW
Common Redpoll	UW
Pine Siskin	W
American Goldfinch	CR
Evening Grosbeak	UW
House Sparrow	CR

Appendix 3. A checklist to the mammals of Northampton, MA.

(* = expected; + = accidental)

Order: MarsupaliaVirginia opossum *Didelphis virginiana*Order: InsectivoraShort-tailed shrew *Blarina brevicauda*
Masked shrew *Sorex cinereus*
Smoky shrew *Sorex fumeus*
Northern water shrew *Sorex palustris* *Hairy-tailed mole *Parascalops brewerii*
Star-nosed mole *Condylura cristata*Order: ChiropteraLittle brown bat *Myotis lucifugus*
Keen's myotis *Myotis keenii septentrionalis*
Silver-haired bat *Lasionycteris noctivagans*
Big brown bat *Eptesicus fuscus*Order: LagomorphaEastern cottontail *Sylvilagus floridanus* *
New England cottontail *Sylvilagus transitionalis*
Snowshoe hare *Lepus americanus* *Order: RodentiaEastern chipmunk *Tamias striatus*Woodchuck *Marmota monax*Gray squirrel *Sciurus carolinensis pennsylvanicus*
Red squirrel *Tamiasciurus hudsonicus*
Southern flying squirrel *Glaucomys volans*
Northern flying squirrel *Glaucomys sabrinus macrotis* *Beaver *Castor canadensis*White-footed mouse *Peromyscus leucopus*
Meadow jumping mouse *Zapus hudsonius*
Woodland jumping mouse *Nopeaeozapus insignis*
Red-backed vole *Clethrionomys gapperi*

Meadow vole	<i>Microtus pennsylvanicus</i>
Pine vole	<i>Microtus pinetorum scalopsoides</i>
Muskrat	<i>Ondatra zibethicus</i>
Porcupine	<i>Erethizon dorsatum dorsatum</i>
Norway rat	<i>Rattus norvegicus</i>
House mouse	<i>Mus musculus</i>
<u>Order: Carnivora</u>	
Coyote	<i>Canis latrans</i>
Red fox	<i>Vulpes vulpes</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Black bear	<i>Ursus americanus</i>
Raccoon	<i>Procyon lotor</i>
Fisher	<i>Martes pennanti pennanti</i> +
Ermine	<i>Mustela erminea cicognanii</i>
Long-tailed weasel	<i>Mustela frenata</i>
Mink	<i>Mustela vison</i>
Striped skunk	<i>Mephitis mephitis nigra</i>
Otter	<i>Lutra canadensis</i>
Bobcat	<i>Lynx rufus</i>
<u>Order: Artiodactyla</u>	
White-tailed deer	<i>Odocoileus virginianus</i>
Moose	<i>Alces alces</i> +

NOTE: Each species reported here is known or expected to occur in Northampton given its observed distribution and abundance in the Connecticut Valley. Voucher specimens from Northampton, however, do not exist for each species listed here. This list was reviewed by Dr. David Klininger at the University of Massachusetts-Amherst.

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^{1.} Although sometimes incorrectly called a swamp, the area is a true marsh. Swamps are wetlands with tall trees. Marshes, however, are characterized by shallow, open water with hummocks of sedges and other waist-high vegetation.

^{2.} Spring Grove Cemetery is the only Northampton site for wild lupine (*Lupinus perennis*), currently "watch listed" in Massachusetts. Years ago, when the Cemetery was burned annually, wild lupine was much more widespread. Given this observation, the DPW should consider a controlled spring burn as part of its maintenance plan. The cemetery also contains the City's only known population of blunt leaved milkweed (*Asclepias amplexifolius*).

^{3.} Six additional green dragon sites are known in Northampton, but only one other is protected. At present, Northampton has more green dragon sites and larger populations than anywhere in the state.

^{4.} This area and the surrounding cattail marsh would be a good place to install several wood duck nesting boxes.