Management Plan for Fitzgerald Lake Conservation Area

Northampton, Massachusetts

2005 – 2010

Prepared by Broad Brook Coalition
in Cooperation with
The Northampton Conservation Commission

SUMMARY OF GOALS AND OBJECTIVES
(NOT NECESSARILY IN ORDER OF PRIORITY)

I. Maintain and Enhance the Diversity and Integrity of Habitats and Species in the FLCA

A. Control invasive species and replant cleared areas with native species
B. Maintain and enhance the diversity and integrity of shrublands found at Cooke's Pasture and South Pasture
C. Maintain and enhance the diversity and integrity of forested uplands
D. Manage recreational use and minimize damage to sensitive sites
E. Protect the water quality in Fitzgerald Lake, Broad Brook, and adjacent wetlands and promote aquatic biodiversity
F. Promote ecological research
G. Protect and expand FLCA

II. Encourage Education and Outreach

A. Provide interpretive materials
B. Maintain nature trails
C. Promote "Walks and Talks"
D. Continue collaboration with organized groups
E. Maintain wildlife blind
F. Publish newsletter

III. Provide Access for Recreational Uses that are Compatible with the Above Goals

A. Promote allowed activities on less-sensitive sites
B. Promote handicapped access where possible
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D. Provide for better enforcement of conservation area rules
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INTRODUCTION

Fitzgerald Lake Conservation Area (FLCA), Northampton's largest conservation holding, contains a variety of habitats and, together with contiguous undeveloped land, supports a relatively wide diversity of wildlife species, including some species that are rare or endangered in the state. By maintaining the quality of habitat, especially the wetlands, residents of Northampton are preserving a piece of the natural heritage of the area and helping to maintain the complexity of an ecosystem. FLCA also provides an outstanding resource for wildlife viewing, environmental education, and fostering an appreciation of nature.

Broad Brook Coalition (BBC), a nonprofit community organization, has a Memorandum of Understanding with the City of Northampton by which BBC carries out day-to-day management of FLCA. Prior to 1996, BBC's activities were performed as needed in response to specific problems. In 1995, the first BBC Management Committee was formed to devise an ecological management plan. Their efforts resulted in the first FLCA Management Plan, 1996–1999. The FLCA Management Plan, 2000–2004, maintained the goals of the first Management Plan. This document, the FLCA Management Plan, 2005-2009, like previous plans, incorporates several earlier sections and modifies their objectives on the basis of accomplishments and new areas that need to be addressed.

As with the first Management Plan, we have relied on several other documents relating to FLCA, such as the City of Northampton's Open Space and Recreation Plan, 1994–1999, and Rediscovering Northampton: the Natural History of City-Owned Conservation Areas by Laurie Sanders (1993) which was revised in 1999. We have also incorporated information from the Forest Management Plan prepared by Karl Davies in 1997–1998.

RESOURCES

Fitzgerald Lake Conservation Area consists of approximately 560 acres in the northeast corner of Northampton. The ecology of the area is richly diverse with uplands, various types of wetlands, old pasture, and the lake. The bedrock is classified as hornblende, quartz and monodiorite gneiss, while the soil types mostly result from the glacial and hydrological history of the area. The upland soils, on moderate slopes, are characterized by numerous rocks, boulders, and rock outcrops, and are thus unsuitable for most commercial uses[1] These soil types provides good potential for the growth of hardwood and coniferous trees, and a fair potential as habitat for woodland wildlife. Soils in drainage areas along streams, wetlands, and the lake are mostly silt loams. These generally have a good to fair potential as either forested or open wildlife habitat.

The resources of FLCA are as follows:

I. Fitzgerald Lake
II. The Dam
III. Wetlands
IV. Forested Uplands
V. Old Pasture
VI. Access and Trails
VII. State Listed Species
VIII. Surrounding Area

Each of these resources is described in detail in "Appendix B: Inventory of Resources." Please refer to this appendix for descriptions.

[1] Soil Survey of Hampshire County, Massachusetts, Central Part. 1981. U.S. Department of Agricutlure, Soil Conservation Service.

PROBLEMS, CONCERNS AND THREATS MANAGEMENT GOALS AND OBJECTIVES

Fitzgerald Lake Conservation Area comprises a number of different habitats, including the lake itself, varied wetland habitats along with associated streams and pools, forested uplands, and old pasture. Each habitat area needs to be protected, and some if not all need ongoing maintenance as well. In this section, we describe known and potential problems, concerns and threats to the resources of FLCA, and outline the corresponding management goals and objectives.

Goal I. Maintain and Enhance the Diversity and Integrity of Habitats and Species

A: Control Invasive Species and Replant Cleared Areas with Native Species.

Concern:

Invasive species pose a threat to the lake, wetlands and upland areas because they outcompete and crowd out native species and reduce biodiversity. Certain invasive species can quickly take over native habitats, greatly decreasing the existing species diversity, sometimes altering the site to a nearly single-species condition. After loss, degradation and fragmentation of habitat, invasive species are the second leading cause of biodiversity loss.

Objectives:

1. BBC will maintain a detailed plan for the removal and/or containment of all invasive species in the conservation area. We will also inform the general public of the dangers of invasive species, in particular those people living in the vicinity of the conservation area.

Invasive plant species of concern in FLCA are Multiflora Rose (*Rosa multiflora*), exotic buckthorn (*Rhamnus spp*.), Purple Loosestrife (*Lythrum salicaria*), Bittersweet (*Celastrus orbiculatus*), Phragmites (*Phragmites australis*), Spotted Knapweed (*Centaurea maculosa*), Black Swallowwort (*Cynanchum nigrum*), exotic honeysuckle (*Lonicera sp*.) and Japanese Knotweed (*Polygonum cuspidatum*).

For most of the invasive species of concern, the preferred method of control is a combination of cutting and herbicide application. Control of these species without herbicide may be possible, but the amount of labor required may be prohibitive. BBC has coordinated numerous work days for hand removal of invasive species, particularly the Multiflora Rose off of the North Farms Road paved trail and the Fishing Place trail.

Investigation into invasive control by the 1999 Board of Directors confirmed that hand control without herbicide might be effective in small stands of invasive plants, but

for larger areas (such as the Multiflora Rose in South Pasture) hand control alone would not only require many volunteer hours, but also would likely be a losing effort given these species' rapid recovery and spread.

With the appropriate selection and application, herbicide may be used very safely and effectively. The herbicide recommended for control of Multiflora Rose, bittersweet, and buckthorn is glyphosate, the active ingredient in Roundup (for nonwetland use), and Rodeo (for wetland use).

Glyphosate is a nonspecific herbicide, which kills all photosynthetically active vegetation it contacts. However, it is nonvolatile and has no soil activity, which means that it becomes so tightly bound to most soils that it cannot travel through them to reach the roots of other plants. Therefore, as long as care is taken to apply the Roundup only to the specific target plants, other plants will remain unaffected. However, according to The Nature Conservancy, the long-term effects of repeated glyphosate treatment on natural systems are not fully understood.

Modes of application such as spraying, in which aerial drift could occur, will be avoided. Instead, any foliar applications (to the leaves) should be done with a low pressure hand sprayer such as those used for misting houseplants. Even better is to apply the Roundup to cut stems using a sponge applicator or hand sprayer. Damage to other plant species can also be minimized by applying the herbicide during the dormant season when most plants are not photosynthetically active. The herbicide should be used in the most dilute solution that is still effective. The toxicity of glyphosate to animals and its persistence in the environment are relatively low compared to other pesticides.

If cut stems are to be targeted, Roundup is most effective when applied immediately after cutting. Whether used on cut stems or as a foliar spray, the effect of the herbicide on the target plants will not be apparent until the following growing season.

Use of Roundup and Rodeo in a conservation area and in aquatic communities requires an individual who has been licensed in their use. BBC will research the cost and feasibility of hiring a licensed herbicide applicator for especially aggressive and intractable invasive species. Until that time, BBC will continue to deal with invasives removal by hand pulling.

2. BBC will work aggressively to prevent the establishment of invasive species not yet present. BBC will post notices near the boat launch at the end of the boardwalk to reduce the possibility of invasion by Zebra Mussels and Water Milfoil. These two species are most commonly carried to new areas on boats. Although motor boats are more likely than nonmotorized boats to carry live individuals between water bodies, it would be worth the effort to take this precaution. Boaters should inspect their boat hulls carefully both before and after submersion; plants or mollusks clinging to the hulls should be removed somewhere far from the lake or streams leading to the lake.

Although Purple Loosestrife has not yet become established in the FLCA, we will conduct annual searches for this invasive around the perimeter of the lake and in the marshy areas of the conservation area, especially where formerly flooded areas have been drained. If any is found, it will be hand removed by pulling the plant with as much of the root as possible. The invasion sites should be monitored in subsequent years. It is our intent to avoid any artificial water drawdown in the lake as such a condition creates an opportunity for Purple Loosestrife to become established.

B. Maintain and Enhance the Diversity and Integrity of Shrublands Found at Cooke's and South Pastures

Concern:

Loss of early successional habitat such as shrublands represents a general trend in Massachusetts, resulting in a loss of species diversity. This habitat type will also disappear in FLCA unless action is taken.

Objectives:

1. Maintain Cooke's Pasture as nonforested shrubland. The old pasture at FLCA must be maintained by a regular mowing regime to prevent succession by woody plants. The rediscovery of Bush's Sedge (*Carex bushii*), a Massachusetts endangered species, in Cooke's Pasture in 1999 suggests that the initial mowing and clearing aided this plant's survival. With the re-establishment of this habitat type, several species of birds and other animals may return, although the requirements for different species vary depending on the mowing regime and the size of the shrubland patch. The restoration of the old Cooke's Pasture will also provide an aesthetic benefit for visitors.

A permanent mowing regime will be established. Sometime after August 31 and through the end of September, brush will be cut to a height of 6 to 10 inches with a brush cutter. At this time, not only have nestling birds already fledged but cutting is most effective because the plants' energy has not yet been stored in the roots. A given area should be removed at the same time of year every 2 to 3 years. More frequent mowing will be detrimental to invertebrate populations. Currently, we recommend dividing Cooke's Pasture in half, with one half mowed the first year, one half the next year, and none mowed the third year. Other disturbances should be kept to a minimum.

The earthen dam that creates Fitzgerald Lake needs maintenance on an annual basis to prevent overgrowth by trees, in particular Black Locust (*Robinia pseudo-acacia*), the roots of which could damage the dam's structure. In the future, the dam will be mowed at least once a year and, if feasible, twice a year.

Cutting of trees and brush in shrubland areas should be carried out selectively. Some mast producing trees have been left in the pasture. John Scanlon, wildlife biologist for the Massachusetts Department of Fisheries and Wildlife, recommended leaving about 25% of the pasture area in tree/shrub islands, to provide wildlife food and shelter. Because the acreage of Cooke's Pasture is below or close to the minimum needed for several shrubland bird species to breed, only a few trees should be left uncut within it. Those left should be mostly apples and crabapples because they provide a food source for wildlife and are not found in the forested upland habitat at FLCA. They have aesthetic value as well. Apple and crabapple trees should be pruned back to a single trunk to maintain vigor. The best time of year for this is February or March, before sap flows in spring. These areas needs to be reevaluated from time to time, and it may be desirable to cut some of the remaining trees to provide more open area.

In addition, the removal of selected species, especially invasives, may be required. Some species may resprout so vigorously that herbicide may be necessary to

kill them. For specific recommendations, see above section on controlling invasive exotics. Any brush cut by hand should be made into brush piles. Along the periphery or inside the old pasture, these will provide some wildlife cover. In each pile, the largest material should be placed on the ground first, with smaller material on top, to a height of about six feet. This will settle down to about three feet after one winter. Trees cut by machinery can be chipped and spread around.

Nesting boxes erected in Cooke's and South Pastures for Eastern Bluebirds and Tree Swallows will be repaired and maintained as necessary. As of 2004, seven bluebird houses have been erected in Cooke's Pasture and two in South Pasture. These will be cleaned and repaired on an annual basis, in the early spring (Feb., March) before the birds start looking for nest sites. If possible, volunteers will be enlisted to monitor nesting success and predation. The bat houses in Cooke's Pasture will also be repaired and maintained as necessary. If possible, these too should be monitored to determine the number and type of species using them.

BBC will plant native fruit-bearing shrubs in Cooke's Pasture. In 2003, a grant application was submitted to the New England Natural Areas and Wildlife Grants Program of the Fund for the Environment to fund the planting of native species that are used by birds and other wildlife. Although evaluated positively, the grant was not funded. BBC will resubmit an application to this program to support the planting of native species. Whether or not the grant is funded we will initiate a planting program on a smaller scale.

2. Maintain South Pasture as nonforested shrubland. Although 5 to 10 acres is considered the minimum needed to accommodate nesting birds, there may be value for wildlife in restoring South Pasture as shrubland habitat. There would definitely be aesthetic benefit, as Multiflora Rose now forms an impenetrable wall along some edges. Areas that have already grown back to forest (primarily second growth white pine) should be left as is for now. The pines provide habitat for nesting birds such as the green heron (active nest observed May 31, 1996).

In the fall or winter, BBC will cut buckthorn and/or apply Roundup to stumps. Cut material will be consolidated into brush piles to provide cover and to confine new buckthorn plants that may sprout from seed. Multiflora Rose should be treated with Roundup or pulled up by hand, and bittersweet treated in the spring. The bittersweet occurs primarily in the forest surrounding the open area. Bittersweet control is a lower priority than keeping the remaining pasture open. See Appendix C for details on invasives removal.

BBC will conduct a mowing regime like that for Cooke's Pasture with half of South Pasture mowed one year, half the second year, and none mowed the third year, whereupon the cycle will be repeated.

C. Maintain and Enhance the Diversity and Integrity of Forested Uplands

Concern:

Forest fragmentation is a growing threat to several songbird species throughout New England. Certain species of birds either require or have better nesting success in forest

interiors with unbroken canopy, uninterrupted by houses and roads, as in a significant portion of the FLCA.

Objective:

Manage forested areas for species diversity, not for timber production or harvest. In 1997 Broad Brook Coalition commissioned a Forest Inventory and Forest Management Plan. Although we believe this plan was prepared according to current best forestry practices, we were disturbed by the plan's emphasis on commercial timber production. It is not our goal to manage FLCA for resource extraction and we will not sell FLCA's timber resources.

Selective cutting of some forested areas and possibly planting native shrubs and trees to increase food supplies may be beneficial to wildlife diversity. Prescribed burning is another strategy that might be considered. At this point, BBC has no intent to perform any of these management techniques, and believes that allowing natural forest succession to take place makes the most ecological and pragmatic sense.

ncreased foot traffic and other human use may require increased trail maintenance I and monitoring to avoid overuse or inappropriate use of the conservation area and disturbance of wildlife. BBC will not construct any new trails unless there are major additions to the conservation area, and any trails added by any other entity will not be maintained by BBC. Only those officially named trails on the current BBC map of the conservation area will be maintained by BBC.

Conflicts between hunters and other users have not been a problem up to now, but may occur, especially because the boundaries of the area where hunting is allowed are only marked on the maps provided at the mapboards. Information will be posted at the kiosks alerting visitors that a portion of FLCA is open to hunting.

D. Manage Recreational Use and Minimize Danger to Sensitive Sites.

Concern:

An increased number of visitors to FLCA raises the question of construction of new trails or loop trails. However, increased trails and loops only fragment habitat further. If existing trails are not maintained compaction and erosion can result, and hikers make new trails or widen old trails to avoid the wet areas, which only spreads the erosion. Horses, off road vehicles and mountain bikes may also cause significant trail damage and impact wildlife.

Uncontrolled dogs are a serious threat to wildlife, particularly to ground- and shrub-nesting birds and other animals. Many people have reported being threatened, frightened, or even bitten by unleashed dogs. Dogs are in danger of being injured by encounters with bear, moose, or other wildlife. Dog feces left on trails is another source of concern, particularly at the North Farms entrance along the handicapped access trail.

Objective:

Trail maintenance, rather than trail construction, should be a priority. Trails have been marked, but need to be reblazed yearly. Increased maintenance may be required to cope with increased use by the public.

Increased interest in FLCA may also mean more misuse of the area by motorized vehicles such as ATVs, ORVs, and dirt bikes (off-road motorcycles). These are illegal in FLCA. All trespassing violations by these vehicles will be reported to the police.

Horse traffic and mountain bicycles can damage trails through wet areas as well as other wet areas. Usage by these enthusiasts will be monitored and further use discouraged if environmental damage is observed.

Although Northampton City Ordinances require leashing of dogs and pick-up of dog droppings, these have often gone unenforced. All violations will be reported to the City's animal control officer. BBC will continue to inform the public of the dangers unleashed pets pose to wildlife. We will also encourage owners to pick up after their pets and continue to provide Mutt-mitts at the main entrances for this purpose.

E. Protect the Water Quality in Fitzgerald Lake, Broad Brook and Adjacent Wetlands and Promote Aquatic Diversity

Concern:

The water quality of the lake, brook and adjacent wetlands is an obvious concern. Eutrophication of the lake could result from high nutrient levels and would result in overgrowth of duckweeds, algae, and other aquatic plants. There is potential for nonpoint-source pollution from a number of sources:

1) Stormwater from all surface roads, especially North Farms Road where it crosses Broad Brook.
2) Septic systems from the North Farms Road area.
3) Lawn and other residentially used chemicals from throughout the watershed.
4) Fertilizers from agricultural land along North Farms Road.
5) Fertilizers and pesticides used in the nearby cemeteries and recreational field.
6) Possible waste and hazardous dumping.
7) Road salt and heavy metals from road runoff.
8) Use of toxic materials such as cuprinol to preserve boardwalks

Objective:

Protect the Integrity of Wetlands and Aquatic Habitat

Use of toxic materials such as cuprinol to preserve boardwalks will not be allowed. Nontoxic alternatives are available.

We will continue to allow fishing and ice fishing and educate people who fish about litter and shoreline erosion. Fishing licenses are required, but enforcement is the responsibility of the Environmental Police.

In the past, the accumulation of trash has been a problem along the lake shoreline where fishermen discard monofilament line (which is very detrimental when ingested by or entangling wildlife) and Styrofoam bait containers. BBC will post and promote the "carry it in/carry it out" waste management rule.

Dredging may have to eventually be considered to keep the lake from becoming too shallow to function as a lake habitat. At this time there is no plan to dredge the lake. BBC will develop a plan to evaluate the successional advance of cattails and other plants at the west end of Fitzgerald Lake.

Disturbance of nesting birds occurs when trails are routed through wetlands and other sensitive habitats. All unofficial trails will be discouraged along the shoreline and through any wet area, and rerouted if possible.

The City received a grant in 2003 to ameliorate the problem of silt runoff from the North Farms Road parking lot into Broad Brook. The planning and construction of this process will be monitored by BBC to ensure that no environmental damage results and that it will serve its purpose effectively. BBC will also consider construction of a berm along North Farms Road to protect the marsh/pond near the road from road salt and other road contamination. This wetland may contain state-listed species and needs to be inventoried.

Wood Duck boxes were erected in Fitzgerald Lake in 2000 and 2003 by the Commonwealth of Massachusetts' Division of Environmental Management.
Four were initially placed at the east end of the lake and, when these were deemed to be fully used by Wood Ducks and other cavity nesting species (e.g. Hooded Merganser (*Lophodytes cucullatus*) and Tree Swallow (*Tachycineta bicolor*)), four more were erected near the center of the lake. These boxes will be maintained and monitored by the state, but BBC will request that the monitoring records be supplied to us and try to ensure that the state is in fact maintaining the boxes in usable condition.

Water Quality tests will be performed at Fitzgerald Lake at least three times a year during spring, summer and fall. Tests will be conducted for phosphates, nitrates, dissolved oxygen, pH, hardness, alkalinity, carbon dioxide, chloride, and sulfate. An initial baseline study is currently being completed. In subsequent years, tests should be run near the same dates and times of day for meaningful comparisons. Water quality will be tested in vernal pools at least annually, particularly for salt in the pond near North Farms Road.

BBC will work to collect species and abundance data on benthic invertebrates as a baseline indicator of water quality. Organisms such as mussels and aquatic larvae are useful biological indicators of the health of an aquatic ecosystem.

BBC will educate residents within the watershed about nonpoint-source pollution through our newsletter and postings on the mapboard. Lawn chemicals, septic systems, and household toxic waste disposal all pose potential threats to water quality in FLCA.

Dumping of toxic materials is the most serious potential threat to water quality. An attempt will be made to identify any dumped trash and the information turned over to City police for enforcement of the litter laws.

Particularly sensitive sites at FLCA are wetlands, including the lake shore, that are especially susceptible to loss of vegetation by trampling and to disturbance of nesting birds; vernal pool basins, where breeding amphibians and invertebrates could be disturbed; and areas where rare species are present. To minimize disturbances, we will

not construct any new trails for now. Labor and capital resources should be concentrated on existing trails. Even if these resources increase, we will only consider additional new trails if existing trails become overused, additional land acquisitions contain nonsensitive features that would enhance recreational use, or if an unofficial path becomes so well established that it is causing erosion or other damage.

If new trails are ever considered, the following principles will be observed.

• Trails will not be through wetlands, including vernal pools.

• No loop trail will be constructed around the south side of the lake. This is the one remaining section of lakeshore that is relatively undisturbed, and should be kept this way for the benefit of species that breed and forage here.

• No trails will be built near Great Blue Heron rookery at the northern end of the marsh. Great Blue Herons are especially sensitive to human disturbance. This site is not an active nesting site at present, but may again be used in the future.

F. Promote Ecological Research

Concern:

Lack of ecological research and inventory could lead to unwise or inappropriate management activities and decisions.

Objective:

Conduct systematic inventories of wildlife and plant species throughout FLCA. Inventories of mammals, breeding and visiting birds, amphibians and reptiles, fish, aquatic and terrestrial invertebrates, and plants are necessary. It is important to collect these baseline data, determine if additional rare species are present, pinpoint the locations of individuals (plants) or populations (wildlife), and estimate population sizes. Inventories should be done or coordinated by individuals (interns or volunteers) who are knowledgeable about appropriate procedures.

G. Protect and Expand FLCA

Concern:

The importance of the surrounding area and natural features beyond the boundaries of the FLCA is described in detail in Appendix B, section VII. If current owners decide to sell their lands, there is danger that the surrounding areas will be developed in such a way as to make FLCA an island in a sea of housing developments.

Objective:

Protection of undeveloped parcels surrounding FLCA, either by purchase or conservation restriction, should be a priority to ensure the maintenance of natural habitat beyond the boundaries of the current FLCA. Large animals in particular

depend on resources outside the current acreage. We will encourage the development of wildlife corridors throughout the area to facilitate the movements of these large animals.

BBC will continue to acquire and/or protect sensitive land abutting FLCA. BBC's Land Acquisition and Preservation Committee will continue to actively work with the City to identify and protect abutting land. Sites with particular ecological value are the peat wetland south of Fitzgerald Lake, the large vernal pool to the north of the lake, the large forested wetland between the northern section of FLCA and Coles Meadow Road, and the large vernal pool along the old telephone right of way north of FLCA. See Appendix B: Inventory of Resources, for a detailed description.

Goal II. Increase Education and Outreach

Concern:

Lack of education and outreach can result in the occurrence inappropriate and ecologically destructive activities at FLCA. In fact, FLCA is a unique resource that can serve the City well as an "outdoor classroom" for natural history instruction.

Objectives:

1. Promote Interpretive Materials. Map boards with maps/brochures are available at the North Farms Road and Boggy Meadow Road trailheads, and there is a map/brochure holder at the Marian Street trailhead. There are also plans for a map board to be installed at the Marian Street trailhead. A four-color version of map/brochure was prepared in 2002 and will be updated as new land is acquired for inclusion in the FLCA. In addition, a leaflet describing a number of points of interest along the Self-Guided Nature Trail constructed on the Fishing Place-Lake Trail loop (North Farms entrance) is available adjacent to the canoe launch. Concerns such as unleashed dogs, nonpoint-source pollution or other conservation problems are communicated to FLCA users through posted notices or mailings.

2. Promote and Maintain Nature Trails: An update of the current Self-guided Nature Trail, which highlights some of the most interesting features of the FLCA, and of the accompanying leaflet, is planned. In addition, we will consider the installation of a second Self-Guided Nature Trail encompassing portions of the Hillside Trail in collaboration with Ms. Emily Case and Prof. Lynn Margulis who have developed a prototype as part of the Environmental Evolution course program in the Department of Geosciences at the University of Massachusetts. An innovative aspect of this possible new Self-Guided Nature Trail will be a leaflet that poses a number of questions about notable features along the route, with answers provided at the conclusion.

3. Promote "Walks and Talks". Throughout the year, a series of "Walks and Talks" is organized to acquaint the public with the natural history of the FLCA. These events, which have proved to be very popular, have included programs on 'Fall Birds', 'Winter

Trees and Tracks' 'Vernal Pools', 'Avian Delights', 'Exploring Biodiversity', 'Aquatic Insects' and 'Dragonflies and Damselflies: Jewels of our Wetlands' over the past year. This series, along with the semiannual BBC Newsletter, is an important way to inform the public about recreational activities at the FLCA, to publicize fund drives for land acquisition, to involve the community in BBC management projects, to gain new members and to promote an interest in land preservation and conservation issues.

4. Continue Collaboration with Organized Groups. Groups such as the Moose Lodge, the Hampshire Educational Collaborative, Americorps and the Lathrop Community have provided invaluable assistance in numerous projects undertaken by the BBC in the FLCA. We intend to maintain these collaborations in the future as well as to encourage volunteer projects and educational programs to serve additional groups. BBC will participate in a survey of wildlife corridors in Northampton organized by the Wildlife Committee of the Northampton Conservation Commission. This project will help to establish the way in which wildlife uses the FLCA and how animals move from one area to another through a crescent of undeveloped land that surrounds the northern and western limits of the City. An effort will be made to have FLCA included in the new descriptive map of birding areas in the Massachusetts portion of the Connecticut River Birding Trail: Source to Sea under the auspices of the Berkshire Pioneer Resource Conservation and Development Council based in Amherst.

5. Maintain Wildlife Blind. BBC will continue to maintain and keep in good repair the wildlife blind. A journal located in the wildlife blind will continue to provide visitors an opportunity to reflect on their experience as well as inform them about wildlife sightings in the adjacent forest and wetland.

6. Publish Newsletter. The semiannual BBC Newsletter will continue to be published and provide BBC an opportunity to educate members and friends, solicit feedback, promote programs and solicit funds.

Goal III: Provide Access for Recreational Users That Are Compatible With the Above Goals

Concern:

Certain recreational activities may become detrimental to wildlife or FLCA habitats.

Objectives:

1. Promote Allowed Activities on Less-Sensitive Sites. Allowed activities, namely nature study, hiking, fishing, cross country skiing, snowshoeing, wheelchair use, non-intrusive research and non-motorized boating, should be encouraged as long as users comply with FLCA rules and the activities do not become detrimental to wildlife or habitat. Promoting recreational use on less-sensitive sites will minimize pressure on

sensitive sites while accommodating current and projected recreational use. We will continue to publicize and promote allowed activities on map boards and brochures.

2. Promote Handicapped Access Where Available. Handicapped access is available on a paved and boardwalked trail off of North Farms Road to the canoe launch. There is no paved access beyond the Bridge over the Brook (BOB) or on other trail areas.

3. Discourage Types of Uses That are Destructive and Provide for Better Enforcement of Conservation Area Rules. BBC will actively exclude ORVs, ATVs, dirt bikes, motorcycles, snowmobiles, and other unauthorized motorized vehicles from FLCA. ATVs in particular have the potential to cause major destruction of wetlands and nonforested areas. Such destruction has already occurred in the past in Cooke's Pasture. Snowmobiles are less destructive as long as there is adequate snow cover, but their noise still stresses wildlife as well as people. The use of gas-powered motorboats and watercraft has not been a problem at FLCA, but their prohibition should continue because of damage they can potentially cause by their wake and noise, and because of the potential for water pollution from gasoline engines.

BBC will maintain the integrity of the gate at Boggy Meadow Road, and the barricades to motor vehicles at other entrances. We will make sure signs stay in place indicating that motor vehicles are not allowed in FLCA.

Mountain bicycles and horses should be prohibited from certain trails. Mountain bikes cause some damage on all trails, especially when trails are muddy. Although it is probably unrealistic to prohibit them entirely from FLCA, they should be kept off trails that are frequently wet or prone to erosion, such as the Lake Trail beyond its junction with Hillside Trail or the Fishing Place Trail. Horses also cause damage to trails, particularly those through wet areas. We will monitor trails for signs of damage and, if necessary, post signs at both ends of wet trails stating that mountain bikes and horses are prohibited.

BBC strongly recommends that the city prohibit camping in FLCA except under special restrictive circumstances involving conservation work. We will continue prohibition on campfires. Not only do they pose the risk of forest fires, but the campfire rings are long lasting and detract from the natural setting.

Dogs should be leashed. Dogs are notorious for harassing or killing wildlife. From an ecological standpoint, dogs should not be permitted in FLCA at all, but this is unrealistic. If dogs stay on trails, harassment will be minimal, and the many visitors who exercise their dogs at FLCA will continue to be able to do so. Signs have been posted at entrances advising dog owners that City Ordinances 5-18 and 5-22 require that owners clean up dog droppings and keep their dogs leashed. Mutt Mitt dispensers were placed at the three entrances in spring 2000 and have been used by responsible dog owners. The plastic bags are biodegradable and can be discarded in household trash for eventual disposal in the landfill. As a result, littering has decreased. Nonetheless, dog wastes along the paved trail for handicapped access (North Farms Road entrance) have continued to be a problem, especially in winter.

We will encourage users to carry out their litter. This message will be communicated on map boards and in our brochure. We will also incorporate litter pick-up

into our trail and invasive species work days to clean up that which has not been properly disposed of.

4. Promote and Maintain Hiking Trails. A well-marked trail system encourages visitors to keep on designated trails. FLCA trails are color-coded by painted blazes, and signs at trail intersections correspond to names on the map/brochure. Trails are marked, cleared and repaired on workdays in the spring and fall with the participation of BBC members and community volunteers. Trail maintenance will be continued on a regular basis and the trails will be reblazed annually. To encourage people to stay on marked trails, fallen trees and branches will be removed, wet areas will be provided with bog bridges or stepping stones, and new growth will be pruned back. The Canoe Launch Boardwalk should be kept clear for wheelchair access as well as safe for use by people carrying canoes.

Goal IV: Ensure a Steady Stream of Funding to Meet the Above Goals and Objectives

Concern:

Broad Brook Coalition lacks a steady stream of funding to support all of its management activities. Membership dues provide operating funds, but major projects cannot be covered by dues alone. Although we apply for grants as needed, they may not always be awarded.

Objective:

BBC needs to secure funding to help maintain and enhance management objectives. Fundraising activities will continue to include the solicitation of paid BBC memberships as well as contributions to the General Fund and Land Acquisition Fund. We will also apply for specific governmental or foundation grants to support special projects or other specific needs.

APPENDIX A: CULTURAL AND LAND USE HISTORY

The use and distribution of the lands purchased from the Nonotuck natives in 1654 were among the first concerns of the early Northampton settlers. Home lots were chosen freely to afford easy access to the principal attraction of the settlement: the fertile meadows along the Connecticut River. These were divided according to the size and wealth of the family. The uplands, including the Broad Brook watershed, apparently were undistributed and were known as "the commons," whereby individuals had proprietary rights to use the land as they needed.

In 1684, thirty years after the founding, our town forebears began a wrangle over the distribution of the commons land that lasted half a century. The crisis resulted from a shortage of forest products (firewood, fence posts, boards ("sawen timber"), and turpentine) caused by demands of a rapidly increasing population and the deforestation for crop lands. The unclaimed land was surveyed and divided into two major subdivisions, whereby Broad Brook became part of the northern boundary between the Inner Commons (used for crops and pasture) and the outlying upland Long Division (mostly woodlots). Over the years, as the fertility of the meadows deteriorated and a wheat rust reduced the grain yield, some upland holdings were awarded to Proprietors in lieu of lands in meadows, or to newcomers. The remaining undivided commons and the "pine lands" were either pasture ground or restricted woodlots (after 1684 no trees smaller than nine inches could be felled).

Dissatisfaction with the original distribution of lands flared up from time to time, with the proprietors calling for legal help from Connecticut in 1715. The source of discontent was chiefly the inequality of land holdings and the fact that individual plots were scattered around town making for a more laborious and inefficient farming system. Gradually claims were consolidated and the town surrendered its rights to the lands to individual Proprietors.

By 1728, Colonel Timothy Dwight (whose grandson became the President of Yale University) had acquired most of the 350 acres of land north of Bridge Road that eventually became the Harold K. Fitzgerald farm. The dwellings were on Bridge Road and an 1831 map shows a saw mill on Broad Brook beyond Fortification Hill (now visible from Bridge Road by looking north across the Fitzgerald Fence field). The old Dwight farm remained in the family until l846. The land continued to be farmed under different owners, and was known variously as the Herdsdale Farm and the Wallace Allen Farm. In 1935, Harold Fitzgerald acquired the farm; in 1965, preparatory to the development of a housing project, he constructed a dam on Broad Brook, creating the 40 acre lake. Mr. Fitzgerald abandoned the project after Conservation Commission restrictions (related partly to stricter wetland regulations) proved too burdensome. He then bargain-sold the northerly 152 acres of his land, including the lake, to the City of Northampton in 1977.

The conservation area land known as Cooke's Pasture consists of parcels consolidated into a farm by Dr. Edward E. Denniston in 1859. He had attached to his medical practice a hydropathic institute on grounds now occupied by the Cooley Dickinson Hospital. To provide his patients with a good diet, he added to his kitchen garden the eight parcels of land he called "Broad Brook Pasture." Dr. Denniston cleared

the land, built a causeway across Broad Brook and erected a barn to house chickens and turkeys. Part of the cellar wall of that barn still can be seen 450 feet north of the old bridge.

After 1885, the farm was owned and operated by Francis Cooke, and then his sons, Frederick and Howard—the latter lived at 920 Bridge Road, and called his farm, "Broad Brook Farm." When he sold it in 1927 to John Pollard, the deed map showed access to the property along Boggy Meadow Road, with a wooden bridge across Broad Brook, an old barn to the north of the bridge, and another road around Fortification Hill from Bridge Road to the 80-acre pasture. The Pollard dairy cows and barns were located on Jackson Street, and only beef cattle were kept out on Cooke's Pasture, with a cattle-holding pen just inside the gate on Boggy Meadow Road.

In the 1950s Cooke's Pasture is described as completely cleared, with Broad Brook having one main course with a few rills and wet fringes around the open field. At the edges were stands of white pine and red maple, and an abundance of wild flowers. After the late 1960's the cattle operations ceased and by 1984 the land was designated "forest land" by the Board of Assessors as a tax lien. Three years later the Pollard family sold the land to the Northampton Land Partnership who planned another housing development. However, in 1994 the Conservation Commission, with the help of funds raised by Broad Brook Coalition, purchased 147.5 acres of Cooke's Pasture for conservation land.

Through time, the land along Boggy Meadow Road has seen a variety of activities: during World War II, there were field maneuvers by National Guard units from Springfield on Cooke's Pasture and there are remains of old trenches; there was once a Boy Scout camping ground in a grassy area off Boggy Meadow Road. On the North Farms side, there was in the 1950's the Mondegas Park recreation hall established by the Corticelli Silk business for its workers on land near where a saw mill had once operated.

Recently purchased additional parcels of old woodlots have brought the total acreage of the conservation area to almost 600 acres. Thus, Northampton's upland forest and marshland has been returned to a "commons" land as a natural preserve for the enjoyment and education of present and future generations.

APPENDIX B: INVENTORY OF RESOURCES (1996)

[Note: No new inventory work has been done since 1996.]

The resources of FLCA are described below under the following headings:

I. Fitzgerald Lake
II. The Dam
III. Wetlands
IV. Forested Uplands
V. Old Pasture
VI. Access and Trails
VII. State Listed Species
VIII. Surrounding Area

I. FITZGERALD LAKE is a 40-acre mud-bottomed water body which is less than 10 feet deep for most of its area. The section near the outlet pipe may reach a depth of 15 feet. The lake is fed and drained by Broad Brook and other sources.

Cattails (*Typha latifolia*) dominate the inlet cove and several other coves. A variety of other aquatic plants ring the shoreline. There is currently at least one active Beaver (*Castor canadensis*) lodge on the lake. Muskrat (*Ondatra zibethicus*) and River Otter (*Lutra canadensis*) have been sighted on the lake, and a variety of upland mammals visit the edge of the lake. Painted Turtles (*Chrysemys picta*) and Water Snakes (*Nerodia sipedon*) are two of the most common reptilian inhabitants of Fitzgerald Lake. Birds found at the lake are diverse, and include Canada Geese (*Branta canadensis*), many species of ducks, Great Blue Herons (*Ardea herodias*), and Osprey (*Pandion haliaetus*). Yellow Perch (*Perca flavescens*) and Pumpkinseeds (*Lepomis gibbosis*) are some of the fish that are common in the lake.

The lake is used for fishing (from shore, non-motorized boats, and ice), canoes and other small boats, ice skating and cross-country skiing, and general passive enjoyment.

II. THE DAM containing Fitzgerald Lake at its eastern end was built in the 1960s . Classified as a low hazard dam, it is an earth impoundment about one acre in size with a metal riser, pipe, and valve to control the water level which is kept constant. There is also a spillway on the north side. Annual brush cutting on the dam has been carried out to prevent tree roots from damaging the integrity of the structure. The dam is inspected periodically by the Dam Safety office of the Department of Environmental Management. The spillway was completely reconstructed in 1997.

III. A variety of WETLANDS are a prime resource of FLCA. Areas that are currently or periodically flooded by Beaver activity cover an extensive swath downstream of the lake. A large portion of this wetland is cattail marsh, with other large areas of Tussock Sedge (*Carex stricta*) along with Meadowsweet (*Spirea latifolia*) and Red Maple (*Acer rubrum*). Two pockets of Common Reed (*Phragmites communis*) have also become established along the edge of the cattail marsh. An area of open water with the dead trunks of flooded trees makes up another portion of this wetland.

Near the northern end of FLCA where King's Brook joins Broad Brook from the west, is another wetland that was flooded by Beaver activity up until a few years ago. Currently a muddy flatland with little vegetation, it will become a vegetated wet meadow unless beaver return. A small Great Blue Heron rookery has existed at the eastern end of this section.

The area southwest of Fitzgerald Lake is a patchwork of old pasture, emergent wetland, and forested wetland. The emergent wetland, an acre or two in size, is predominantly Reedgrass (*Calamagrostis*) interspersed with Silky Dogwood (*Cornus amomum*), Willows (*Salix spp*.), Joe-Pye Weed (*Eupatorium spp*.), and Virgin's Bower (*Clematis virginiana*). The forested wetland is dominated by Speckled Alder (*Alnus rugosa*), Poison Sumac (*Rhus vernix*), and Red Maple. Black Bear (*Ursus americana*) come to this area in early spring to feed on Skunk Cabbage (*Symplocarpus foetidus*).

In the vicinity of Boggy Meadow Road lie two separate small wetlands bordering seasonal streams. The Four-toed Salamander (*Hemidactylium scutatum*), a state-listed species of special concern, was found breeding here in sphagnum moss mounds.

Four vernal pools at FLCA have been certified through the Natural Heritage Program of the Massachusetts Division of Fisheries and Wildlife. Certification provides a limited amount of protection to these important habitats. Three of the certified vernal pools lie in a cluster just north of the Fishing Place Trail, and the fourth lies southwest of the junction of the Lake Trail and the Narrows Trail. Breeding by Spotted Salamanders (*Ambystoma maculatum*), Jefferson/Blue Spotted Salamanders (*A. laterale*), Wood Frogs (*Rana sylvatica*), and Fairy Shrimp (order *Anostraca*) has been documented in these pools. Additional vernal pools in FLCA have yet to be certified: one along the now-closed entrance road from North Farms; a few in the Pine's Edge parcel; one about one hundred yards west of the old telephone line near the height of land; and possibly the pool in the center of Cooke's Pasture.

IV. The majority of land at FLCA is FORESTED UPLANDS that are all quite rocky. In the higher, drier sites the dominant species are mostly Red Oaks and White Oaks (*Quercus rubra, Q. alba*) and Hickories (*Carya spp*.), with an understory of Mountain Laurel (*Kalmia latifolia*), Witch Hazel (*Hamamelis virginiana*), and other shrubs. In moister sites maples (*Acer spp*.), Eastern Hemlock (*Tsuga canadensis*), and White Pine (*Pinus strobus*) are common.

Most of this forest is between 65 and 125 years old, but there are two areas of notable exception. The parcel just north of the tributary of Broad Brook at the extreme northern end of FLCA was heavily logged in 1990. Sparse Red Maple and White Pine and a few white oaks remain in the canopy. In the undergrowth are sprouts of Black Birch (*Betula lenta*) and Mountain Laurel in a tangle of sun-loving, disturbance species including Fireweed (*Erechtites hieracifolia*) and Blackberry (*Rubus allegheniensis*). Another section of forest was burned in the 1980s, and these 10+ acres are now resprouting with Mountain Laurel, Witch Hazel, oak, Red Maple, Highbush Blueberries (*Vaccinium corymbosum*), American Chestnut (*Castanea dentata*), and Sweet Fern (*Comptonia peregrina*).

Although conservation areas in Northampton are generally closed to hunting, it is permitted in the Abuza section of FLCA . This parcel was acquired by the city under the condition that hunting be allowed there. As per state law, there still exists a 200 foot no-hunting zone along trails.

As is typical of oak forests in Massachusetts, there is evidence that Gypsy Moths (*Lymantria dispar*) are present in low numbers now. Periodic population explosions of this insect can be expected, causing defoliation of trees for one or two years.

V. There are two areas of OLD PASTURE at FLCA. Abandoned as pasture about thirty years ago, woody vegetation has been returning to these areas. One of these, Cooke's Pasture, covers about 10 acres to the east of the lake. During the winter of 1996-97 cutting was begun to restore this to non-forested habitat. Some areas of 10–12" dbh white pines remain to be cut along the edges, but in most of Cooke's Pasture all woody vegetation has been cut with the exception of a few Apple (*Malus spp*.) and Crabapple (*Pyrus spp.)* trees, and other shrubs and trees that border wetlands.[2]

South Pasture is the area of abandoned pasture that lies south of the lake. It was cleared in the past two to three years. The edges of South Pasture remain densely overgrown with Multiflora Rose (*Rosa multiflora*), which could probably be eliminated and replaced with native food-producing shrubs. If the adjoining old pasture on the abutter's property to the south were included, the acreage of this section would be about doubled.

VI. ACCESS to a four mile network of maintained TRAILS is from three entrances: a city-maintained parking lot on North Farms Road, a right-of-way on Marian Street, and Boggy Meadow Road, which begins at the end of Cooke Avenue. The North Farms Road parking lot, with space for eight cars, including one space reserved for handicapped parking, is considered the primary entrance. A 1/4-mile paved, wheelchair-accessible path leads from the parking lot to a 500 foot boardwalk and canoe launch at the west end of the lake. With the exceptions of this path and Boggy Meadow Road, all trails are designed for use by pedestrians only. They are marked with paint blazes on trees.[3] Many of the trails have wooden bog bridges and/or stepping stones installed to prevent trampling of wet areas. Trails are also used by cross-country skiers and snowshoers, mountain bicycles, and occasionally horseback riders, ATVs, and snowmobiles. Mountain bikes and horses have caused damage to some sections of trails, especially the Fitzgerald Lake Trail. Other than Boggy Meadow Road, motorized vehicles are illegal.

VII. There are some STATE LISTED SPECIES with current and/or historical records of occurrence at FLCA. There are historical records of two rare plants in Cooke's Pasture. Bush's Sedge (*Carex bushii*) is a plant of open, wet, meadows, and the Pendulous Bulrush (*Scirpus pendulous*) is usually found in calcareous fens, a wetland type that is not part of FLCA. Both plants were found in 1983 by Bruce Sorrie, a botanist with the Massachusetts Natural Heritage Program. In 1994 another search was conducted

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[2] Prior to cutting, the perimeter of Cooke's Pasture was forested in early successional tree species, especially White Pine and Aspen (*Populus* spp.). The interior was a mixture of shrubs like Speckled Alder, Hawthorne (*Crataegus* spp.), Silky Dogwood, Winterberry (I), and glossy and buckthorns (*Rhamnus frangula* and *R. cathartica*); herbaceous plants including Goldenrods, (*Solidago* spp.), Dewberry (*Rubus* spp.), and asters (*Aster* spp.); grasses; and isolated White Pines and Red and White Oaks. Quite a few Crabapple and Apple trees also grew throughout the old pasture area.

[3] During the fall of 1996, BBC hired an intern who completed designs and secured funding to improve visitor information at FLCA. This consists of map and information boards for each of the 3 entrances, a brochure including a trail map and regulations, and a self guided interpretive nature trail near the North Farms Road entrance. These were installed in 1997–1998.

for both species by the MNHP. This time, only the Pendulous Bulrush was found. A third search was conducted on June 26, 1996, by Dr. David Lovejoy, of the Department of Biology at Westfield State College, Leslie Duthie of the Norcross Wildlife Sanctuary in Monson, and Bill Schafer and Monica Jakuc, BBC members. Neither plant was found on this search. It is possible that habitat changes in Cooke's Pasture created unfavorable conditions for these species.

[Note: In July of 1999, Savannah Cutter, Laurie Sanders, and Leslie Duthie rediscovered two clumps of Bush's Sedge in Cooke's Pasture. It appears that the clearing of Cooke's pasture allowed this species to reappear. Prior to the clearing, the the plant was probably so shaded that it could not flower or fruit. This discovery underscores the importance of maintaining habitats.]

The MNHP has records of Spotted Turtles (*Clemmys guttata*) at FLCA. This is ranked as a species of special concern. Also in the spring of 1996, BBC members Molly Hale and Sara Griesemer found breeding Four-toed Salamanders (*Hemidactylium scutatum*), another Species of Special Concern.

VIII. Ecologically, FLCA has numerous intricate ties to the SURROUNDING AREA. Surface and ground water flows across boundaries, and all the larger species of wildlife depend on resources outside the conservation area. The value of the protected lands and waters within FLCA is affected by the relative uniqueness of these habitats elsewhere. The condition of THE SURROUNDING AREA has a fundamental influence on the quality of habitat and diversity of species that FLCA can support. FLCA is in the lightly developed northeast corner of Northampton. The predominantly oak forest type in FLCA continues several miles to the north, well into Hatfield, and also in a large area west of North Farms Road. This latter forested area is the source of Broad Brook, which flows across private and U. S. Veterans Administration Hospital land before crossing North Farms Road and entering Fitzgerald Lake. Except for the Pines Edge condominiums and the North Farms Road/Country Way neighborhood, there is currently an undeveloped buffer between the FLCA and developed sections of the city. However, about half of the watershed of Fitzgerald Lake and of the downstream reaches of Broad Brook is developed in urban uses. Most of this use is single family homes, but other uses include agricultural (pasture and corn), two cemeteries, a middle school, and a recreation field. Broad Brook empties into Running Gutter Brook, which then flows into the Mill River in Hatfield, and finally into the Connecticut River. From the point where Broad Brook leaves FLCA, it is only a little over three miles to the mouth of the Mill River.

There are several ecologically sensitive sites surrounding FLCA. An isolated peat wetland about an acre or two in size is located about 200 yards south of FLCA on Fitzgerald family property. Laurie Sanders reports at least four feet of peat here. Scattered Tupelo (*Nyssa aquatica*) and Swamp White Oak (*Quercus bicolor*) grow along the margin, and two Pitch Pines (*Pinus rigida*) grow within the wetland. Sanders also reports finding here Willow Herb (*Epilobium spp*.) and one cluster of Virginia Chain Fern (*Woodwardia virginica*), only the second known location in Northampton. A Spotted Turtle was also found in this location in the spring of 1996 by Molly Hale. [Note: Hale verified that Spotted Turtles were living in this peat wetland as of 1999.]

A large vernal pool on the Vollinger property northwest of FLCA is also significant. Wood Frogs and Spring Peepers (*Hyla crucifer*) breed abundantly here, as do Spotted Salamanders and the Jefferson/Blue Spotted Salamander complex. Although

there are historical records for Marbled Salamanders (*Ambystoma opacum*) here, none were found by Laurie Sanders in 1993, or in spring 1996 by Molly Hale, Monica Jakuc, and Dr. Stephen G. Tilley, a herpetologist at Smith College. This pool is also used by Wood Ducks (*Aix sponsa*) and Mallards (*Anas platyrhynchos*). Another large vernal pool is located north of the conservation area, before the Hatfield line, and just east of the telephone right-of-way. A third vernal pool is in a depression that was once a lead mine, about 200 yards west of the peat wetland described above. [Note: This is now a certified vernal pool.]

Another nearby site of conservation value is a large forested wetland between the northern section of FLCA and Cole's Meadow Road. This is a rich seepy swamp forest with braided streams and abundant Skunk Cabbage. It is also an excellent foraging area for Black Bears in the spring.

[Note: Two other vernal pools exist near the Pines Edge section, according to Molly Hale.]

Two parcels of abutting land have conservation restrictions. The Anciporch property, which forms a link between the Pines Edge section and the rest of FLCA, is federally classified as Forest Legacy land, which protects the property from development. This property contains a large scrub-shrub wetland, that is a likely site for both Spotted Turtles and Four-toed Salamanders, plus numerous other species. Another protected parcel abutting Boggy Meadow Road is owned by the Lathrop Community. In exchange for constructing a cluster development along Bridge Road, the back portion of the property has a conservation restriction that prohibits development there.

APPENDIX C: INVASIVE PLANT REMOVAL

Sources used in making these recommendations include articles from the Natural Areas Journal on guidelines for managing Multiflora Rose[1,2], buckthorns[3], and Bittersweet.[4] Reprints of these materials were provided by The Nature Conservancy as their recommendations for dealing with these species. John Scanlon, consulting forester and wildlife biologist for the Massachusetts Department of Fisheries and Wildlife, also provided recommendations similar to those in the above sourcesMost sources recommend the use of glyphosate, a nonspecific herbicide, in the form of Roundup (non-wetland use) and Rodeo (wetland use).[5] This section has not been updated since the previous management plan.

1. Multiflora Rose

Recommended method: Cut down clumps either by hand or with machinery such as the "hydro-axe" used by some tree service companies. The cutting should be done in July–September or in the dormant season (when the leaves of most deciduous plants have fallen and herbaceous plants have died). The dormant season is preferred for the application of Roundup because this season minimizes potential harm to nontarget species. Immediately after cutting, a 10 to 20% solution of Roundup should be applied to the cut stems with either a sponge applicator such as a sponge "paint brush" or a low pressure hand-held sprayer. This will kill the root system and prevent resprouting. New sprouts from seeds will still need to be controlled the following season, but these can probably be manageably cut by hand.

Alternative method: As an alternative to herbicide treatment, "three to six cuttings or mowings per growing season for more than one year can achieve high plant mortality. Such treatment may need to be repeated for two to four years. Repeated cutting is preferred over mowing, because repeated mowing will damage native vegetation as well as Multiflora Rose."[1]

2. Exotic Buckthorns

Recommended method: Cut stems or trunks and follow by an application of Roundup. Cutting should be done in the fall after other plants have lost their leaves but leaves are still on buckthorn. This timing minimizes impact on nontarget species and also makes the buckthorns easier to locate. Immediately after cutting, a 50% solution of Roundup should be carefully applied to the cut surface with a sponge applicator or a hand sprayer as described for Multiflora Rose. This treatment will probably have to be repeated over several years as new sprouts grow from seeds. In wetland areas, Rodeo should be substituted for Roundup, again with a 50% solution.

Alternative method 1: Cut stems or trunks and clip re-sprouts as they occur. This will have to be done several times in a growing season, as new sprouts can develop quickly.

Alternative method 2: Burning is an effective method of controlling buckthorn. The earlier management plan did not recommend burning in the Fitzgerald Lake area for several reasons. First, this is not a fire-adapted ecological community. Second, much of the buckthorn is in areas that have developed into second-growth forest, which would be

difficult to burn safely, and would be adversely affected by burning. Third, the proximity of the southern side of Fitzgerald Lake, where the most buckthorn exists, to a residential area, presents potential safety and public relations problems.However, controlled burning still remains a possible approach if it can be done in such a way as to avoid the problems above.

3. Purple Loosestrife

Recommended method: Hand pulling of small infestations of one- to two-year-old plants before they set seed, and spot treatment of older plants with non-selective herbicide such as Rodeo for aquatic communities or Roundup on terrestrail sites. If herbicides are used, they are most effective when sprayed in the late summer or early fall, but repeated use is costly. Due to a strongly developed taproot, removal by digging is not recommended since the disturbance may encourage proliferation. Biological controls, such as a species of beetle that eats this plant, are also a possibility

4. Bittersweet

Recommended method: Pull up by the roots. If this is impossible, cut stems and apply Roundup in a 100% solution to the cut stems using a sponge applicator or hand sprayer (see Multiflora Rose). This application should be done in spring after the last killing frost and before emergence of spring ephemeral plants, which may be killed by the poison.

5. Phragmites

Recommended method: Hand cut the stems just after it goes to seed (August/September) when it's at its weakest. Carefully carry out all cuttings as the plants can easily re-establish themselves by cuttings or seeds. Just before frost, use a fine-nozzle squirt bottle with 10% by volume Rodeo to squirt some into the hollow stem. It will get carried down to the rhizome to kill the plant. The Rodeo is then degraded by bacteria in a fairly short time so it is not residual, and it is very specific to the Phragmites.

6. Japanese Knotweed

Recommended method: Treatment of Japanese Knotweed is a lower priority than the other invasive species because although this plant is extremely difficult to eradicate, it is not spreading very fast. However, treatment of this species could be easily included when other invasives are being treated. Use treatment similar to that for Phragmites. The plants should be repeatedly cut during the growing season and then before frost, Roundup should be applied as described above.

Once an invasive has been removed from an area, reseeding with native species will help prevent the cleared area from merely growing back into another stand of invasives or of opportunistic annual weeds. Reseeding with plants known to produce food for wildlife will also have a positive effect on species diversity.

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1. Szafoni, R. E. 1991. Vegetation management guideline: Multiflora rose: (Rosa multiflora Thunb.). Natural Areas Journal 11(4): 215-216.
2. Evans, J. E. 1983. A literature review of management practices for Multiflora Rose (Rosa multiflora). Natural Areas Journal 3(1): 6-15.
3. Heidorn, R. 1991. Vegetation management guideline: exotic buckthorns: common buckthorn (Rhamnus cathartica L.), glossy buckthorn (R. frangula L.), and Dahurian buckthorn (R. davurica Pall.). Natural Areas Journal 11(4): 216-217.
4. Hutchison, M. 1992. Vegetation management guideline: round-leaved Bittersweet (Celastrus orbiculatus Thunb.). Natural Areas Journal 12(3): 161.
5. Glyphosate is an organophosphate but unlike the other pesticides in this group, does not damage nerve function. Persistence in the environment: 1-18 months. Acute oral and dermal toxicity to mammals: moderate (1 oz. to 1 pint per 150 lb. human). Suspect carcinogen and suspect mutagen for mammals. Low immediate toxicity to bees and birds. Low to medium toxicity to fish and crustaceans. Glyphosate is soluble in water, insoluble in oil, and non-volatile.
Source: Briggs, S. A. 1992. Basic Guide to Pesticides; their characteristics and hazards. Taylor and Francis, Washington, D.C.