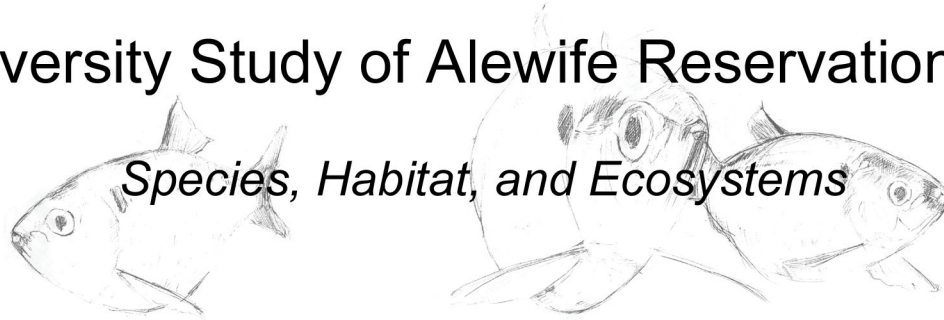




Biodiversity Study of Alewife Reservation Area



Species, Habitat, and Ecosystems

Forest Characterization Report Little Pond/Little River, Belmont/Cambridge, Massachusetts

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Purpose

The purpose of this investigation is to characterize a specific area of existing forestland in terms of forest type, forest stand composition, and relative abundance. The following report was developed through review of existing site information (both current and historical), limited field investigation, literature review, and interpretive synthesis.

Site

The subject site, approximately 25 acres in total extent, is located along the municipal border between Belmont and Cambridge, Massachusetts. The site is bounded by Little Pond on the west, Little River on the south, Acorn Park Drive on the east, and Frontage Road to the north. For the purposes of this characterization, the site is characterized without respect to property ownership.

Background Data

The site is located within the greater Boston metropolitan area, a densely developed and thoroughly urbanized mix of residential, commercial, industrial, and institutional land uses, transportation networks, and utility infrastructure. Open

space is severely limited (less than 5% land coverage) in the Upper Mystic River Watershed and the majority of this limited resource is represented by public park land, golf courses, and other forms of intensively managed open space.

A preliminary review of readily available historic resources indicates that the site itself has also been significantly disturbed. Comparisons between the Massachusetts Geological Commission (MGC) Survey map of 1903 and the US Geological Survey (USGS) topographic map of 1946 indicate that Little Pond, west of the site, had formerly been connected directly to Spy Pond, a much larger waterbody now separated from Little Pond by Route 2, a high volume, multilane, limited access highway. Little River, formerly the outlet for both Little Pond and Spy Pond, drained both waterbodies through the common connection where Route 2 is now located. Furthermore, the channel of the Little River has been relocated from its historical position at the north end of Little Pond to the south end of the pond. In addition to major hydrologic modifications, the 1903 MGC survey map also depicts significant wetlands dominating the western half of the site and extending well into the central section of the eastern half. Interestingly, these are the only wetland areas shown in immediate association with Little Pond and they do not appear on the 1946 USGS map. Both maps depict a low hill or knoll in the center of the site at elevation 10 to 20 feet above mean sea level and a roadway crossing from southwest to northeast across this low hill.

Review of floodplain maps prepared by the Federal Emergency Management Agency (FEMA) for the Town of Belmont indicate that the elevation of the 100-year floodplain at the site has been calculated to be 8.2 feet above mean sea level (NGVD—National Geodetic Vertical Datum). Generalized mapping prepared by FEMA indicates that the majority of the site is subject to flooding in the 100-year event and that only a central “island” remains above the level of the 100-year flood.

Review of soil type maps prepared by the USDA Natural Resource Conservation Service for Middlesex County, MA

indicate that the elevated central portion of the site is comprised of “Udorthents”, a catch-all category including both natural soils which have been altered and fill materials. The lower elevations to the north, west, and east are mapped as “Freetown Muck”, a deep organic deposit occurring over a variety of mineral substrates.

A substantial land development project is currently proposed for the privately owned portion of the site. Valuable additional information is available, including a topographic survey at 1 foot contour intervals, and a vegetative cover type map.

Field Observations

Elevations onsite generally reflect mapped conditions. There is a smooth low hill in the center of the site, approximately 4 to 6 acres in extent, which slopes gently (0 to 3%) downward to the north, east, and south. Along the western slope, a low, disjointed scarp of shallow excavations and/or landfilling breaks the smooth contour of the land surface. It is evident from surface observations that the north-central and west-central portions of the site have been landfilled. Farther west toward Little Pond, surface conditions appear to reflect native low-lying soil types.

Vegetation on the site, with one significant exception, is a mix of various wetland plant communities. These bottomland forest stands, scrub-shrub patches, and marshes are mixed on the landscape in a complex mosaic of habitat patches reflective of past land use and disturbance history, slope position (hydrologic variability), and, to a lesser degree, soil conditions. Along the edges of Little Pond and Little River, black willow (*Salix nigra*), weeping willow (*S. babylonica*), green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*), and red maple (*A. rubrum*) dominate a well-grown canopy at 40 feet to 60 feet. Notable also by their presence and ecological implication are several mature cottonwoods (*Populus deltoides*). Lake and river bank forest stands are interspersed with small herbaceous marsh patches of narrow-leaved cattail (*Typha angustifolia*), purple loosestrife (*Lythrum salicaria*), and buttonbush

(*Cephalanthus occidentalis*), and small patches of shrub swamp dominated by silky dogwood (*Cornus amomum*) and speckled alder (*Alnus serrulata*). Soil surface conditions here suggest that the site margins flood at least annually, if not more often.

Interior to the low, regularly flooded bank margins, a wet, bottomland forest of silver and red maple, American elm (*Ulmus americana*), and pin oak (*Quercus palustris*) dominates. This community also contains numerous native and non-native plant species that are considered to be weedy or invasive in disturbed or reorganizing habitats. These invasive plants include Norway maple (*Acer platanoides*), common buckthorn (*Rhamnus cathartica*), European buckthorn (*R. frangula*), multiflora rose (*Rosa multiflora*), and oriental bittersweet (*Celastrus orbiculatus*).

The elevated central core of the site, extending almost to Acorn Park Drive on the east, is dominated by an unusual monodominant stand of silver maple. Average diameter of canopy trees ranges from 8 inches to 10 inches at 40 feet to 50 feet in height and the stand is fully stocked at approximately 80 to 100 square feet basal area per acre. Subdominant canopy species are also uniformly silver maple trees. At its periphery, this stand is intermixed with Norway maple, red maple, black cherry (*Prunus serotina*), and, along its southern limits, pin oak and grey birch (*Betula populifolia*). In the interior of the stand however, only black cherry seedlings and small saplings compete successfully beneath the dense shade of the silver maple canopy.

In addition to mature silver maple scattered elsewhere throughout the site, the central core stand includes two or three massive, multi-trunked silver maple functioning as canopy “super-dominants”. These trees have an open-grown form and appear to have been in existence since the immediately adjacent areas in the elevated central core were open field or cropland. These “wolf trees” are a likely seed source for the uniform and apparently even-aged stand of silver maple now dominating the central core.

Interpretive Review

The mixed hardwood forest communities along the pond and river margins are dominated by a common wetland or floodplain association identified as Northern Floodplain Forest or, more recently, ash-elm-maple forest type. Although under significant stress from invasive or non-native species, the mixed association of forest stands, scrub-shrub wetlands, and small marshes provides a diverse patchwork of habitat types with value for a wide variety of urban and suburban wildlife species.

The site exhibits evidence of a long and varied disturbance regime. The presence of a roadway across the site and, as mapped in 1903, buildings onsite suggest that past land use here was likely more intensive. The flat, glacially derived clay lands around the perimeter of the Boston Basin were, in many areas, intensively cultivated market gardens. Literature citations of 130 to 150 years were given for the likely maximum age of silver maple.

From forest evidence alone, the presence of an unusual stand of silver maple at the highest points in the study site suggests that floodplain or wetland dynamics formerly persisted at higher elevations than at present. Silvicultural data to support this conclusion include literature references documenting that (1) natural regeneration of young silver maple seedlings is most successful on seedbeds of moist, mineral soils with considerable organic matter, (2) Growth of young trees is seriously affected by competition from other vegetation, (3) silver maple generally cannot compete with other species in upland, and (4) the species is usually found in mixed hardwood stands.

In addition to the generally recognized values of habitat diversity and the significant value of remnant forest fragments in an urbanized landscape, silver maple provides some notable species-specific wildlife habitat values as well. The buds of silver maple provide a vital link in the food chain of squirrel populations. The early swelling and budburst characteristics of the species come during the critical late winter-spring period when stored food supplies of squirrels

are exhausted. Local studies conducted on floodplains in the province of New Brunswick show that the species ranks far above other dominants on wet, mesic sites as nesting trees for wood ducks and goldeneye ducks. Silver maple ranks high as a food source for beavers and, according to availability, it is exceeded only by common alder in importance.

Conclusions

The site contains a thoroughly interspersed mixture of wetland and floodplain habitat types of varying ages developed in response to landscape position, hydrologic, and edaphic factors, and disturbance history. Forest composition is generally compatible with a history of post-agricultural uses, but portions of the site have been significantly altered in response to hydrologic modifications and landfilling. Currently, the site is most appropriately described as reorganizing “major floodplain swamp”. The dominance of silver maple and the continuing presence of cottonwood as a viable colonizer and canopy species are the determining factors.

The presence of a significant stand of silver maple, in association with a variety of dynamic lower elevation wetland plant communities, is highly unusual, especially in the landscape context of a densely developed urban watershed. In general, comparable sites within the Boston Basin are, if present at all, extremely rare. In this specific context, the upper reaches of the Mystic River watershed, this site is unique.

The floodplain forest present at this site retains, in spite of and possibly because of its history of disturbance, a broad suite of environmental functions and values. Flood storage, flood desynchronization, water quality attenuation, and wildlife habitat functions appear to have both local and regional value and the possibility for additional heritage value, recreational value, and educational value cannot be overlooked. Fragmentation of the reorganizing forest remnant on the site is not likely to have a positive impact on any of the environmental functions and values present.

Trees & Shrubs

Indicator	Genus & species:	Common name
FAC+	<i>Acer negundo</i>	Ash-Leaf Maple
UPL	<i>Acer platanoides</i>	Norway Maple IN.
	<i>Acer pseudoplatanus</i>	Sycamore-Maple
FAC	<i>Acer rubrum</i>	Red Maple
FACW	<i>Acer saccharinum</i>	Silver Maple
FACU-	<i>Acer saccharum</i>	Sugar Maple
FACU-	<i>Ailanthus altissima</i>	Tree-Of-Heaven IN.
NI	<i>Alnus incana</i>	Speckled Alder
FAC	<i>Aronia melanocarpa</i>	Black Chokeberry
FAC	<i>Betula allegheniensis</i>	Yellow Birch
FACU	<i>Betula lenta</i>	Black Birch
FACU	<i>Betula papyrifera</i>	Paper Birch N.
FAC	<i>Betula populifolia</i>	Gray Birch
	<i>Carya sp.?</i>	Hickory
FACU	<i>Celastrus orbiculatus</i>	Oriental Bittersweet IN.
FACU-	<i>Celastrus scandens</i>	American Bittersweet
OBL	<i>Cephalanthus occidentalis</i>	Buttonbush N.
FACU	<i>Celtis occidentalis</i>	Northern Hackberry
FAC+	<i>Clethra alnifolia</i>	Sweet Pepper-Bush

Trees & Shrubs

Indicator	Genus & species:	Common name
	<i>Comptonia peregrina</i>	Sweet Fern
FACW	<i>Cornus amomum</i>	Silky Dogwood
FAC-	<i>Cornus racemosa</i>	Gray Swamp Dogwood
	<i>Cornus rugosa</i>	Round Leaf Dogwood N.
FACW+	<i>Cornus sericea</i>	Red Osier Dogwood N.
FAC	<i>Crataegus phaenopyrum</i>	Washington Hawthorn
	<i>Cynanchum nigrum</i>	Black Swallowwort IN.
	<i>Elaeagnus umbellata</i>	Autumn Olive IN.
	<i>Euonymus alata</i>	Winged Euonymus IN.
FACU	<i>Fagus grandifolia</i>	American Beech
	<i>Fagus sylvatica</i>	European Beech
FACU	<i>Fraxinus americana</i>	White Ash
FACW	<i>Fraxinus pennsylvanica</i>	Green Ash
FAC-	<i>Gleditsia triacanthos</i>	Honey-Locust
FACW+	<i>Ilex verticillata</i>	Winterberry
FACU	<i>Juglans nigra</i>	Black Walnut
FACU	<i>Juniperus virginiana</i>	Eastern Red Cedar

Indicator = Indicator Category (see page 30).

N. = Native, *I.* = *Introduced*, **IN.** = **INVASIVE**