3 IMPLEMENTATION

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A. DESIGN PROCESS AND PRIORITIES

This Master Plan makes recommendations for the restoration of the Alewife Reservation and the Alewife Brook and its adjacent parkland. It will serve as a framework for the more detailed design stages currently underway. The conceptual ideas described herein will be modified and refined, as the design moves toward construction documents. Critical Reservation resources such as plant and animal habitat will be revisited to ensure that they are considered, enhanced, and protected in the final design. The MDC will provide citizens with opportunities to respond as these detailed plans take shape.

DESIGN PROCESS

1. *Master Plan Stage:* Visionary plan for the whole area and conceptual designs for selected sites are produced.
2. *Design Development Stage:* Design elements are refined for certain areas and developed to a higher level of specification. Preliminary cost estimates are produced.
3. *Construction Documents Stage:* Designs are worked out in detail using drawings, technical written specifications, and a detailed cost estimate allowing the recommended restoration designs to be build by a qualified contractor.

Metropolitan District Commission planners identified priorities for implementation within the project area at the outset of the Master Plan process. These areas include the Little Pond area, the former ADL parking lot, and the greenway along the west bank of Alewife Brook, and to ensure continuity, a segment on the east side between the Henderson Bridge and Broadway. However, the MDC is committed to implementing all the recommendations put forward in this document to the extent funding allows. Funding to bring the design for the greenway along the west bank to a more detailed level has been secured. The MDC is now seeking funding for 100% design and construction documents, specification preparation, and funds for the actual construction that will reclaim and rehabilitate this area, as well as additional funds for the design development stage for the other two priority areas. This will be a phased program requiring determination and continued support from the public, constituents, and elected officials.

In addition to design and implementation of the three MDC priorities, two other major projects in the Reservation area are moving forward. One is the design of a stormwater wetland in the Reservation south of the Little River. This project by the City of Cambridge and the Massachusetts Water Resource Authority in conjunction with the MDC is described in more detail in Section 4A. The work is being closely coordinated with the Master Plan team to ensure consistency with the goals and objectives defined in this Master Plan for the Alewife Reservation. The improvements this project will bring to the southern Reservation will be significant. If these improvements were not in process, this southern section of the Reservation would be among the MDC's top priority areas listed above.

The second project is the development of the Belmont Uplands adjacent to the Reservation

Figure 69: The greenway west of Alewife Brook is one of the three priority areas identified and will undergo detailed design in the next phase of planning.

by O'Neill Properties (see Section 4A for more detail). While there is significant opposition to the Belmont Uplands development by those concerned with the ecological impacts of this project, the developer has discussed some mitigation options with the MDC.

Although the MDC opposes the development of any remaining open space around Alewife, there are currently limited resources to purchase these private lands. Given this reality the MDC has worked with O'Neill Properties and the town of Belmont to provide as much protection and mitigation for the Reservation as possible. Among the numerous beneficial results will be a gift from O'Neill Properties to the MDC of a permanent Conservation Restriction for approximately 7.8 acres of upland and wetland habitat abutting the Reservation.

B. SCHEDULE

The time frame for implementation of the recommendations identified in this Master Plan depends on available funding for the necessary design and construction activities (refer to Section 3D for potential funding sources). The MDC anticipates a 10- to 20-year design and implementation process for this Master Plan. Full implementation for the three priority areas is expected to be possible within a 5-year

5-YEAR ACTION PLAN

Spring 2003- Spring 2004:
Design development and 100% construction documents for West Bank Greenway (area west of Alewife Brook)

Starting 2004:
Design development and construction documents for ADL parking lot and Little Pond

Starting 2004-2008:
Construction of restoration recommendations starting with West Bank Greenway, followed by ADL parking lot, and Little Pond in phases as funding becomes available

Starting Fall 2003:
Design development followed by construction documents for stormwater wetland south of Little River (by others with MDC coordination)

2004/2005:
Anticipated construction of stormwater wetland and associated recreational and educational features such as boardwalks and gathering area south of Little River in Alewife Reservation (by others with MDC coordination)

Starting 2005-2008:
Design for remaining areas in the Reservation, especially restoration of Wellington Brook and supplementation of boardwalk and path system as well as de-channelization of Alewife Brook between Route 2 and Henderson bridge, restoration of the cattail marsh, and restoration of the east side of the Parkway including redefining the Parkway edge with tree planting, historic lighting, etc.

period. Recommendations that require more extensive study and modeling regarding their feasibility, design development and construction (labeled as long-term recommendations in Section 2C) are not expected to be fully implemented within the 5-year time frame.

The development of the design for the identified priority areas will be the next step in the planning process and is expected to be completed by the summer of 2004. Partial funding is already secured for this phase of work.

A 5-year action plan follows, based on the assumption that funding can be secured and permits can be obtained in a timely manner. All those actions will either be executed by the MDC or implemented under close coordination with the MDC and with MDC's Master Planning team. Actions will be consistent with the goals and objectives put forth in this Master Plan.

C. BUDGET

Cost estimates will be prepared for implementing the conceptual designs and Master Plan recommendations. Recent restoration projects of similar size cost roughly one million dollars per mile of greenway. However, restoring a natural channel to the Alewife Brook will raise the cost of improvements along the Alewife Brook Corridor significantly. The MDC is eager to identify other agencies or businesses that share an interest in the restoration of the Alewife area. For example recent negotiations have been conducted by MDC Planning with the City of Cambridge and O'Neill Properties to fund design and construction of portions of proposed work within the Reservation and within the 7.8 acre Conservation Restriction to be gifted to the MDC by O'Neill Properties (see Section 4A for details).

D. FUNDING SOURCES

The phased implementation of this ambitious, ecologically oriented Master Plan will require ongoing support and adequate funding. Given the present fiscal climate, it is unlikely that restoration and enhancement of the Alewife Reservation and Alewife Brook corridor can be accomplished solely by support garnered from state funding of the MDC. There must be continued creative exploration by the MDC for alternative funding, new productive partnerships, and continued public support.

FIGURE 70. Biodiversity Days 2002. From right to left: Mayor Sullivan, Ellen Mass of FAR receiving $2000 Riverways Inventory Grant check from former Secretary Bob Durand, Representative Alice Wolf, Representative Anne Paulsen, Representative Jim Marzilli

D1. Public Sector Sources

State and Federal Programs

Sources of potential state-level support include other state agencies that manage state parks, establish wetland mitigation banks, restore fish and game populations, do transportation planning or river management, or have environmental and public health concerns. The Commonwealth of Massachusetts passed a $750 million bond bill in 2002 to support environmental capital projects such as these.

Federal funding opportunities include the US Department of Transportation (USDOT), the US Army Corps of Engineers (USACE), the US Environmental Protection Agency (USEPA), the Federal Emergency Management Agency (FEMA), the US Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS). Recommended ecological restoration projects (e.g., construction of a wetland on the site of the former ADL parking lot and dechannelization of Alewife Brook) will require significant funding. One viable funding source for such projects is the ecosystem restoration program administered by the USACE that is described in Section 206 of the Water Resource Development Act of 1996. This program provides funds for ecosystem restoration projects up to five million dollars, with a cost-sharing plan that asks the project sponsor to share 35% of the cost total. The USACE carries the remaining 65%. The USACE has shown interest in the past in the restoration of the ADL parking lot, Alewife Brook, and the cattail marsh and has included these sites among others in the proposed Massachusetts and Cape Cod Bay Ecosystem Restoration Feasibility Study.

Construction of past and recent MDC greenway restoration projects was mainly possible through funding from the federal TEA-21 program. The TEA-21 program derives from the Intermodal Surface Transportation Equity Act (ISTEA) authorizing funding of a wide variety of transportation infrastructure projects, including improvements to public greenways. The MDC plans to seek TEA-21 funding for the proposed greenway development on the west bank of the Alewife Brook. This will create a vital link in the regional path network and provide extensive ecological rehabilitation of the Alewife Brook corridor.

Public Agency Joint Ventures

Many of the local, state and federal agencies listed above should be approached to formalize working partnerships that are mutually beneficial to both the MDC and the respective public service mandate of the partnering agency. One such current initiative is the coordination and planning effort between the MDC, the City of Cambridge's Department of Public Works and the Metropolitan Water Resources Authority (MWRA) to create a stormwater wetland on a portion of the Reservation. The project will benefit wildlife and the park user, and will help alleviate serious pollution presently entering the Little River and Alewife Brook through combined sewer overflows (CSO).

Public Finance

Some of the most successful wetland and river corridor restoration projects in the country have obtained a large funding base through local voters approving a special bond to manage the specific project. Another approach being used elsewhere in the country involves establishment of a stormwater user fee through which residents and businesses are charged relative to the amount of runoff that leaves their properties. Adoption of such a program for the Alewife watershed could help sustain supplemental funding of options discussed above.

D2. Private Sector Sources

Private sector sources should be regarded more as supplemental funding sources since they are generally capable of generating limited resources compared to federal or state funds. Nevertheless they represent an important funding source, for example, for small-scale educational or interpretive projects.

FIGURE 71. A recent fundraising event in November 2002 for an environmental mural received broad support, from community members to state officials. From left to right: MDC Project Manager Dan Driscoll, Naturalist Peter Alden, Massachusetts Governor Mitt Romney.

Foundation and Individual Grants

Under federal and state tax laws, companies and individuals can receive tax benefits by donating some of their wealth to nonprofit charitable organizations (e.g., a community-based land trust). Creating such an entity for the Alewife area would be one way to raise funds for land acquisition, Reservation enhancements, and seasonal maintenance.

Special Events and Fundraisers

Many opportunities exist for creating public interest and financial support for ongoing restoration and enhancement efforts within the Alewife Reservation and Alewife Brook Greenway corridor. A recent event organized by the Friends of the Alewife Reservation (FAR), in which Massachusetts Environmental Secretary Robert Durand began the state-wide Biodiversity Days campaign from the banks of the Little River, brought helpful attention to the area. Similar opportunities exist for engaging government officials, the public, and businesses to raise visibility and support for the Alewife

Reservation and Brook. The highly successful Mystic River Run, in which joggers symbolically follow the spawning run of alewife upstream to the race finish line is another engaging, easily adaptable model for mobilizing public support through recreation and education.

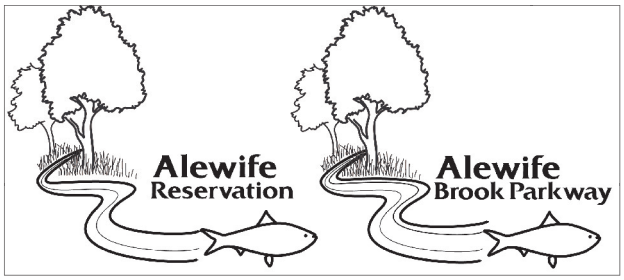

FIGURE 72. The Alewife logo can be used on signs, clothing, brochures, and other items to help raise public awareness of and commitment to restoring the Alewife area.

Abutting Business Contributions

The Alewife Reservation and Alewife Brook are fringed by numerous abutters including apartment complexes, retail businesses, industries, and commercial office spaces. These institutions should be solicited to help sponsor restoration improvements along the particular section of the MDC lands to which they are adjacent. The strategy employed would be to establish an "adopt a wetland/greenway" program in which site improvements in the immediate area would be credited to the sponsoring group in a newsletter or some other form of public notification.

Neighborhood Business Contributions

Restoration of the Alewife Reservation and Alewife Brook Greenway will provide numerous economic benefits to the area. Green space has been shown to positively affect local communities by providing amenities that attract people to live and work in these communities. Proximity to open space increases property values. Opportunities for ecotourism and recreation generate economic benefits for area businesses, which create jobs and income for local residents. Attempts should be made to engage those businesses that are situated within walking distance of the MDC lands. MDC and support groups should encourage good corporate citizenship through supporting the overall neighborhood improvements that will ensue through implementation of the Master Plan.

Merchandise Sales

Revenue might also be generated by community groups through the sale of products such as clothing sporting the Alewife logo, field guides to the flora and fauna of the Alewife area, and maps of trails and other points of interest for pedestrians and cyclists.

E. REQUIRED PERMITS

Permits are required whenever proposed work may affect environmentally sensitive areas such as water bodies, wetlands, floodplains, rare or endangered species habitat, historic and archeological sites, and sites with hazardous materials. Some federal, state and local agencies will need to review and/or permit components of the Master Plan prior to construction. Plan implementation may fall under the jurisdiction of the following policies and regulations.

Clean Water Act, Section 404 and Rivers and Harbors Act of 1899, Section 10. (33 USC 401-426; 40 CFR 230). This act controls discharges of dredged or fill material in wetlands and water bodies in order to restore and maintain the chemical, physical and biological integrity of US waters (federally defined wetlands and water bodies). Section 10 of the Rivers and Harbors Act requires coordination with and approval by USACE for dredging in US waters and/or construction of structures in US waters.

Clean Water Act, Section 402 and the National Pollution Discharge Elimination System (NPDES). (33 USC 1342; 40 CFR 122-125, 131, 14 CMR 3.00.) This act sets standards for point and nonpoint discharges of wastewater into surface

water bodies and sets ambient water quality criteria that must be met. It also sets forth a process by the US Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MADEP) for granting General Permits, Group Permits and Individual Permits. In Massachusetts, the USEPA issues permits and the MADEP certifies permit conditions.

Massachusetts Environmental Policy Act. (30 MGL 61; 301CMR 11.00.) This policy is the state equivalent of the National Environmental Policy Act. It sets forth a process of environmental impact analysis and public review of state projects. It is applicable to projects directly undertaken by state agencies; private projects seeking permits, funds or lands from the state; and any projects that will dredge, fill or alter more than 1 acre of wetland. (It does not apply to private projects requiring local approval only.) Review is based upon an Environmental Notification Form and/or Environmental Impact Report. Upon approval by the MA Office of Environmental Policy Act, the project is issued a Certificate.

Massachusetts Water Quality Certification for Discharge of Dredged of Fill Material, Dredging, and Dredged Material Disposal in Waters of the US within the Commonwealth. (21 MGL 26-53; 314 CMR 9.00.) These regulations outline procedures for the Massachusetts administration of the Clean Water Act Section 401 for discharges in US waters within Massachusetts. Discharge is not permitted if there is a practicable alternative with less adverse impact on aquatic ecosystems. Potential adverse impacts to wetlands and land under water must be minimized and mitigated. Activities must comply with State Surface Water Quality Standards. A Water Quality Certification is required when a federal permit (Clean Water Act 404/Section 10) is needed for filling wetlands or waterways. Projects with impacts to areas less than 5,000 square feet are reviewed and approved by the local Conservation Commission. Projects with impacts on areas more than 5,000 square feet are reviewed by the MADEP Division of Water Quality Control and are issued a Major Water Quality Certification.

Massachusetts Public Waterfront Act and the Waterways Licenses Law. (91 MGL 1.00 et seq.; 310 CMR 9.00.) This act defines private property rights in tidal areas to mean low water. It defines public access rights to tidal land between mean low and mean high water for the purposes of fishing, fowling and navigation. Public access rights extend to mean high water in tidal bodies and ordinary high water in non-tidal bodies. Access rights are also extended to "filled tidelands," i.e., to the historic high water in areas filled as long ago as the 1640s. Proposed activities that will occur below mean high water in flowed or filled tidelands requires a Waterways License from the MADEP Division of Waterways.

Massachusetts Wetlands Protection Act. (131 MGL 40; 310 CMR 10.) This act prohibits damage to inland wetland, river, and coastal resource areas within 100- foot buffer zones (25 feet in designated urban areas). No resource areas may be altered, filled, dredged, or removed in such a way as to adversely impact water supplies, groundwater sources, surface water quality, flood prevention, shellfish habitat, fisheries, and wildlife habitat. It also sets forth the MA Stormwater Management Policy and its performance standards. The jurisdictional riverfront resource area of the Little River in Belmont and Arlington is 200 feet wide; however, the riverfront area of Alewife Brook and Little River in Cambridge and Alewife Brook in Somerville is only 25 feet wide. Proposed projects with impacts less than 5,000 square feet are reviewed and permitted by municipal Con-

servation Commissions. The MA Department of Environmental Protection reviews projects with greater impacts.

Municipal Conservation Ordinances. Belmont, Cambridge, and Somerville do not have ordinances. The Town of Arlington has Wetlands Protection Town Bylaws that regulate wetlands in more detail than the Massachusetts Wetland Protection Act.

Massachusetts Endangered Species Act. (131A MGL; 321 CMR 10.00.) This act prohibits the taking of state-listed rare and endangered species and damage to their habitat. The Massachusetts Natural Heritage and Endangered Species Program will review proposed activities to determine whether any priority habitats or state-listed species occur in the project area and will recommend how to minimize any potential impacts.

Historic and Archaeological Preservation. The Massachusetts Historical Commission may need to review proposed activities to determine if they have potential impacts on historic or archaeological resources.

F. ENCROACHMENT RESOLUTION

Key steps toward implementing the Master Plan involve reclaiming properties from unauthorized commercial, industrial, and residential abutters that have illegally extended their property onto MDC parkland. Such encroachments include gardens, storage of materials, vehicle parking lots, fences to and along the water's edge, and portions of buildings.

Using the process outlined below the MDC Planning Office resolved approximately 75 encroachments along the Charles River, above Watertown Square. Several of these former "encroachers" are now stewards helping to maintain the new greenway along the Charles River.

The framework for resolving encroachment issues includes surveying property lines to determine ownership and to identify possible violations. With this information, abutting property owners must be notified and opportunities created for amicable resolution. As part of the Master Plan a new survey was developed by Judith Nitsch Engineering based on aerial photography taken in the spring of 2002. This survey information will be used by the MDC in resolving existing encroachments.

The MDC developed a detailed guide for encroachment resolution from their experience

ENCROACHMENT RESOLUTION PROCESS

1. Create a list of owners and occupants.
2. Notify tenants of an upcoming survey.
3. Conduct a survey to delineate property lines and set boundaries in the field.
4. Photograph the site and film video documentary.
5. Check all past leases.
6. Decide long-term restoration strategy and restoration plan.
7. Hold meetings with encroachers.
8. Develop an encroachment compensation formula.
9. Calculate the size of all encroachments.
10. Establish an Encroachment Reclamation Trust Fund.
11. Send abutter notification letters.
12. Distribute Acknowledgement of State Ownership/Agreement to Quit Forms.
13. Distribute Memorandum of Agreement.
14. Return signed Acknowledgments and MOAs to abutters.
15. Continue abutter communication.

along the Charles River Reservation. The process will be used for resolving encroachments and reclaiming public land along the Alewife Reservation and Alewife Brook corridor.

G. MAINTENANCE AND MANAGEMENT

Restoration of the Alewife Reservation and Alewife Brook Greenway is a long-term investment that requires a comprehensive maintenance and management program. The success of the Master Plan depends on a commitment to execute maintenance and management plans after construction is completed. The MDC acknowledges citizen criticism voiced about inadequate maintenance and management in the past and is dedicated to improving the current effort. However, increased maintenance will result in increased costs that in the past MDC was not able to bear due to budget constraints. It is therefore unlikely that adequate and effective maintenance can be performed solely by the MDC. Hence this Master Plan recommends that the MDC take advantage of the growing public interest in natural areas and create mechanisms for citizens to participate in the ongoing care and maintenance of the Alewife area (refer to Section 3H for proposed strategies).

G1. Maintenance

The following maintenance recommendations (described in detail in Appendix D) are designed to ensure the long-term ecological health and integrity of the Alewife system. Conventional maintenance strategies typically used for urban parklands are unlikely to meet the needs of a complex ecological system like the Alewife area.

In general, maintenance strategies should reflect a commitment to environmentally sensitive methods. Such methods typically favor physical labor over chemical applications; the use of low-toxicity, low-residue compounds; and strategies such as Integrated Pest Management (discussed in Appendix D).

The Alewife Reservation and Alewife Brook corridor share some maintenance require-

KEY MAINTENANCE STRATEGIES

- Establish a schedule of routine activities (weekly, monthly, seasonally, annually) to tend the landscape and perform minor repairs. Routine activities include clean up of litter and trash, seasonal removal of debris, and maintenance of storm drainage structures. Inspection and repair of paths, walkways, and site furnishings should also be carried out.

- Establish a program for invasive species control in both the Alewife Reservation and Alewife Brook Greenway. The full range of invasive species should be monitored and managed, including aquatic, herbaceous, and woody types. Long-term monitoring is critical, because once an invasive species enters the landscape, eradication becomes very difficult.
- Provide turf and plant maintenance for the Alewife Brook Parkway, including regular weeding, pest and disease control, watering, fertilizing, mulching, pruning, replanting, seeding and mowing. Meadow areas in the Reservation will also require mowing once or twice a year, as well as possible overseeding during the first three years to combat weeds and invasives.
- Develop a schedule and budget for the replacement of infrastructure, site amenities, and plantings as they wear out or decline with age.

ments, however, they also have significant differences. The Reservation should ultimately develop into a self-sustaining, natural system that requires limited intervention (e.g., servicing of infrastructure elements such as paths and boardwalks). The Alewife Brook corridor is a more controlled area that will require more frequent intervention.

G2. Management

It is essential that the entire Alewife system, from Little Pond to the confluence with the Mystic River, be managed as a single entity to ensure uniformity of the vision and programming of the management decisions. Fortunately the entire site is under the MDC's jurisdiction. Consideration should be given to hiring an Alewife MDC ranger to be responsible for oversight of the entire parkland. The six key components that have frequently been identified as being essential to open space management programs include consideration of user safety and risks, patrol and emergency procedures, administration, programming and events, stewardship and enhancement, and funding for ongoing activities.

H. COMMUNITY INVOLVEMENT AND STEWARDSHIP

Planning is a vital component of open space management. This Master Plan is a critical step toward proper stewardship. Often the plans that work best are those supported by organizations, corporations, institutions, and a mobilized community of concerned individuals, which this one is. Public–private partnerships can provide the best opportunities to ensure implementation success by combining community spirit, entrepreneurial drive, volunteerism, good corporate citizenship, financial resources, professional expertise, and long-term commitment. It is also important to cultivate a sense of community pride, support, and shared stewardship. All of those factors are required to properly restore the Alewife Reservation and Alewife Brook corridor.

H1. Volunteer Efforts

Restoration

Sustainable, and therefore successful, environmental restoration projects involve more than simply repairing degraded physical landscapes. Restoring the degraded human–nature relationship is equally important. Efforts should be made to engage the local community to help restore the Alewife Reservation and Alewife Brook corridor rather than relying solely upon professional practitioners. The successful removal of water chestnut from the Alewife area water bodies is an example of excellent MDC–volunteer coordination and partnering. Well-managed and organized public involvement in restoration projects can help ensure ongoing maintenance and support for the area. All such efforts must receive the guidance and approval of the MDC.

Stewardship

Public involvement is critical to a successful planning effort. A lack of public involvement and caring generates "orphan" open spaces and parklands. The continued involvement of concerned individuals for periodic trash clean-ups and removal of invasive plants will be essential to achieving the Master Plan recommendations and sustaining a long-term stewardship program for the Alewife Reservation and Brook.

H2. Organizations

Education

The creation of interpretative programs at Alewife for school children and adults will help generate the needed commitment to restore and enhance the Alewife Reservation and

FIGURE 73. Teenagers displaying good stewardship of the Alewife Reservation by performing a trash clean-up.

Alewife Brook corridor. Educational materials could include brochures, newsletters, videos, models, and school curricula. After-school programs and guided tours will provide on-site education.

Coalition Building

There are currently more than a dozen citizen groups with interest in the long-term well being of the Alewife Reservation and Alewife Brook corridor. These groups are focused on flooding, water quality, municipal projects to separate storm and sanitary sewer drains, cleaning up the Alewife Reservation, educational opportunities for local schoolchildren, and influencing proposed developments and re-developments in the area. These include, in alphabetical order:

- Alewife Neighbors
- Alewife Study Group
- Belmont Citizens' Forum
- Boston Society of Architects
- Cambridge Highlands Neighborhood Association
- Coalition for Alewife
- Concord-Alewife Study Group
- East Arlington Good Neighbor Association
- Friends of Alewife Reservation (FAR)
- Friends of Blair Pond
- Friends of the Community Path
- Friends of Fresh Pond
- Massachusetts Bicycle Coalition
- Mystic River Watershed Association
- North Cambridge Stabilization Committee

Merging some of these groups could provide a centralized, more effective, and better funded advocacy organization.

Faculty and students from Tufts University, the Graduate School of Design at Harvard, and Antioch New England Graduate School have been involved in study and research in the area. At Master Plan public meetings the MDC and team members emphasized the need for cooperation among these citizen groups. In addition, the importance of working with municipal departments and state agencies was highlighted. All of these stakeholders have expressed strong interest in holding forums to facilitate cooperation and a unified call for attention and resources for addressing Alewife's watershed challenges.

Summary Recommendations:

- Create an efficient agency mechanism for coordination of volunteer efforts (e.g., hire a full-time park ranger)
- Establish a regional forum or roundtable that brings all involved citizen groups, institutions, and numerous municipal departments and state agencies together to discuss and coordinate efforts