

RESTORING WETLANDS OF THE NEPONSET RIVER WATERSHED

A Watershed Wetlands Restoration Plan



Wetlands Restoration & Banking Program
Massachusetts Executive Office of Environmental Affairs

January 2000



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Prepared for the Citizens of the Neponset River Watershed

by the

Wetlands Restoration & Banking Program

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January 2000

Dedication

In Memorium

Elizabeth S. Houghton 1909 – 1999

Our vision for the restoration of wetlands along the Neponset River has been inspired by our friend and colleague, Elizabeth S. Houghton. We offer this plan in thanksgiving for her life and work.

Elizabeth S. Houghton devoted herself and her resources to the protection of the Commonwealth's wetland environment. She was a founding member of the Neponset Conservation Association; an organization she guided and supported as it became the Neponset River Watershed Association. Through her tenacious urgings, much of the Neponset watershed is now designated an Area of Critical Environmental Concern.

Elizabeth's vision of environmental protection did not stop at the water's edge. In the 1970s, she helped stop the Southwest Expressway from bisecting the Fowl Meadow. She truly understood the connection between thoughtless highway and public works projects and the devastation of Massachusetts' precious open spaces. For thirty years she fought to keep citizens involved in transportation planning, dedicating the rest of her life to protection of the meadow and the Neponset River from encroachments of roads and development.

Winner of the Massachusetts Audubon Society's "A" Award and holder of an honorary doctorate degree from Curry College, as she felt her life drawing to a close Elizabeth wondered who would continue to view the river, and especially the Fowl Meadow, from her perspective.

Please remember Elizabeth Houghton as you pass by Routes 128 and 95 in Canton, looking north over her beloved Fowl Meadow and the Neponset River. She can no longer show you her photographs of the watershed under flood conditions and remind you that the aquifer under the meadow is 150 feet deep, holds 95 billion gallons of pure water, and provides flood storage to protect abutting towns. Elizabeth would applaud our efforts to restore Neponset wetlands, but she would remind us that there are presently nine separate proposed transportation and public works projects that threaten its well being.

Which of us will protect it now?

Ellen Anderson

Longtime friend and colleague from the Neponset River Watershed Association
November 1999

Acknowledgements...

A comprehensive, community-based approach to restoring wetlands in the Neponset River watershed involves many partners. WRBP wishes to thank both those who have already participated and those who will continue this important effort into the future, including:

Conservation Commissions of the Neponset

Boston, Canton, Dedham, Dover, Foxborough, Medfield, Milton, Norwood, Quincy, Sharon, Stoughton, Walpole, and Westwood

Other Local Government Agencies

City of Quincy Department of Public Works, Dover Water Department, Boston Parks and Recreation Department

Environmental Organizations

Neponset River Watershed Association, Massachusetts Audubon Society, Massachusetts Association of Conservation Commissions, East Walpole Civic Association, Friends of the Estuary, Boston Natural Areas Fund, Canton River Watch Dogs

State Agency Programs

Massachusetts Watershed Initiative, Neponset River Subwatershed Team (of the Boston Harbor Watershed Team), Areas of Critical Environmental Concern Program (ACEC), Metropolitan District Commission, Riverways Program, Natural Heritage Program, Massachusetts Coastal Zone Management, Massachusetts Bays Program, Metropolitan Area Planning Council, Norfolk County Mosquito Control District, Suffolk County Mosquito Control District

Federal Coastal America Partnership

US Army Corps of Engineers, Environmental Protection Agency, Natural Resources Conservation Service, US Fish & Wildlife Service, National Marine Fisheries Service, Federal Highway Administration

THANK YOU!!

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INTRODUCTION

A Call for Community-Based Action

Under the Massachusetts Watershed Initiative, those who live, work, and play in the Neponset River watershed are collaborating with state and federal agencies on a comprehensive approach to watershed management – protecting remaining open spaces, cleaning up polluted waters, and restoring wetlands. Along with other actions, such as controlling stormwater runoff and addressing failing septic systems, wetland restoration is an effective tool for improving watershed health. Wetland restoration can help address problems such as flooding, water pollution, low stream flows, and loss of fisheries and wildlife habitat. The *Neponset River Watershed Basin Wide Action Plan*, adopted in March 1997, includes wetland restoration as a key goal. As one component of this watershed plan, Neponset advocates are implementing a watershed-wide wetland restoration effort in cooperation with the Massachusetts Executive Office of Environmental Affairs (EOEA), Wetlands Restoration & Banking Program (WRBP).

The publication of *Restoring Wetlands of the Neponset River Watershed: A Watershed Wetlands Restoration Plan* (the *Plan*), marks the end of the planning phase of this initiative. While a number of restoration projects have already begun, with the adoption of this *Plan*, we now officially begin the implementation phase of a community-based wetland restoration effort within the Neponset. The purpose of this *Plan* is to identify the most significant opportunities for restoring the wetlands of the Neponset River watershed and to adopt action steps toward implementation. The *Plan* provides the following key elements to facilitate long-term, sustained action:

- ◆ A goal of 130 acres of wetlands restored throughout the watershed by 2010.
- ◆ A long-term commitment to securing state and federal funding, corporate contributions, and other support for local restoration projects, coordinated through the Wetlands Restoration & Banking Program's GROWetlands Initiative.
- ◆ A list and map of 171 potential wetland restoration sites in the watershed (Appendix B).
- ◆ A list and map of 65 projects that can further the seven restoration goals adopted for the Neponset (Appendix C).
- ◆ An emphasis on restoring wetlands within ecologically significant areas.
- ◆ Town-by-town maps showing the locations of restoration sites (Appendix D).

- ◆ Ongoing collaboration with the Neponset River Watershed Team.

The Action Agenda presented in this *Plan* is intended to engage many partners and ensure continued public support for a long-term restoration effort. Just as the wetlands of the Neponset have been destroyed and degraded site-by-site, acre-by-acre, reversing the damage will take many individual actions over an extended period. While we may never be able to measure precisely the results of our collective efforts, it will be gratifying to know that every restoration project completed successfully makes a contribution to the overall health of the Neponset River, its watershed, its plant and wildlife communities, and the people it sustains.

Why Restore Wetlands in the Neponset River Watershed?

Try to imagine the wetlands of the Neponset River watershed as they appeared four hundred years ago - vast uninterrupted expanses of salt marsh at the estuary, fringing wetlands along the banks of the mainstem and tributaries, a freshwater marsh at Fowl Meadow as far as the eye could see, expansive white cedar and red maple swamps in the headwaters. Fish moved freely upstream to spawn, unimpeded by dams. Shorebirds found ample shallow pools and natural creeks in the salt marshes for feeding. The wetlands filtered runoff from adjacent lands, helping to keep the water in the river clean and pure. Wetland plant life was diverse and vigorous, providing lush habitat for many species of mammals, amphibians, reptiles, fish, birds, and insects.

This abundance of natural resources provided critical support for the colonization of the New World. But, as the watershed became more settled, wetlands were drained to provide rich soils for farming, dams were built to harness power and provide water supplies, and marshes were crossed by roads and rail beds. The landscape continued to change as human activity increased. Wetlands were filled to provide land for housing and for commercial and industrial uses. Wetlands became common dump sites. Polluted runoff, and industrial waste were piped directly into the river. Spoils from river dredging were spread over the salt marshes. It is hard to say how much of the wetland resources in the Neponset River watershed have been degraded by pollution or destroyed altogether. Statewide, the loss is at least 28% and nationally the story is even worse - 50% of the country's wetlands are gone. (Dahl, 1990)

Despite centuries of filling, dredging, altering, and removing of wetlands, the Neponset River watershed still contains over 8,000 acres of these aquatic resources. A diverse range of wetland types is represented. Although some individual wetlands may provide the full range of wetland functions, most Neponset wetlands are altered by or, at the very least, threatened by, past and present land use activities. Forested and scrub/shrub wetlands dominate the watershed, with 5,000 and 2,000 acres respectively, yet these wetland types have been heavily impacted by development and associated changes in hydrology and water quality. Bogs are much scarcer throughout the watershed but, where they do still exist, such as at Ponkapoag Pond and in the Mill/Mine Brook area, these sensitive wetlands are also at increased risk from land use impacts. Significant Atlantic white cedar (*Chamaecyparis thyoides*) wetlands in Walpole and Sharon, and smaller cedar stands elsewhere in the watershed, are failing to regenerate after decades of cutting, ditching, and flooding. These cedar wetlands are significant

natural communities and, in addition to their landscape level functions, provide habitat for several rare or threatened wetland wildlife species. Formerly, there were much more extensive salt marshes in the estuary, but since the onset of European settlement in the Neponset, these highly productive resources have been filled for development, covered with dredge spoils, and ditched for salt hay production or mosquito control. Many of the Neponset's remaining salt marshes have been invaded by common reed (*Phragmites australis*), a tall, dense reed that reduces wildlife habitat values and dramatically increases the risk of fire.

State law no longer allows most activities that harm wetlands, but the Neponset River watershed shows many effects from past abuses. Due to damming of the river, shad, river herring, and smelt can no longer reach historic upriver spawning grounds. Water quality problems can be found throughout the watershed. Some developed areas are prone to costly flooding. Sources for drinking water supply are neither as abundant nor as dependably clean. Birds and other wildlife that rely on wetlands are far fewer, both in numbers and variety.

Although the exact acreage of degraded wetlands is difficult to quantify, the identification of 171 potential wetland restoration sites in this *Plan* suggests widespread wetland loss and degradation throughout the watershed. Even in a degraded condition, wetlands in the Neponset River watershed continue to provide important functions (e.g., water purification, flood storage, fish and wildlife habitat) at both the site and landscape levels.

While it is not possible to turn back the clock, now there is an initiative underway to identify wetlands of the Neponset that are still restorable and bring them back. A number of restoration projects implemented throughout the watershed, over time, can help improve the watershed as a whole. WRBP is using a partnership approach to restoring wetlands in the Neponset River watershed. WRBP's strategy is to mobilize and work with communities, advocacy groups, and interested citizens to implement a watershed-wide restoration effort. A coordinated effort by landowners and other advocates to implement restoration projects can both bring back some of the watershed's lost and degraded wetlands and improve the health of the watershed overall. Under this initiative, wetland restoration activities will be locally driven but will be supported by both public and private resources.

What is “Wetland Restoration”?

The wetlands of the Neponset River watershed have been impacted in many ways. They have been filled for construction, ditched for mosquito control and to create agricultural lands, drained to create land suitable for development, and flooded due to obstruction of water flow by roadways and other structures. They have been eroded by channelized streamflow and choked with sediment from road runoff. In the past few decades, several species of invasive plants have displaced native wetland plant communities reducing their capacity to provide biologically diverse wildlife habitat.

WRBP defines wetland restoration as *“the act, process, or result of returning a wetland or a former wetland to a close approximation of its condition prior to disturbance.”* The goal of wetland restoration is to bring back wetland functions that have been lost through wetland destruction and degradation, including water quality improvement, flood storage and flood protection, and fish, shellfish, and wildlife habitat.

WRBP has defined two general types of wetland restoration activities. Type 1 wetland restoration involves reestablishing a wetland on a former wetland site. Type 2 wetland restoration involves returning a damaged, degraded, or otherwise functionally impaired wetland to its prior (pre-disturbance) condition, or one similar to it. Type 1 restorations result in an increase of wetland acreage. Type 2 restorations bring about a change in the kind or condition of an existing wetland, typically with no gain in wetland acreage. A single wetland restoration project may involve both types of restoration.

Restoring the wetlands of the Neponset will require many strategies as no two sites are identical. Restoration will involve such activities as removing or resizing culverts, plugging ditches, replacing hydric soils, removing fill, stabilizing stream banks, and removing pollution and sediment sources. Because site conditions and needs vary, each restoration site will require a unique project design.

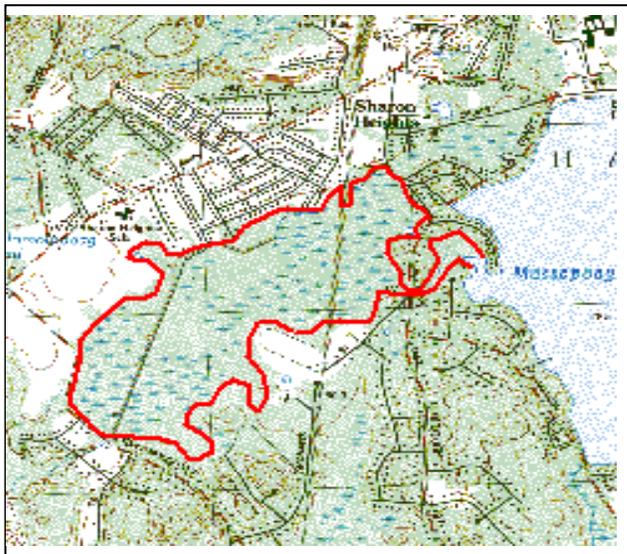
Wetland restoration is the act, process, or result of returning a wetland or a former wetland to a close approximation of its condition prior to disturbance.

On the following pages are three examples of restoration projects that are planned or underway in the Neponset River watershed.

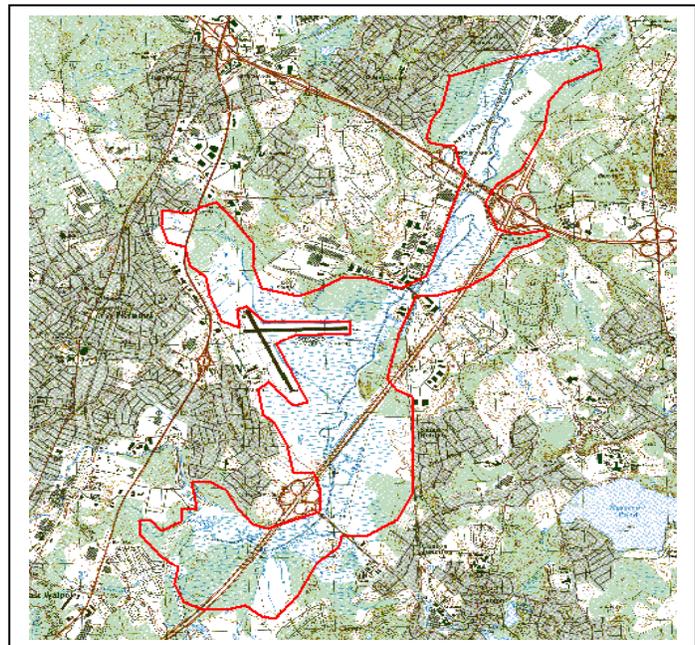
EXAMPLES OF WETLAND RESTORATION PROJECTS IN THE NEPONSET RIVER WATERSHED

Sharon White Cedar Swamp: Located to the west of Lake Massapoag, the largest natural lake in the Neponset watershed, the Sharon White Cedar Swamp is a priority wetland restoration site. In general, cedar swamps are a rare habitat type in Massachusetts. This particular site also provides habitat for rare animal species. Portions of this 250-acre cedar swamp are dying due to ditching and drawdown of groundwater levels. WRBP has accepted a nomination from the Sharon Conservation Commission to include the project under WRBP's GROWetlands Initiative (Groups Restoring Our Wetlands). WRBP has conducted a preliminary site assessment and is assembling a project team, including an internationally-known white

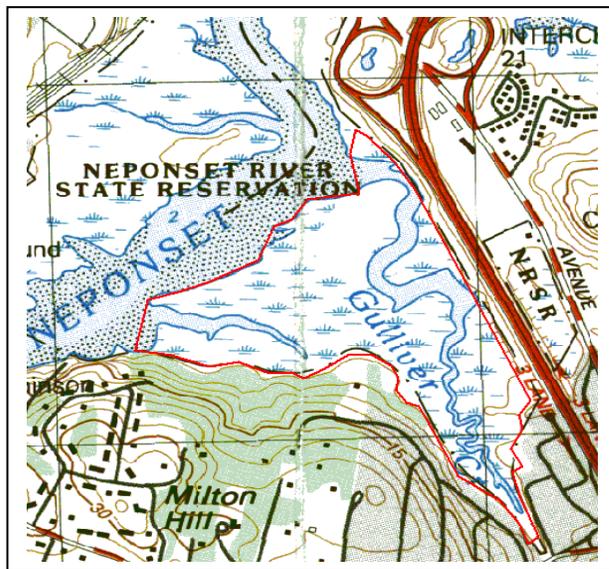
cedar specialist from Yale University's School of Forestry. A preliminary investigation has been completed and WRBP is seeking \$50,000 to fully evaluate the site and develop a draft wetland restoration plan. Activities necessary to restore viable white cedar stands and improve groundwater recharge will include hydrologic modifications within the wetland, improved stormwater management in the abutting residential neighborhoods, control of invasive vegetation and, most probably, tree planting. Including costs for additional Site Evaluation, Project Development, Design, and Construction, restoration costs may be as high as \$500,000. The project is eligible for federal and private funding programs, but matching funds will be needed.



Fowl Meadow: The Fowl Meadow wetland system is the largest and most valuable complex of aquatic and wetland habitats in the interior of the Neponset River watershed. In 1992, the Environmental Affairs Office designated 8,340 acres in the municipalities of Boston, Canton, Dedham, Milton, Norwood, Randolph, Sharon, and Westwood as the Fowl Meadow and Ponkapoag Bog Area of Critical Environmental Concern (ACEC). Portions of the Fowl Meadow overlie two EPA-designated Sole Source Aquifers and several of the encompassing towns draw at least a portion of their municipal water supply from the extensive aquifer deposits. The Neponset River watershed wetlands restoration plan identifies 15 individual wetlands restoration projects in the ACEC, affecting over 1500



acres of wetlands. Wetland impacts in the Fowl Meadow complex include filling for airports, railroads, and roadways; surface drainage modifications, groundwater withdrawals, and widespread changes in vegetation. Ranging from the smallest vegetation management projects to highly complex initiatives aimed at protecting groundwater supplies, wetland restoration projects in the Fowl Meadow truly have the potential to improve water quality, important flood storage, and fisheries and wildlife habitats at the landscape level. In order to develop the type of inter-community cooperation necessary to prioritize and achieve these goals, WRBP is working with the Neponset River Watershed Association to develop and support a Fowl Meadow Working Group. This group, made up of representatives from each affected town and appropriate state and federal agencies, will work to evaluate a suite of projects and implement those that will be most effective. Existing partners in this important effort include the Metropolitan District Commission (partial landowner), Neponset River Watershed Association (non-profit), MassHighway, Massachusetts Area of Critical Environmental Concern Program, Massachusetts Division of Fisheries & Wildlife, Massachusetts Natural Heritage & Endangered Species Program, Massachusetts Wetlands Restoration & Banking Program, and municipal Conservation Commissions (Canton, Dedham, Milton, Norwood, Sharon, Westwood). In order to catalyze the Fowl Meadow Working Group, WRBP is seeking \$50,000 to further evaluate and prioritize the sites. It is expected that several low-cost restoration projects will be identified for immediate implementation at a cost of approximately \$75,000. Federal, corporate, and foundation grants will be sought.



Gulliver's Creek: The Gulliver's Creek salt marshes are inextricably linked with historic Boston from the time of earliest settlement, when colonists mingled with Native Americans to catch fish at the waterfall now dammed at Lower Mills, to the earliest days of independence, when Quincy granite for the Bunker Hill Monument was freighted to Gulliver's Creek barges by way of the nation's first railroad. The marshes themselves were harvested for salt hay for centuries and were likely first impacted by ditching to increase production of this formerly critical commodity. As the horseless carriage reduced the need for salt hay, marsh economic values declined and impacts mounted – grid ditching for make-work mosquito control during the Great Depression, filling for adjacent development

and dredge spoil disposal, and the ever-increasing load of stormwater pollutants from surrounding uplands. Natural fisheries habitat resources have been lost and the marsh is now dominated by monocultures of common reed (*Phragmites australis*), an aggressive weedy plant with less habitat value than native salt marsh vegetation. These impacts are not irreversible. Depending on the goals and extent of a salt marsh restoration plan, degraded habitat and water quality values can be improved. Preliminary investigations are underway and WRBP is seeking \$65,000 to fully evaluate the site and develop a draft wetland restoration plan. The most effective strategy would likely involve a long-term commitment to the site, beginning with a thorough investigation of surface conditions, vegetation distribution, and influent water quality and moving through a planned program of improvements in tidal flushing, stormwater management, and species diversity. Including costs for additional Site Evaluation, Project Development, Design, and Construction, restoration costs may be as high as \$200,000. Any program of improvements would be beneficial, of course, but the historic and ecological values of the Gulliver's Creek Marshes merit a signal effort to restore this important and highly visible coastal wetland. WRBP currently is working with a private company that may be interested in funding the project through the Corporate Wetlands Restoration Partnership.

How This Plan Was Developed

The Wetlands Restoration & Banking Program developed the “watershed wetlands restoration planning” approach with technical support from the U.S. Army Corps of Engineers, and piloted it in the Neponset.¹ The Neponset was chosen so that wetland restoration activities could be integrated with the Massachusetts Watershed Initiative’s pilot program in the Neponset.

Restoring Wetlands of the Neponset River Watershed is the culmination of a three-phase planning process. During Phase I watershed stakeholders were identified and notified of the Wetland Restoration & Banking Program’s intent to initiate a watershed wetlands restoration plan. In Phase II, the locations of potential wetland restoration sites were identified through aerial photographic interpretation and field surveys. Existing information about the watershed’s water quality, flood storage capacity, fish habitat, and wildlife habitat was evaluated to determine how wetlands restoration might benefit the watershed. This information and analysis was presented in a *Preliminary Report* (PR). Public meetings were held to receive input on the PR and to adopt restoration goals for the watershed. In Phase III, a draft and final *Plan* were prepared. The draft *Plan* identified priority sites that can address the restoration goals adopted by the watershed community and proposed an Action Agenda for their implementation. Following public comment on the draft *Plan*, this final *Plan* has been prepared and distributed.

For those seeking more detailed information about wetland restoration site identification, watershed analysis, and criteria for selecting priority restoration sites, the following documents were prepared as part of this *Plan* and are available at public libraries in each community covered by the *Plan*, or from WRBP:

- ◆ *Neponset River Watershed Wetland Restoration Analysis*, U.S. Army Corps of Engineers, New England District, July 1997. This is a technical report that includes an initial list of potential wetland restoration sites and detailed analysis of watershed-level wetland functions.
- ◆ *Neponset River Watershed Wetlands Restoration Plan: Preliminary Report*, Wetlands Restoration & Banking Program, September 1997. This report summarizes the Army Corps’ technical report and suggests wetland restoration goals for the watershed for public comment.

¹ For information on WRBP’s watershed wetlands restoration planning process, please refer to: 1) “*Site Identification and Evaluation Procedures*”, WRBP, July 1996 and 2) “*Watershed Wetlands Restoration Planning Guidance*”, WRBP, July 1, 1996.

- ◆ *Draft: Neponset River Watershed Wetlands Restoration Plan, Wetlands Restoration & Banking Program, December 1998.* In this document, potential sites are prioritized based on the adopted goals for wetland restoration and an Action Agenda is proposed for public comment.

This final *Plan* summarizes information previously presented and presents a final Action Agenda for the Neponset River watershed wetlands restoration initiative.

***NEPONSET RIVER
WETLAND
RESTORATION
INITIATIVE***

***IMPLEMENTING THE
WATERSHED WETLANDS
RESTORATION PLAN***

ACTION AGENDA

for Restoring Neponset Wetlands

- ***Restore 130 acres of Neponset River Watershed Wetlands by 2010.***
- ***Promote wetland restoration at priority wetland restoration sites.***
- ***Promote wetland restoration within ecologically significant areas.***
- ***Provide technical, funding, and other support to project sponsors through the GROWetlands Initiative.***
- ***Promote the use of wetland restoration sites for education and research.***

The Action Agenda was developed based on input throughout the planning process from watershed stakeholders. It represents the core activities of the Neponset River wetland restoration initiative. WRBP will play a lead role in collaboration with the Watershed Team working with stakeholders to implement the Action Agenda. Each action item is described in detail.

Action Agenda

***OVER ALL GOAL:
Restore 130 Acres of
Neponset River Watershed
Wetlands by 2010***

In May 1999, the Commonwealth announced its goal of restoring 3,000 acres of Massachusetts wetlands by 2010. WRBP has adopted a goal of restoring 130 acres of wetlands over the next ten years as the Neponset's share of this statewide goal.

HOW?

The wetlands of the Neponset will be restored site-by-site, wetland-by-wetland. This Plan provides sufficient information for selecting restoration projects. With 171 sites representing almost 6,000 acres of potentially restorable wetlands identified, ample opportunities are available.

WHO?

Meeting the goal will require a collaborative effort involving many groups and individuals. WRBP and its many public and private partners are available to assist with project selection and implementation. ***WRBP challenges Neponset River watershed stakeholders – conservation commissions, other local agencies, landowners, environmental and other civic groups, businesses, state and federal agencies, and others – to join forces to make this goal a reality.***

Action Agenda

Promote Wetland Restoration at Priority Sites

HOW?

To restore 3,000 acres of wetlands in ten years and achieve watershed improvements, it has been important to set clear priorities. Priority wetland restoration sites within the Neponset River watershed have been identified based on their ability, if restored, to contribute to the restoration goals adopted by watershed stakeholders.

Wetland Restoration Goals for the Neponset River Watershed

In order to ensure broad consensus in the Neponset, watershed advocates have agreed on a set of wetland restoration goals. The goals were adopted in collaboration with stream teams, conservation commissions, community leaders, and others. The goals described below reflect the vision of the watershed community for improving its wetlands. They have provided the yardstick against which potential projects have been evaluated in order select the most important sites that can contribute to improving the health of the watershed.

Goal: Improve Water Quality

Wetland restoration projects can help improve water quality at key locations within the watershed. The *Preliminary Report* lists a number of “hot spots” identified by the Department of Environmental Protection and the Neponset River Watershed Association through water quality testing. Wetland restoration in key locations can help address these problem areas. This *Plan* identifies 68 sites that address this goal.

Goal: Restore Salt Marshes

Salt marshes are among the most ecologically productive habitats in the world. The remaining salt marshes within the Neponset River estuary have been

severely degraded. This *Plan* identifies 16 sites representing up to 900 acres of potentially restorable salt marshes.

Goal: Improve Wildlife Habitat

There are many opportunities for improving wildlife habitat, especially within the Mine/Mill Brook Complex, the Cedar Swamp Complex, the Neponset River Estuary Complex, and the Neponset River Mainstem Complex (See Figure 1). This *Plan* identifies 76 sites that address this goal.

Goal: Improve Flood Storage

There are significant opportunities for improving flood storage, especially within or immediately upstream of identified flood damage areas (See Figure 2). This *Plan* identified 84 sites that address this goal.

Goal: Address Invasive Species

Of particular concern are salt marshes that have been invaded by common reed (*Phragmites australis*). Additionally, purple loosestrife (*Lithrum salicaria*) invasion is pervasive throughout the watershed and needs to be addressed. While at least 39 sites with these invasive species were identified, this does not represent a comprehensive survey.

Goal: Improve Cold Water Fisheries Habitat

Few self-sustaining cold water fisheries remain in the Neponset River watershed. Of particular concern are the existing cold water fisheries habitat in Traphole Brook and the Tubwreck/Mine/Mill Brook subwatershed. The *Plan* identifies 5 sites that address this goal.

Goal: Improve Groundwater Recharge and Stream Baseflow

Wetland restoration can help address the impacts of reduced water table levels on stream flow and can, in some circumstances, help maintain groundwater supplies. This *Plan* identifies 69 sites that address this goal.

Identification of Priority Wetland Restoration Sites

Application of WRBP's site evaluation methodology initially identified 159 potential wetland restoration sites in the Neponset River watershed. These sites were described in the *Neponset River Watershed Wetlands Restoration Plan: Preliminary Report*. Based on public input on the *Preliminary Report* and the adoption of watershed-level wetland restoration goals, WRBP further evaluated these 159 sites, as well as 12 additional sites identified by participants in the planning process. A total of 171 potential restoration sites are included in this *Plan*. These sites are listed and described on Table 1 and located on Map 1 in Appendix B.

Out of the total of 171 sites, the *Draft Plan* identified 65 priority sites that can make the most significant contribution to improving the Neponset River watershed based on the 7 restoration goals. These priority wetland restoration projects are listed and described in Table 2 and located on Map 2 in Appendix C. They are presented on Table 2 in the following categories and prioritized within each category by size because larger wetlands are likely to provide more and more varied function:

- ◆ *High Functional Value sites:* These are sites that have the potential to improve the watershed overall for water quality, flood storage, and fish and wildlife habitat. Please note that a number of these sites also are significant for improvement of groundwater recharge and stream baseflow.
- ◆ *Additional Significant Groundwater Recharge and Stream Baseflow Sites:* These are sites that are not already listed as priority sites for other reasons and that are significant for groundwater recharge and stream baseflow because they are 65 acres or greater in size and/or because they overlay an approved Zone 2 recharge area or Interim Wellhead Protection Area. Nine such sites are included in the "high functional value sites" category but, in order to eliminate duplication, they are not listed again in this category. They can be identified as those for which "yes" has been entered in the column entitled "Hydrologic Support Site?"
- ◆ *Salt marsh Restoration Sites:* All salt marsh restoration sites are considered priority sites.
- ◆ *Cold Water Fisheries Sites:* These are restoration sites that may benefit cold water fisheries.

While the priority sites represent potential wetland restoration projects that, theoretically, provide the highest improvement for the watershed overall, **every site listed in this report has potential to improve wetland functions at a minimum at the project site.**

WHO?

WRBP will encourage adoption of priority wetland restoration sites by project sponsors and will support these projects through its GROWetlands (Groups Restoring Our Wetlands) Initiative. (See page 25 for more about GROWetlands.)

Action Agenda

***Promote Wetland
Restoration within
Ecologically Significant
Areas***

HOW?

To support EOEAs' initiative for biodiversity through biological conservation and community preservation, EOEAs has identified wetland restoration projects of watershed-level ecological significance, including:

- ◆ ***Salt marshes*** of the Neponset Estuary Area of Critical Environmental Concern (site #: B1, B2, B3, B6, ML1, ML2, ML3, ML4, ML5, ML6, ML21, Q1, Q2, Q6, Q4, Q9)
- ◆ ***White cedar swamp complexes*** in Sharon and Walpole (site #: C2, D3, SH7, M8, WL6, WL9, WL53, WL54, WL55, WL56)
- ◆ ***Cold water fishery*** of Traphole Brook and potential cold water fisheries of Plantingfield/Purgatory and Mill/Mine/Tubwreck Brooks (site #: N10, N13, WL16, WL17, WL18)
- ◆ ***Wetlands in the Fowl Meadow/Ponkapoag Bog*** Area of Critical Environmental Concern (site #: Fowl Meadow – C1, C2, C18, C19, C20, C21, C22, DD3, ML12, N1, SH1, SH2, SH3 Ponkapoag Bog – C2, C3, C23)
- ◆ ***Riparian wetlands*** of the Lower Neponset river banks (site #: B5, ML22)

Please refer to Table 1 in Appendix B for detailed information on each of these sites. These sites can be located on individual town maps in Appendix D

WHO?

WRBP will continue to promote projects from the list of 65 priority restoration sites, and will provide support under the GROWetlands Initiative (see page 25) for other wetland restoration projects proposed in the Neponset River watershed. In addition, WRBP will give special attention to groups of projects within these ecologically significant geographic areas within the Neponset River watershed. Specifically, WRBP plans to:

- ◆ Form a Fowl Meadow Working Group to evaluate restoration options for the largest wetland complex in the watershed.
- ◆ Recommend key projects to be adopted by the Neponset River Subwatershed Team for support and funding. WRBP has recommended to the team a study of the Sharon White Cedar Swamp and a pilot purple loosestrife management project in Fowl Meadow.
- ◆ Continue to promote salt marsh restoration projects, as opportunities arise. Projects already underway are restoration of 2 acres of salt marsh at Pope John Paul II Park, restoration of 20 acres of salt marsh at Metropolitan District Commission's (MDC) Neponset Marshes Reservation, and a study of restoration options at Billings Creek in Quincy.
- ◆ Work with the Massachusetts Division of Fisheries and Wildlife, citizen groups, and others, to promote wetland restoration that supports cold water fisheries.
- ◆ Work with the Massachusetts Division of Fisheries and Wildlife, the Neponset River Subwatershed Team, the US Army Corps of Engineers and others, to explore options for fish passage at Lower Neponset dams, and related wetland restoration opportunities along the Lower Neponset river banks.

Action Agenda

***Provide Technical Support,
Funding, and Other Support
to Project Sponsors Through
the GROWetlands* Initiative***

HOW?

The purpose of this *Plan* is to bring about improvement of the watershed through wetland restoration at a number of sites. At each site, a project sponsor will take responsibility for the restoration work from inception to completion. While anyone may sponsor a wetland restoration project, sponsors are usually local and may include conservation commissions, land trusts, schools, businesses, other public agencies, and private landowners. Project sponsors need not be the landowner as long as landowner approval has been obtained. Project sponsors may be eligible for funding and technical assistance through the GROWetlands (Groups Restoring Our Wetlands) Initiative coordinated by WRBP.

WHO?

WRBP provides ongoing technical assistance and support to GROWetlands projects. Funding may come from federal agencies through the Partnership To Restore Massachusetts Wetlands, from WRBP's own GROWetlands Grant Program or other state funding sources, or from the Corporate Wetlands Restoration Partnership managed by WRBP.

In 1994, the Commonwealth signed a cooperative agreement with federal agencies under the Coastal America Partnership, including US Fish & Wildlife Service, Environmental Protection Agency, National Marine Fisheries Service, US Army Corps of

***Groups Restoring Our Wetlands**

Engineers, Federal Highway Administration, and Natural Resources Conservation Service. Under the “Resolution to Restore Massachusetts Wetlands”, state and federal partners have pledged to work together to restore inland and coastal wetlands in Massachusetts in cooperation with the state’s Wetlands Restoration & Banking Program.

WRBP established the GROWetlands Initiative to ensure effective coordination between locally initiated wetland restoration projects and federal wetland restoration funding programs. Projects accepted under GROWetlands become Coastal America projects and are given priority consideration for federal funding and other assistance – all coordinated through WRBP. To date, nearly 50 projects have been nominated for GROWetlands. Over 40 projects have received full or partial funding through the partnership, including several in the Neponset River watershed.

WRBP administers its own GROWetlands Grant Program that funds wetland restoration projects on a competitive basis. In 1999, this program awarded \$100,000 in grant funds. In addition, the Executive Office of Environmental affairs has established a Corporate Wetland Restoration Partnership (CWRP) managed by WRBP. Corporate partners may donate funds to an EOEA trust fund to provide general support the Commonwealth’s wetland restoration efforts or may donate funds, goods, or services towards the restoration of a particular site. CWRP represents an additional potential funding source for GROWetlands projects.

In 1999, Massachusetts launched the Corporate Wetlands Restoration Partnership (CWRP), the first program of its kind in the nation, to encourage voluntary corporate participation in proactive restoration of degraded wetlands. Corporate partners contribute funds and in-kind services through partnership agreements with EOEA. Many donor options are available and agreements can be tailored to specific goals and needs of both large and small companies. Monetary donations are deposited in the Natural Resources Damages Trust Fund. A CWRP Advisory Board of corporate, government, and nonprofit members recommends projects to the EOEA Secretary for funding. Administrative costs are held to 10% so that 90% of CWRP funds go directly to wetland restoration.

“WRBP has published the GROWetlands Handbook: A Citizen’s Guide to assist wetland restoration project sponsors. Copies can be obtained for no charge by calling WRBP at (617) 626-1177.”

WRBP plans to actively seek nominations for GROWetlands for the priority projects and other projects in ecologically significant areas of the Neponset identified in this *Plan*.

While securing project funding is crucial, GROWetlands projects receive other benefits. WRBP provides guidance for every aspect of project development and implementation from project design, to permitting, to pre- and post-construction monitoring. WRBP has published ***GROWetlands Handbook: A Citizen's Guide*** to assist wetland restoration project sponsors. Copies may be obtained at no charge by calling WRBP at (617) 626-1177. **All nominations of wetland restoration sites for GROWetlands are welcome. Please use the GROWetlands Project Nomination Form in Appendix E.**

Action Agenda

Promote the Use of Wetland Restoration Sites for Education and Research

HOW?

Restoration projects provide excellent opportunities for educating the public about the importance of wetlands and what can be done to restore them. Many sites can provide hands-on experience, such as planting and monitoring, for a wide range of age groups from elementary school through adults. Restoration sites also provide excellent opportunities for gathering data to address a range of scientific and programmatic questions such as: Once construction is complete, how long before a restored wetland provides critical functions? What restoration techniques work best? Which wetlands are easiest to restore. Which are the hardest? How well can we control exotic and invasive species at restoration sites?

WHO?

WRBP is working to establish a statewide network of restored wetlands as education and research sites. With such a network in place, academic institutions may choose from a pre-identified set of restoration sites with established sampling stations and recommended research projects, or develop their own. Grade school curricula can incorporate a set of site-specific, pre-packaged activities. The sites can be used as outdoor classrooms for municipal conservation commissioners. The general public can visit the sites and use interpretive materials to learn about wetlands and how they are being restored.

WRBP will work with project sponsors, academic institutions, and others to identify restoration sites within the Neponset that are appropriate for education and research, and will guide the development of the sites for these purposes.

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Appendix A.

Key to Tables

- ◆ **How to read the tables – page 37**
- ◆ **Explanation of terms – page 39**

How To Read The Tables

The tables in this *Plan* that describe the potential wetland restoration sites contain a wealth of information. Each is too large to display on a single 8.5" x 11" sheet and, therefore, is presented on multiple pages. Following is a template to show how the pages of each table are numbered so that they may be read both across and down. This template shows the maximum number of sheets that may be presented and the number/letter system that is used. A schematic of the sheets will be presented before each table to guide the reader. In addition, the tables include terms that may be unfamiliar to the reader. These are defined below.

Template For Tables

<i>Sheet Ia</i>	<i>Sheet Ib</i>	<i>Sheet Ic</i>
<i>Sheet Iia</i>	<i>Sheet Iib</i>	<i>Sheet Iic</i>
<i>Sheet IIIa</i>	<i>Sheet IIIb</i>	<i>Sheet IIIc</i>
<i>Sheet Iva</i>	<i>Sheet Ivb</i>	<i>Sheet Ivc</i>
<i>Sheet Va</i>	<i>Sheet Vb</i>	<i>Sheet Vc</i>
<i>Sheet Via</i>	<i>Sheet Vib</i>	<i>Sheet Vic</i>

Explanation Of Terms

The information collected for each potential wetland restoration site identified in this *Draft Plan* and displayed in one or more of the tables includes some or all of the following. These terms are presented in the order in which they appear on Table 11. Not all tables include all terms, but the order in which they appear is consistent with the order presented below.

Site #: A unique, coded identification number for each site location, as originally identified and published in the *Neponset River Watershed Wetlands Restoration Plan: Preliminary Report*.

Existing Wetland Type: A technical classification of the existing wetland system based on the US Fish & Wildlife Service's widely utilized *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, et al.; 1979). Wetlands identified in this report include specific classes from both freshwater (P-palustrine, or streamside) and saltwater (E-estuarine) systems. Specific wetland classes included in the site information tables are PFO (freshwater wooded swamps), PSS (freshwater shrub swamps), PEM (freshwater marshes), PF04 (coniferous freshwater wooded swamps), POW (freshwater ponds, lakes, or other open water areas), and E2EM (coastal salt marshes).

Predicted Restored Type: A similar technical classification of the post-restoration wetland based on the same classification system.

Impact Characterization: The condition or activity, observable on aerial photographs or on the ground, which has resulted in the wetland being identified as a potential restoration site.

Restoration Type: Type 1 (restoration of non-wetland areas to wetland) or Type 2 (restoration of lost wetland function to an existing but degraded wetland).

Impact Size (Acres): The approximate size of the lost or degraded wetland area to be restored.

Landscape Classification: A technical classification of the geologic setting of the potential wetland restoration site, based on a classification system developed for this study (see *Neponset River Watershed Wetlands Restoration Plan: Preliminary Report*, Appendix G).

Surrounding Landscape: General land use characteristics of the area surrounding or adjacent to the potential wetland restoration site.

Restore Flood Storage: Improve the capacity of the wetland restoration site to detain or store, rainfall-runoff volumes so as to incrementally reduce flood stages (maximum water surface elevation), increase floodwater storage volumes, and/or desynchronize flood peaks at or downgradient of the restoration site.

Restore Water Quality: Improve the capacity of the wetland restoration site to remove sediment or other pollutants, remove or transform excess nutrients, reduce summer water temperatures, and/or increase dissolved oxygen concentrations in the inflow or outflow water column.

Restore Fish & Wildlife Habitat: Improve the capacity of the wetland restoration site to provide important structural wildlife habitat features for individual species, improve overall habitat quality for a more diverse assemblage of wildlife species, and/or provide or increase the utility of travel or migratory corridors between other significant wildlife habitats within the watershed.

Upgradient of Flood Damage Area: A location upstream of any developed area having a recorded history of significant flooding, as evidenced by risk to human life, structural damage to real property, interruption or utility or transportation services, and/or loss of commercial or agricultural production.

Located in 100-Year Floodplain: A location within any area defined and mapped by the Federal Emergency Management Agency (FEMA) as being subject to a 1% or greater chance of flooding within any year.

Constricted Outlet: The presence of or potential for an outlet from a wetland restoration site which restricts, or can be designed to restrict, the discharge of water from the site.

Flat Site: A potential wetland restoration site which has, or could be designed to have, low gradient surface topography adequate to create depositional water velocity conditions (Marble, 1992).

Support Vegetation Type: A potential wetland restoration site which has, or could be designed to have, dense vegetation adequate to reduce water flow velocities and/or provide significant surface area for microbial activity.

In Position to Improve Water Quality: A location downstream of or within a stream segment documented by monitoring to be in violation of the Massachusetts Surface Water Quality Standards (314 CMR 4.00 *et seq.*).

Will There be Surface Water Impacts?: An estimate of the likelihood that any future wetland restoration design will include modifications to the existing surface water drainage system.

Soils Suitable for Phosphate Removal?: Site primarily contains alluvial, alfisols, ferric, clay or other fine-textured soils, or these soils can be provided.

Soils Suitable for Nitrate Removal?: Soils are primarily organic or organic soils can be provided.

Permanently Saturated?: Existing or designed water regime results in year-round soil saturation to the surface or within the root zone (1 foot).

Seasonal or Permanent Flooding?: Existing or designed water regime results in year-round seasonal or permanent flooding above the soil surface.

Low Gradient Site?: A potential wetland restoration site which has, or could be designed to have, low gradient surface topography adequate to create depositional water velocity conditions or sheet flow.

Channel Flow?: A determination of the presence of existing channel flow within a potential wetland restoration site.

Support Dense Emergent Vegetation?: Dense emergent or woody vegetation is present or can be planted.

Habitat Quality?: A determination that restoration activities at a particular site will support a goal of improving overall physical, chemical, and/or biological habitat quality, as measured by important structural habitat features.

Habitat Diversity?: A determination that restoration activities at a particular site will support a goal of improving wetland class diversity within the watershed.

Connectivity to Other Habitats: A determination that restoration activities at a particular site will support a goal of providing or improving the utility of travel or migratory corridors between 2 or more high habitat value wetlands, especially wetlands within protected conservation areas.

Type of Ownership: Private or public. If public, then the ownership entity is identified.

Cost of Restoration: A preliminary estimate of the project cost for wetland restoration activities based on very general criteria. Cost estimates provided in 3

categories; “low” less than \$10,000, “moderate” between \$10,000 and \$10,000, and “high” greater than \$100,000. Estimated costs include planning, design, permitting, and implementation.

Fix Type: Actions necessary to restore lost or degraded wetland sites; biological, chemical, hydrological, management, or substrate modifications.

Difficulty in Restoration of Wetland: An estimate of the difficulty associated with the successful restoration of a particular wetland class at the potential wetland restoration site. Estimates are provided in 3 categories; “Less difficult” – marsh and wet meadow, “More difficult” – shrub and deciduous forested swamps, and “Most difficult” – bogs, fens, and Atlantic white cedar swamps.

Surrounding Level of Disturbance: Qualitative description of the level of disturbance surrounding the potential wetland restoration site.

Invasive Plant Species: Presence of invasive plant species, such as common reed (*Phragmites australis*) or purple loosestrife (*Lythrum salicaria*).

Difficulty in Restoration of Functions: An estimate of the difficulty associated with the successful restoration of particular wetland functions at the potential wetland restoration site. Estimates are provided in 3 categories; “Less difficult” – flood storage, sediment retention, waterfowl production, “More difficult” – wildlife, fish, food chain support, other water quality functions, and “Most difficult” – groundwater functions.

Sensitive Habitats Present: Whether or not the site is identified by the MA Natural Heritage & Endangered Species Program as rare plant or animal habitat or the site of an uncommon natural plant community.

Proximity to Landfills: Adjacent to or downgradient of a mapped landfill or an unmapped landfill identifiable from aerial photographs.

Appendix B

Potential Wetland Restoration Sites

- ◆ **Map 1 – following page 44**
- ◆ **Template for Table 1 – page 45**
- ◆ **Table 1 – following page 46**

Template For Table 1: Potential Wetland Restoration Sites

<i>Sheet Ia</i>	<i>Sheet Ib</i>	<i>Sheet Ic</i>
<i>Sheet IIa</i>	<i>Sheet IIb</i>	<i>Sheet IIc</i>
<i>Sheet IIIa</i>	<i>Sheet IIIb</i>	<i>Sheet IIIc</i>
<i>Sheet IVa</i>	<i>Sheet IVb</i>	<i>Sheet IVc</i>
<i>Sheet Va</i>	<i>Sheet Vb</i>	<i>Sheet Vc</i>
<i>Sheet VIa</i>	<i>Sheet VIb</i>	<i>Sheet VIc</i>

Appendix C

Priority Wetland Restoration Sites

- ◆ **Map 2 – following page 48**
- ◆ **Template for Table 2 – page 49**
- ◆ **Table 2 – following page 50**

Template For Table 1: Priority Wetland Restoration Sites

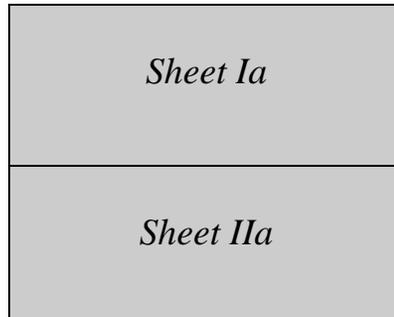


Table 1 is comprised of two separate sheets which should be read in the configuration shown above.

Appendix D

Potential Wetland Restoration Sites in Neponset River Watershed Cities and Towns

Town-by-town maps are presented following page 52:

- ◆ **Map 3: Boston**
- ◆ **Map 4: Canton**
- ◆ **Map 5: Dedham**
- ◆ **Map 6: Dover**
- ◆ **Map 7: Foxborough**
- ◆ **Map 8: Medfield**
- ◆ **Map 9: Milton**
- ◆ **Map 10: Norwood**
- ◆ **Map 11: Quincy**
- ◆ **Map 12: Sharon**
- ◆ **Map 13: Stoughton**
- ◆ **Map 14: Walpole**
- ◆ **Map 15: Westwood**

Appendix E

GROWetlands NOMINATION FORM

GROWetlands Wetlands Restoration Project Nomination Form

Thank you for your interest in restoring Massachusetts wetlands. If you wish to sponsor a wetland restoration project and would like to propose that it be considered part of the statewide wetlands restoration initiative called **GROWetlands** (Groups Restoring Our Wetlands) under the Massachusetts Wetlands Restoration & Banking Program, please fill out this form and return to the address below.

Project Name: _____

Project Location: City/Town _____ Watershed _____

Please attach a USGS quad sheet or other map on which the site location has been marked.

If available, please attach current and historic photos and aerial photos of the project site.

Project Sponsor: _____

Designated Representative: _____

Telephone: _____ FAX _____ E-mail _____

Address: _____

Project Co-Sponsors: _____

Landowner: _____

Has landowner expressed support for wetland restoration at the site? Yes ___ No ___
Explain:

Is all or part of the wetland totally destroyed or does it exist in a degraded condition? Explain:

Briefly describe the current condition of the wetland to be restored.

Is the wetland part of an agricultural facility or was it farmland in the past?

Is in agricultural use now. Was never farmed. Was formerly agricultural land.

Explain:

What caused the impact to the wetland?

Is the wetland area under an outstanding enforcement order? Yes No If yes, explain:

What is the approximate size of the area proposed to be restored?

What is the approximate size of adjacent wetland areas, if any?

Please attach a sketch of the area showing the wetland to be restored, adjacent wetlands and waterbodies, roads and buildings in the immediate vicinity, and other pertinent information to describe the site. If possible, indicate different wetland types that are present (Phragmites swamp, wet meadow, forested wetland, etc.).

If known, what was the wetland type(s) prior to impact?

If known, what restoration activity would be required to restore the wetland?

If known, what is the approximate cost of the restoration?

Has any funding been identified for this project? Yes No

If yes, describe:

Would you like WRBP to arrange a site visit and evaluation by a Wetlands Restoration Assistance Team, a group of volunteer wetland scientists? Yes No

Signed: _____ Date: _____

Please send this form with attachments to:

GROWetlands
EOEA Wetlands Restoration & Banking Program
One Winter Street - 5th Floor
Boston, MA 02108
(617) 626-1177

A representative of WRBP will contact you as soon as possible. Please call us if you have any questions!