

# City of Gloucester Comprehensive River and Stream Habitat Restoration Report



2003



Tim Purinton

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## Table of Contents

<i>Chapter</i>	<i>Page</i>
I. Executive Summary.....	3
II. Introduction .....	4
III. Report Goal and Methodology.....	5
IV. Overview of Gloucester Watersheds.....	10
V. Analysis of Potential Restoration Projects.....	13
VI. Priority Restoration Projects.....	15
VII. Moving Projects Forward.....	18
VIII. Conclusion.....	21
IX. Acknowledgements.....	23

### *Appendices*

Site Evaluations and Associated Maps.....	Appendix A
Quadrant 1.....	Appendix A(1)
Quadrant 2.....	Appendix A(2)
Quadrant 3.....	Appendix A(3)
Quadrant 4.....	Appendix A(4)
Restoration Code Key .....	Appendix B
Potential Anadromous and Catadromous Restoration Sites and Priority Restoration Site Maps.....	Appendix C
Criteria for Defining Restoration Potential.....	Appendix D
Example of a Recent Restoration Project, West Ox Pasture Brook..	Appendix E

## **I. Executive Summary**

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This comprehensive community-wide report, that field identified 225 potential restoration sites, has been completed with a grant from the Massachusetts Division of Fish and Wildlife and Environmental Law Enforcement's, Riverways Urban Rivers Program. After the first phase of field assessments, sites were prioritized using a ranking system that incorporated the likelihood of potential funding and support, as well as environmental benefits. This ranking method was chosen to reflect opportunity, as well as ecological merit. Results of the prioritization process indicated that some projects should be considered independently while others should be assessed in comparison with other projects in the same watershed. Some examples of restoration projects suggested by the report include anadromous/catadromous fish passage improvements, installation of storm water best management practices, culvert enlargement, stream daylighting, invasive species management, and stream corridor enhancement.

The report was developed to more effectively take advantage of funding sources for restoration by demonstrating that a methodical and credible assessment was undertaken, showing the range of potential projects in the city and highlighting the level of community support for projects, as well as the benefits of restoration. A more detailed restoration plan may be needed to clarify specific project needs and long-term goals. The report can also be used as an historical reference for future mitigation. Because the report actively involved Gloucester residents, was put forth by municipal officials working with a local non-profit and was articulated in the city's comprehensive master plan, stewardship was integrated from the start and future projects have a strong community context.

## **II. Introduction**

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Gloucester is America's oldest seaport and is located on Cape Ann on the North Shore in Massachusetts. A long history of residential and commercial development pre-dating wetlands and river protection regulations has resulted in considerable alteration and manipulation of the City of Gloucester's wetlands and waterways.

Historically restoration activities have been associated with mitigation for permitted and non-permitted activities impacting wetlands. More recently wetland and waterways restoration has been used to enhance habitat functions and values, and build civic pride by educating and recruiting citizen volunteers. Systematic restoration planning is undertaken with the hope of instilling a vision that not all human impacts on resource areas are negative and inspiring citizens to take action to protect and improve municipal natural resources.

Restoration for purposes of this report means to return to a more natural ecological condition and may include enhancement and creation of resource functions and values that do not currently exist. A recommended restoration project may not propose replication of what once existed, but rather a more preferable alternative to enhance biological functions and values. The first step in ecological restoration is to identify impaired or degraded sites and evaluate potential restoration strategies and benefits.

This report is intended to be a living document. The inventory of potential sites is to be appended as new opportunities are identified. Not every potential site in Gloucester has been identified, and as this report is being written restoration projects are currently in the permitting process, under construction, or being monitored for success.

### III. Report Goal and Methodology

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#### *Goal*

The goal of this restoration report is to provide an inventory of degraded river and stream habitats and anadromous fish runs in Gloucester, and to promote the protection of healthy river systems through restoration, stewardship, and education.

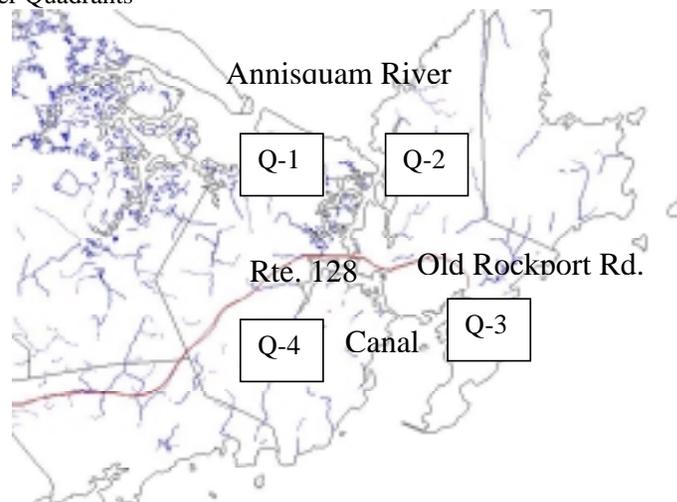
This restoration report is a step in achieving one of the goals of the City of Gloucester's Community Development Plan 2001. The Community Development Plan states: "Protect the environmental resources of Gloucester through regulation, vigilance, and actions that preserve water supply and water quality and conserve rare and sensitive natural environments and habitats." Two of the objectives to fulfill this goal include "make wetlands, anadromous fish, and shellfish bed restoration and protection priorities for action" and "inventory all rivers and streams and wetlands and establish restoration programs" (City of Gloucester, 2001). This restoration report is clearly a primary step, and can be used as a baseline to be updated as more information is made available and restoration projects are undertaken. This restoration report seeks to promote the restoration and enhancement of Gloucester's environmental resources.

#### *Site Identification Process*

To identify restoration opportunities, degraded habitats were investigated and sites were field identified throughout the entire municipality of Gloucester. These sites are defined as *potential* restoration sites and they represent some level of human disturbance on the landscape. To facilitate fieldwork and report organization geographic quadrants were developed and sites were classified as Q-1, Q-2, Q-3, or Q-4.

Q-1 sites were sites found north of Route 128 and west of the Annisquam River. Q-2 sites were those found east of the Annisquam River and north of Old Rockport Road. Q-3 sites were those found south of Old Rockport Road and east of the Blynman Canal and Q-4 sites were west of the canal and south of Route 128 (see Figure 1 below).

Figure 1. Gloucester Quadrants



Potential restoration sites were identified based on their connection to fresh and saltwater perennial and intermittent streams. Most potential restoration sites are associated with a specific stream and adjacent wetlands, although some are connected to the inner and outer harbor, the Blynman Canal, and other coastal features. Not all wetlands and streams were investigated, nor every human disturbance along each stream inventoried. For example along Gloucester's coastline, as well as along the Mill and Annisquam Rivers, many disturbances to the natural banks exist. Some of these disturbances include docks, floats, piers, jetties and a variety of shoreline armoring. These sites were not considered for restoration except in certain cases where structures seemed abandoned, large scale or of no practical use. Particular focus was placed upon areas of acute human disturbance, such as along roads, near dams or adjacent to dense residential/industrial activity.

Target species for restoration and enhancement have been defined for purposes of this report as either riverine or estuarine. Riverine is defined as all aquatic and terrestrial organisms that depend on freshwater rivers and streams and their associated wetlands and floodplains to live. Estuarine is defined as all aquatic and terrestrial organisms that depend on saltwater rivers and streams and their associated wetlands and floodplains to live including anadromous or catadromous species. Anadromous describes the life history of fish that enter fresh water from the ocean to spawn and catadromous describes fish that enter salt water from fresh water to spawn.

In Gloucester resident anadromous species considered for restoration include rainbow smelt (*Osmerus mordax*), alewife (*Alosa pseudoharengus*) and blue back herring (*Alosa aestivalis*). Only one catadromous species was considered for restoration in this report; the American eel (*Anguilla rostrata*). In some instances multiple target species, which may benefit from restoration, have been identified for an individual site.

The 1889 and 1899 atlases of Gloucester, Rockport, and Manchester produced by George W. Standly and Co., available in the City of Gloucester Engineering Department, were consulted prior to and during site investigations to assist in determining where streams were once located and the general landscape condition. These plates, along with such other resources as older USGS topographic quadrangles and aerial photography, should be further consulted as specific plans for restoration are developed.

During field investigations potential restoration sites were numbered in order of discovery, longitude and latitude coordinates (waypoints) were recorded using a handheld global positioning system (12 Channel Garmin), a digital photograph(s) was taken of the site and the site was sketched by hand. The waypoints were imported into a geographic information system software program (ArcView) and overlaid on USGS topographic maps. Field sketches were digitized and photographs edited and enhanced to illustrate natural patterns of water flow. If a site was too large to photograph properly, half-meter resolution orthophotos were included as a visual site reference.

A key part of the site identification process involved looking for landscape features that have been altered by human activity. Disturbance indicators such as linear stream banks, symmetrical mounding of earth, and proliferation of invasive plant species were looked for in the field.

Sites that citizens identified as needing restoration were also investigated and many of the sites identified in this report could not have been inventoried without citizen participation and assistance.

#### *Potential Restoration Activities*

The following types of restoration activities were identified in this report: buffer enhancement, bank improvement, channel re-alignment, culvert upgrade, stream daylighting, dam removal, fill removal, fish/eel ladder, invasive plant species management, open marsh water management, roughened ramp, fish/shellfish stocking, storm water best management practices, and trash removal. Many sites identified included more than one recommended activity to achieve desired habitat restoration. The restoration activities prescribed to a site are general in nature and do not address needed restoration design and specification development. For example the need for invasive species management has been identified at many locations, but how invasive species are to be managed (i.e. burning, herbicide application, removal, replanting of native species) was not addressed. Such specification can only be derived after more in depth field study and potential modeling of proposed conditions.

The following are brief definitions of the proposed restoration activities prescribed for different sites in this report:

*Buffer Enhancement* – Buffer enhancement was recommended if a lack of streamside natural vegetation was noted, typically this is the case when lawns or impervious surfaces replace the natural buffer. Natural vegetative buffers should be maintained along streams to encourage filtering of pollutants and to alleviate impacts of flooding.

*Bank Improvement* – This was recommended where natural stream banks have been replaced with hard structures such as stone or concrete retaining walls. A natural bank fosters the growth of vegetation, which encourages wildlife and reduces the impacts of flooding.

*Channel Re-alignment* – Where streams have been artificially straightened, ditched or channelized, channel re-alignment was recommended. A natural sinuous streambed creates more riverine habitat and encourages a pool and riffle system to develop, which is critical to many aquatic organisms.

*Culvert Upgrade* – Many culverts in both freshwater and saltwater environments are too small to allow for fish or aquatic species passage or may alter natural flow. Older culverts may be in disrepair or have been installed incorrectly. Culverts should be placed to allow undisturbed flow to occur and set low enough to allow

the natural stream bottom to establish. Culverts should also be as short as possible to limit the total area of disturbance. Some undersized and clogged culverts may have acted to create wetlands upstream - in these cases culvert upgrades should be considered carefully so no net loss of resource area occurs.

*Stream Daylighting* – Daylighting literally means the act of bringing a stream back to the light of day. Some streams have been culverted to allow for lawn, to facilitate access, or as a method of land use control. Allowing streams to “breathe” again creates a more natural state and reestablishes valuable natural stream functions such as wildlife habitat, pollution filtering, and flood control.

*Dam Removal* – Dam removal was recommended where in-stream dams serve a limited purpose. Many of Gloucester’s dams are important because they create water supply reservoirs, but other dams do not and alter the stream’s natural functions. Alteration may be positive in that dams may create wetlands and deep water habitat upstream, but they also may be negative in that they limit fish passage. These two factors must be balanced when considering dam removal.

*Fill Removal* – Fill removal is a generic term for the removal of fill in the stream or the adjacent wetlands. Fill removal may have been noted when a stonewall crossed a stream or when elevations were raised within a wetland for some land use purpose.

*Fish/Eel Ladder* – Fish and eel ladders are often used to facilitate passage of an anadromous or catadromous species. Ladders can be installed at dams or at culverts to allow passage over in-stream obstacles and to allow for a more natural flow.

*Invasive Plant Species Management* – Three invasive plant species were identified as degrading streamside and wetland habitats for purposes of this report – although many more exist and are present in Gloucester. These three species; Japanese knotweed (*Polygonum cuspidatum*), common reed (*Phragmites australis*), and purple loosestrife (*Lythrum salicaria*) are the most visible and arguably cause the greatest amount of disturbance to wetland habitats (not aquatic). Management of these species may involve a host of specific techniques that have not been included in this report.

*Open Marsh Water Management* – Open Marsh Water Management or OMWM is the process by which the hydrology of a salt marsh is changed to allow for more tidal flow to certain areas. These areas may be salt pannes or poorly drained portions of marsh. More tidal flow expands fish habitat, which can increase predation of mosquito larvae. OMWM can also create more saline conditions in the salt marsh, which can reduce growth of common reed.

*Roughened Ramp or Roughed Ramp*– The installation of roughened ramps facilitate fish passage and are often used to promote American eel passage. A

roughened ramp may simply be the addition of stones in a streambed to reduce dramatic elevation changes that hinder fish passage. A roughened ramp is usually a low technology alternative to the installation of a fish ladder and may be as effective.

*Stocking* - Stocking is a means of returning a natural population of fish species to a watershed. This report only identifies one area for stocking, as the prime objective of this report is to first enhance or restore stream functions. A more careful analysis of stream stocking should be considered prior to risking the fate of stocked species in watersheds that may not be suitable.

*Storm Water Best Management Practices* – Untreated storm water can seriously degrade a stream. Sediment and other more noxious pollutants from road runoff are often directly discharged into watersheds via street drains. Sites were only identified where the physical effects of storm water pollution were noted, such as sediment plumes.

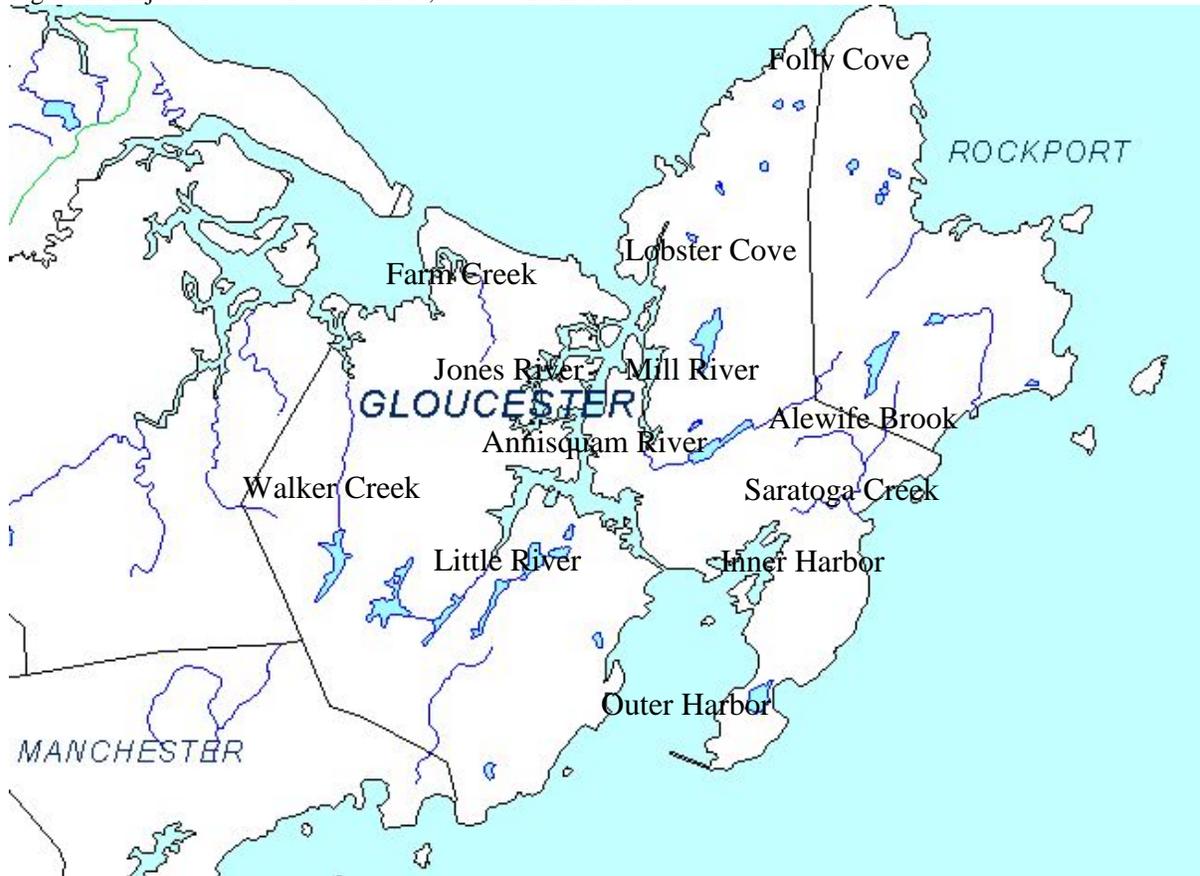
*Trash Removal* – Streams and rivers are often the recipient of illegal dumping. Where streams were especially affected by *large* amounts of trash they were noted in this report. The dumping of yard waste in streams fell under fill removal rather than trash removal.

## IV. Overview of Gloucester's Watersheds

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Because the land surface of Gloucester is dominated by exposed granite and shallow soils, many small rivers and streams are present throughout the city. Some of these include: Jones River, Mill River, Little River, Alewife Brook, Stoney Brook, Farm Creek and Walker Creek. Headwater ponds and former quarries feed many other small, unnamed streams. These include: West Pond, Clark Pond, Buswell Pond, Upper and Lower Banjo Ponds, Fernwood Lake, Wallace Pond, Dykes Pond, Haskell Pond, Sleepy Hollow Pond, Babson Reservoir, Goose Cove Reservoir, Langsford Pond, and Klondike Reservoir. It is useful to identify potential river and stream restoration sites in the context of watersheds, as the benefits of an individual project may depend upon the implementation of others. Figure 2 identifies the location of some of Gloucester's major watersheds, coves, and harbor.

Figure 2. Major Gloucester Watersheds, Coves and Harbor



The following table shows the distribution of the 225 potential restoration sites by watershed. The greatest number of sites is within the smaller unnamed streams (39).

Table 1. Potential Restoration Sites by Watershed

Alewife Brook	2
Annisquam River	18
Babson Reservoir Tributary	1
Blynman Canal	9
Buswell Pond	2
Clark Pond	3
Day's Pond	3
Duck Pond	2
Dykes Pond	1
Ebben Creek Tributary	1
Emerald Forest	1
Farm Creek	9
Fernwood Lake	5
Folly Cove/Stoney Brook	3
Freshwater Cove	1
Good Harbor/Long Beach	8
Goose Cove Reservoir.	7
Hodgkins Cove	2
Inner Harbor	1
Jones River/Sleepy Hollow Pond	6
Jones River/Annisquam River	5
Klondike Reservoir	1
Lane's Cove	2
Langsford Pond	4
Lily Pond	1
Little River	3
Lobster Cove	1
Mill River	11
Mill River Tributary	7
Niles Pond	1
Niles Beach	1
Norman's Woe Creek	6
Outer Harbor	4
Pigery Creek	4
Plum Cove	2
Rafes Chasm Creek	1
Saratoga Creek	7
Sheep Pond	2
Sleepy Hollow Pond	2
Smith Cove	1
Unnamed	39
Upper Banjo Pond	1
Walker Creek	11
Walker Creek Tributary	11
Wallace Pond	2
West Pond	8
Wolf Trap Brook	1
Wonson Cove	1

Some of Gloucester's streams are in relatively pristine condition and do not require extensive restoration activities. Some of the more pristine streams are found in Q-1 (northwest Gloucester) where less development has historically occurred and where there is more protected open space. Some of the more exemplary streams include the three unnamed streams that originate near Thompson Mountain and flow to Essex Bay, Farm Creek, and the upper portion of the unnamed stream that flows to interchange 13 at Rte. 128.

Some other notable streams originate in Dogtown Commons. They include, Alewife Brook – from Rockport to Babson Reservoir, and portions of Stoney Brook that drains to Folly Cove. In general most of the protected watershed lands contain small streams that are also in good condition, most of these streams flow to some of Gloucester's large reservoirs. Wolf Trap Brook in Magnolia is also a stream that is in relatively good physical condition.

Although the majority of Gloucester's streams and rivers were investigated, some were inaccessible or time constraints did not allow for a full field study. Priority was always given to streams where known impacts have occurred. The following areas should be investigated in the future:

- The tributary of Haskell Pond running west from Forest Lane
- Southern banks of Haskell Pond
- Portions of salt marsh along Jones River, eastern bank near Pearce Island
- Portions of salt marsh along Essex Bay at the outlet of Walker Creek
- Salt marsh section of Lanes Creek
- Quarries of Lanesville area
- Orchard Swamp/Beaver Swamp
- Alewife Brook immediately adjacent to Rockport
- Outlet of Strangman Pond
- Tidal portions of the Mill River between Riverdale and Riverdale Station
- Bass Rocks Country Club wetlands and waterways
- Most of the shoreline of Dykes Pond
- Portions of stream along Magnolia Ave. from industrial park to Magnolia Ave.
- Cat Brook (Magnolia)
- Wetlands and stream on northwest edge of Ravenswood Park

Site evaluations of each potential restoration site can be found in Appendix A. Along with site descriptions are abbreviated prescribed restoration activities. The key to restoration activity abbreviations can be found in Appendix B.

## V. Analysis of Potential Restoration Projects

Figure 3 represents the distribution of prescribed restoration activities identified in this report. The most frequently prescribed restoration activity was fill removal at 84 potential restoration sites. There is also a clear need for culvert upgrades with 69 potential restoration sites needing repairs or replacement of existing culverts to improve flow. There were almost an equal number of buffer enhancement, stream daylighting, invasive species management, and storm water best management practice projects identified.

Figure 3. Restoration Techniques Identified

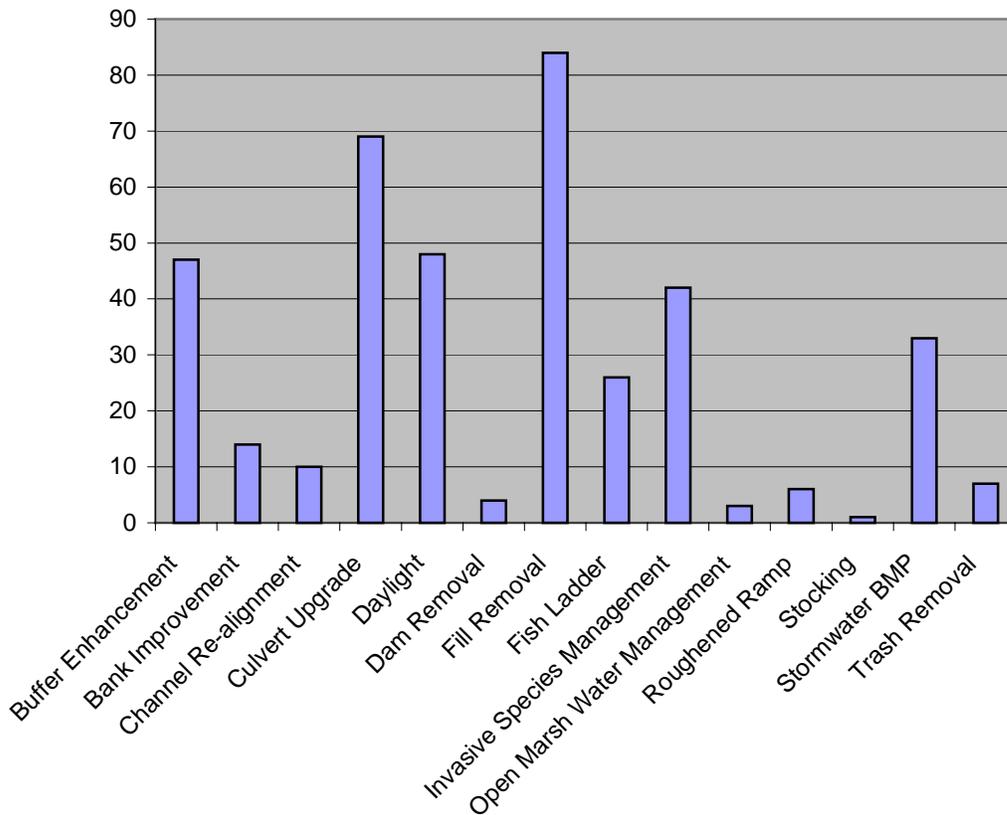


Table 2 shows the total number of potential restoration site, which if restoration is undertaken may enhance habitat of target species. There were almost an equal number of freshwater (riverine) and saltwater (estuarine) potential restoration sites identified. Not all sites identified as improving catadromous species habitat were considered as improving anadromous species habitat. Target species have different habitat requirements, not all of which could be addressed at each site. Sites that had more than one target species identified are those sites that usually were at the interface between salt and fresh water.

Table 2. Breakdown of Target Species

<b>Target Species</b>	<b>Number of Potential Projects</b>
Anadromous	5
Anadromous/Catadromous	29
Anadromous/Estuarine	10
Anadromous/Riverine	8
Catadromous	13
Catadromous/Riverine	9
Estuarine	72
Estuarine/ Riverine	1
Riverine	78

Table 3 identifies potential restoration sites addressing the enhancement of fish habitat or passage by target species and quadrant. Each site should be studied further to examine the full potential to enhance or re-introduce these species. These sites should also be compared to the sites recently examined by the Massachusetts Division of Marine Fisheries in their re-write of the 1970 completion report, titled Anadromous Fish Investigations, due out soon.

Table 3. Specific Target Fish Species, Potential Restoration Sites

*Alewife*

<b>Q-1</b>	<b>Q-2</b>	<b>Q-3</b>	<b>Q-4</b>
17, 36, 65	16,17,18,19,20,21,43,65,66	30,31,45	24

*Blueback Herring*

<b>Q-1</b>	<b>Q-2</b>	<b>Q-3</b>	<b>Q-4</b>
36,54	43,48		24

*Rainbow Smelt*

<b>Q-1</b>	<b>Q-2</b>	<b>Q-3</b>	<b>Q-4</b>
23,29,54,61,63	6,15,16,34,38,43,48,58		19,23,29,35

*American Eel*

<b>Q-1</b>	<b>Q-2</b>	<b>Q-3</b>	<b>Q-4</b>
65	7,12,19,66	26,39	38

Appendix C contains a map of sites where restoration activities are specifically targeted to enhance fish habitat.

## VI. Priority Restoration Projects

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### *Prioritization process*

The technical review team met four times to review all the potential restoration sites identified. The team ranked identified sites, using a scoring system based on 11 ranking criteria. Table 4 displays the total number of potential sites and priority sites identified per quadrant.

Table 4. Priority Sites per Quadrant

<b>Quad</b>	<b>Total Potential Sites</b>	<b>Priority Sites</b>
Q1	66	8
Q2	67	9
Q3	46	9
Q4	46	6

Of the 225 sites the team ranked, 32 top scoring potential restoration sites were categorized as major projects and the remaining 193 projects were identified as minor projects. Ranking of sites as either major or minor was inherently a subjective process, but in general minor sites were sites either too small to consider for priority action or lacked enough information to qualify as an immediate priority. Many of the minor sites may be worthy of action either immediately or in the future, but in the interest of time the team decided not to review all minor projects under the ranking criteria developed for this report. Appendix C contains a map of priority restoration projects.

### *The ranking criteria*

Eleven categories were developed with variable scoring given to the individual categories. The 11 categories include: *direct impact area of the restoration, the indirect impact area of the restoration, biological value, community support, stewardship, landowner support, cost, fundability, engineering, education value and liability*. Each of the categories was weighted according to their potential importance in gaining support and implementing a restoration project. See Appendix D for the Criteria for Determining Restoration Potential score sheet.

Table 5 lists the results of the ranking of major projects by quadrant, site number, and watershed. The highest score was 175 points out of a possible 230. All scores were divided by 175 to normalize scores to a 100-point scale.

Table 5. Ranking Results

Quad	Site #	Watershed	Score	%	Normalized Score
Q-1	61	Unnamed	175	76	100%
Q-1	45	Jones/Annisquam River	170	74	97%
Q-1	7	Walker Creek	165	72	94%
Q-2	48	Mill River	165	72	94%
Q-1	36	Sleepy Hollow Pond	160	70	91%
Q-1	65	Walker Creek	155	67	88%
Q-3	26	Day's Pond	155	67	88%
Q-4	23	Little River	155	67	88%
Q-4	24	Little River	155	67	88%
Q-4	29	Fernwood Lake	155	67	88%
Q-4	37	Blynman Canal	155	67	88%
Q-2	46	Mill River	150	65	85%
Q-1	64	Annisquam River	145	63	82%
Q-2	43	Mill River	140	61	80%
Q-3	3	Blynman Canal	140	61	80%
Q-3	20	Good Harbor Beach	140	61	80%
Q-2	42	Mill River	135	59	77%
Q-2	64	Alewife Brook	135	59	77%
Q-3	14	Saratoga Creek	135	59	77%
Q-3	11	Blynman Canal	130	57	74%
Q-2	59	Annisquam River	125	54	71%
Q-3	6	Emerald Forest	125	54	71%
Q-3	46	Day's Pond	125	54	71%
Q-4	14	Norman's Woe Creek	125	54	71%
Q-4	15	Norman's Woe Creek	125	54	71%
Q-1	20	Walker Creek	120	52	68%
Q-1	54	Unnamed	120	52	68%
Q-2	44	Mill River	120	52	68%
Q-2	47	Mill River Tributary	120	52	68%
Q-2	45	Mill River	115	50	65%
Q-3	43	Good Harbor	110	48	62%
Q-3	28	Saratoga Creek	105	46	60%

One clear result of the prioritization process is that some sites are watershed dependant while others could be described as stand-alone or independent projects. For example, eight project sites were identified in the Mill River watershed. These sites are inextricably linked and for one project to become a success other projects must also be implemented. For example site Q-2 43 is the Mill River tide gate at Washington Street, a smelt restoration project along Poplar Street (Q-2 48) can not be done successfully if the tide gate is not opened to allow fish passage at critical periods. As well, successful common reed eradication on the Mill River watershed will probably require removal or partial removal of the tide gate to raise salinities in the tidal portions of the watershed.

Other sites within the same watersheds have been identified in the prioritization process. These watersheds include Day's Pond (3 sites), Little River (2 sites), Norman's Woe

Creek (2 sites), and Walker Creek (3 sites). In general, each site should be considered in context of conditions in the watershed, including upstream and downstream influences.

## VII. Moving Projects Forward

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Taking a good project idea and actually making it a reality is a difficult and labor-intensive effort. Fortunately habitat restoration projects are becoming more commonplace. On the North Shore in the past five years there have been several completed pro-active restoration projects, including two in Gloucester, one at Long Wharf and one at Little River (Table 6). There are also nine active projects to be completed in the next two years including an eel passage project in Rockport and a project re-introducing the tide to restore over one hundred acres of estuarine habitat at the Parker River National Wildlife Refuge, in Newbury.

Table 6. Recently Completed, Pro-active Restoration Projects (North Shore Only)

<b>Town</b>	<b>Area</b>	<b>Restoration Method</b>	<b>Habitat Type</b>	<b>Project Contact</b>
Essex	Conomo Point	Culvert Upgrade	Salt Marsh	Essex Conservation Commission
Gloucester	Long Wharf	Culvert Upgrade	Salt Marsh	Gloucester Shellfish Constable
Gloucester	Little River	Fish Ladder Installation	Freshwater Stream	Gloucester Shellfish Constable
Ipswich	Argilla Road	Culvert Upgrade	Salt Marsh	NOAA Restoration Center
Ipswich	Cedar Point	Culvert Upgrade	Salt Marsh	The Trustees of Reservations
Newbury	Parker River/Main Street	Fish Ladder Installation	Freshwater River	Essex County Greenbelt Association
Newburyport	Joppa Flats	Fill Removal	Salt Marsh/Brackish Marsh	Massachusetts Audubon Society
Rockport	Saratoga Creek	Fill Removal/Storm water Improvement	Salt Marsh	Rockport Conservation Commission
Rowley	West Ox Pasture Brook	Daylighting	Freshwater Stream	Rowley Conservation Commission

The planning, implementation and monitoring of these projects can provide examples of both successes and means to improve restoration efforts. Lessons learned during these projects may help clarify permitting frameworks, funding possibilities, and strategies to gain support.

Restoration planning may require extensive fieldwork and hydrologic modeling. Many of the past alterations of Gloucester's river and streams related to the re-routing of water for a specific purpose. These may include agricultural practice, road development, and elevating land prone to flooding for housing development among others. Filling, and artificial connection and containment, may have achieved desired results with little engineering or planning. However, in restoring habitat functions and values, vegetation and water and soil distributions, must be considered along with existing infrastructure. Most if not all of the sites identified would require working in floodplains. Both safety and property value must also be considered. There are many potential restoration site attributes, which must be identified and well understood.

Important potential restoration site attributes include:

- Surveyed plan depicting property boundaries
- Existing stream and wetland boundaries
- FEMA 100-year floodplain boundaries
- Elevation contours
- Soil type, depth, and distribution
- Fill characteristics and quantities (if applicable)
- On site vegetation
- Existing infrastructure
- Stream bank and bed characteristics
- Existing flow characteristics
- Depth to groundwater

Collected site data can then be used in the formulation of a restoration design. The landscape will most likely be manipulated in a manner similar to the alteration at the root of the disturbance, involving earthwork and traditional landscaping. However, existing conditions and proposed conditions can be used to model outcomes qualitatively or quantitatively. Alternatives should also be developed considering cost and ecological benefit.

Creating strategic partnerships is a key component to any successful restoration with the most important partner being the landowner. Other potential partners are listed below (Table 7). Each of these organizations has a particular focus and mission, but all have similar interests in promoting habitat restoration. Neighborhood groups are also important partners, as well as multiple municipal boards, committees, commissions and municipal departments and staff.

Table 7. Project Coordination Information (partial list)

<b>Monitoring Sources</b>	Global Programme for Action Committee, MA Wetlands Restoration Program
<b>Funding Sources</b>	NOAA Restoration Center, Partners for Wildlife, FishAmerica Foundation, American Rivers, Conservation Law Foundation, Mass Wetland Restoration Program, EPA/NMFS Five Star Program, Ducks Unlimited, Ocean Trust, Gulf of Maine Council
<b>Potential Permit Requirements</b>	MEPA, Local and State Wetlands Protection Act, Chapter 91, Wetland Restriction Order (M.G.L c. 130 s. 105), Gloucester Lowlands Special Permit, ACOE Section 404/Section 10, 401 Water Quality Certification, MA CZM Consistency Review
<b>Potential Project Partners</b>	Ducks Unlimited, Mass Audubon, Essex County Greenbelt Association, the Trustees of the Reservations, the MA Wetlands Restoration Program, the Massachusetts Division of Marine Fisheries, the Eight Towns and the Bay Committee and the NOAA Restoration Center.

Another important potential partner, in particular for projects involving infrastructure changes such as culvert installation or upgrading, is the Gloucester Department of Public Works. An extensive planning and data collection effort is underway in order to comply with the EPA’s Phase II Storm Water requirements. This river and stream restoration report should be consulted to identify ways in which the implementation of storm water management projects and river and stream restoration can be combined.

For smaller scale projects such as buffer enhancements, individual landowners can make a significant difference. Individual landowners should consult with the City of Gloucester Conservation Commission to determine what can be done to improve their streams. See Appendix E for an example of a recently completed project.

## VIII. Conclusion

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Gloucester's rivers and streams have been impacted by a variety of disturbances, some of which can be ameliorated by pro-active restoration. Those responsible for determining mitigation for prior or future disturbance should refer to this report. Mitigation and pro-active restoration should be used in tandem to achieve tangible watershed improvements.

This inventory and prioritization of sites provides a starting point for the city and stewardship groups to address the degradation of Gloucester's rivers and streams. Many of the sites identified in this restoration report will need further study, especially if the maximum ecological benefit is to be obtained. A hydrologic study, for example, is an essential component of any project that proposes to alter flow, as the repercussions of a poorly planned and executed restoration may be devastating.

This report should also be used as a mechanism to raise awareness and as a tool for the community to start to think more systematically and holistically about the health and protection of environmental resources. Individual landowners can also use this report to consider making small changes to improve watershed health such as increasing streamside vegetative buffers and eliminating yard waste fill in wetlands and waterways.

Results from the prioritization process have revealed that some potential restoration sites can be considered independently, without addressing upstream or downstream disturbances. Others must be done in conjunction with several projects in the same watershed or the full positive effect of the restoration will not be realized. Addressing multiple sites at the same time or in phases is usually the best way to restore anadromous and catadromous fish runs.

This report identifies sites that may eventually become excellent restoration projects. The hard work of identifying project proponents, rallying landowner and political support, finding and procuring funding, permitting projects, managing contractors, monitoring and project compliance comes next.

Related publications for further reference:

- Executive Office of Environmental Affairs, Rumney Marshes Area of Critical Environmental Concern, Draft Salt Marsh Restoration Plan. June 2001.
- Kenneth Reback and J. DiCarlo, Massachusetts Division of Marine Fisheries, Completion Report, Anadromous Fish Project, 1967-1970
- Parker River Clean Water Association, Tidal Crossing Inventory and Assessment. December 1996
- Michael Ross, Recreational Fisheries of Coastal New England. University of Massachusetts Press, 1991
- Gill Lewis and G. Williams, Rivers and Wildlife Handbook. Royal Society for the Protection of Birds, 1984.
- Henry Bigelow and W. Schroeder, Fishes of the Gulf of Maine. Edited by Bruce Collette and G. Klein-MacPhee, Smithsonian Institution Press, Third Edition, 2002.
- Richard Pinkham, Daylighting, New Life for Buried Streams, Rocky Mountain Institute, 2000.
- Robert Buchsbaum and P. Brady, Buffer Zones: The Environment's Last Defense, A Report Submitted to the City of Gloucester, 1989.

## **VIII. Acknowledgements**

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City of Gloucester and Mass Audubon acknowledge the Massachusetts Division of Fish and Wildlife and Environmental Law Enforcement's, Riverways Urban Rivers Program for generously funding this river and stream habitat restoration report. Joan Kimball is the director of the Riverways Programs and Cindy Delpapa coordinates the urban grants program.

The City of Gloucester staff that were actively involved in the report are: David Gilmour, Planning Director and project coordinator; Dave Sargent, Board of Health; Mike Hale, Engineering Department; Gregg Cademartori, Conservation Agent and Robert "Stubby" Knowles, Shellfish Department. These staff members comprised the report's technical review team.

We would also like to thank the following for their support; Mayor, John Bell; City Counselor, Christine Rasmussen; Community Development Department Director, Dale Brown and Grant Department Director, Sarah Buck.

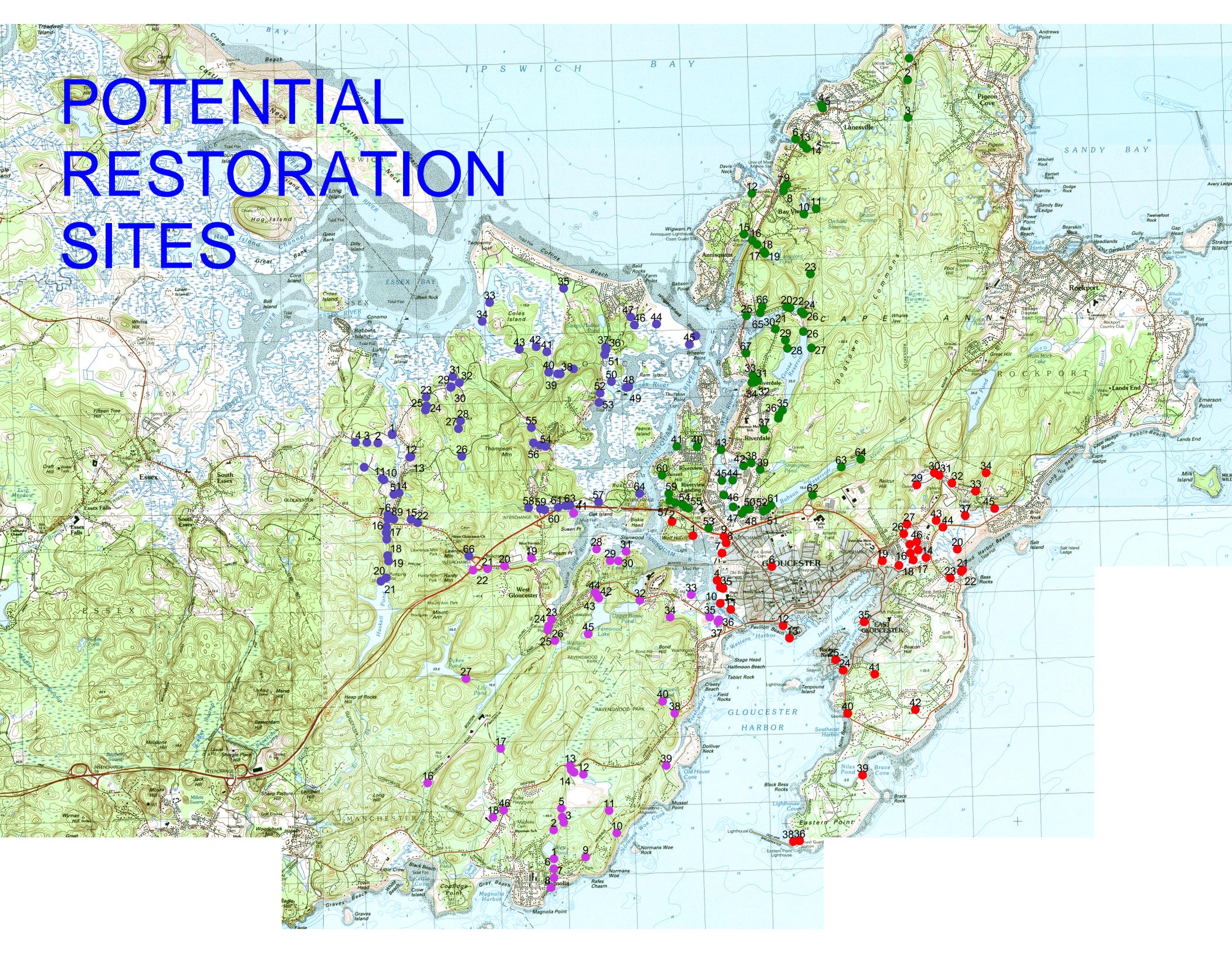
The following Cape Ann residents contributed by providing information vital to the report or assisted in outreach and education; Vilma Hunt, Geoff Edwards, Gregg Smith, Barbara Lambert, Max Schenk, and Tori Bagshaw. Many others citizens assisted in field research by allowing access to sites and by answering questions about local streams and the natural history of Gloucester.

## **Appendix A**

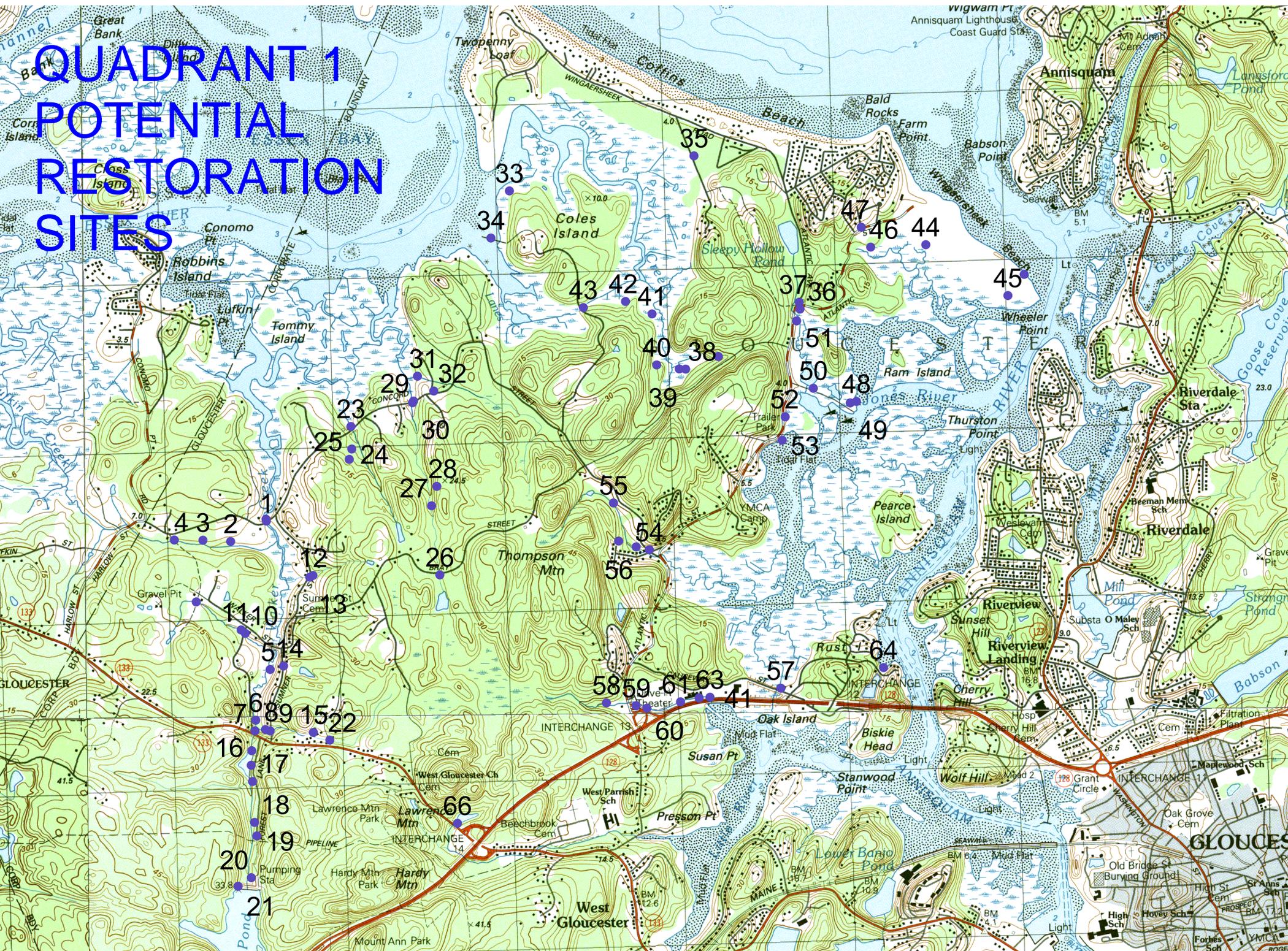
### **Site Evaluations and Associated Maps**

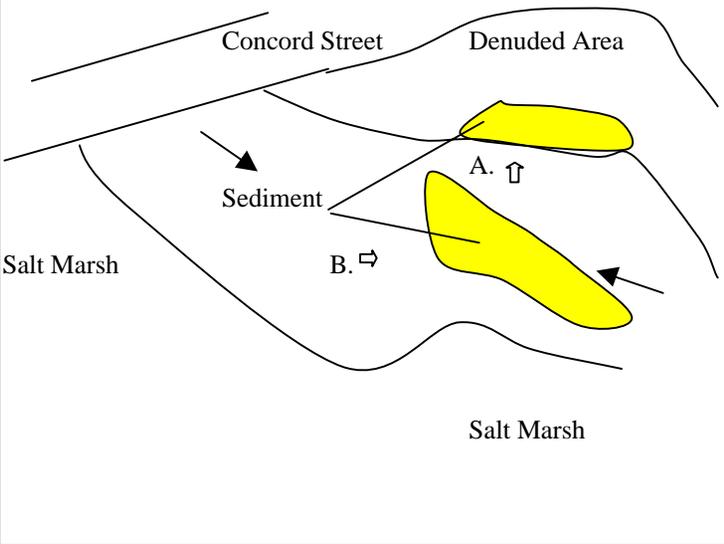
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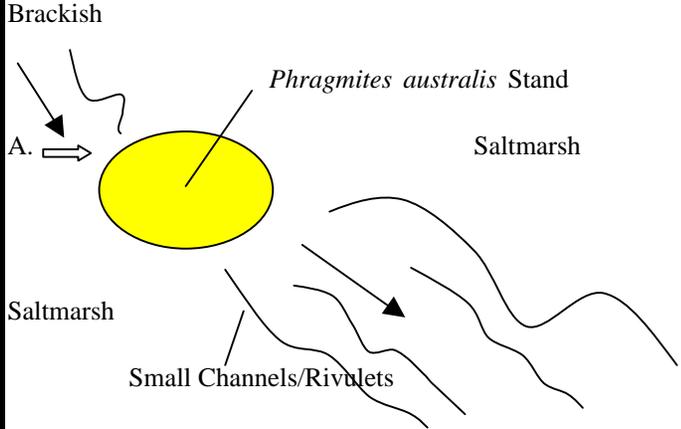
# POTENTIAL RESTORATION SITES

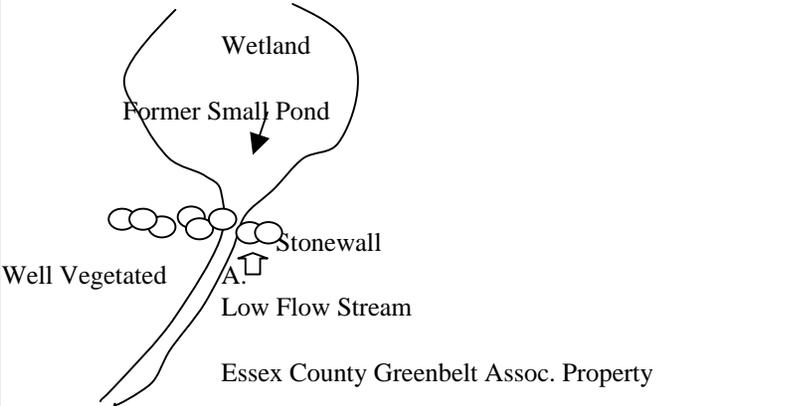


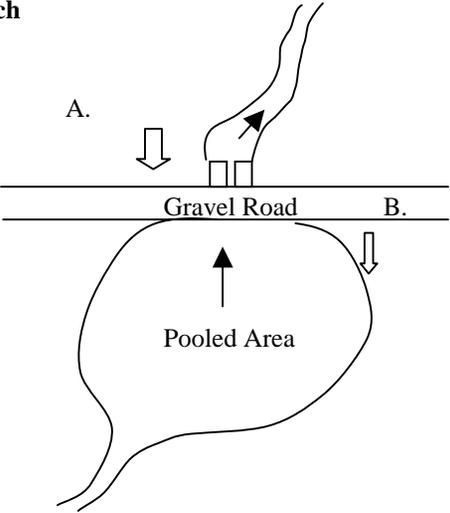
# QUADRANT 1 POTENTIAL RESTORATION SITES

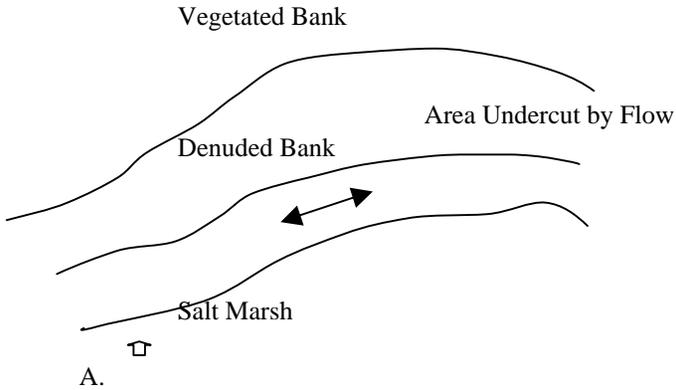


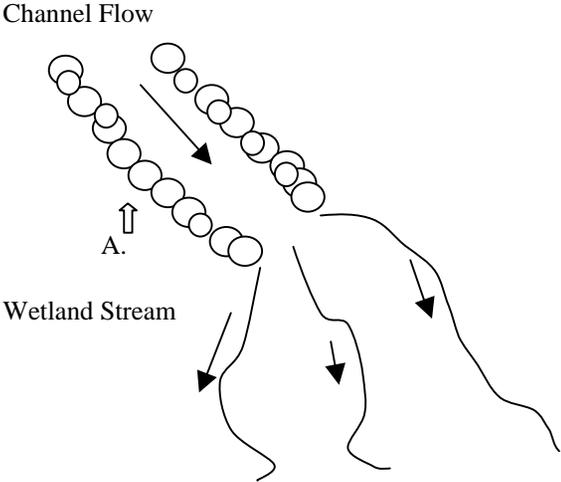
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	1	Walker Creek	Saltmarsh/Tidal Flat	FR, BMP	Estuarine	Concord St.	Unknown	1, 2
<b>Notes</b>				<b>Photo</b>				
Spoils due to stormwater - sediment buildup				<b>A.</b> 				
Sand pile adjacent to road deposited from swale cut in bank								
Years of accumulated sediment								
Little corresponding shellfish life associated with spoil piles								
No stormwater infrastructure along Concord Street								
Sediment exposed at low tide only								
In stream gravel bar, edge of bar is sand								
Denudation of bank may be due to human use								
Upstream bridge may affect area of impact								
								
<b>Restoration Priority</b>				<b>B.</b> 				
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

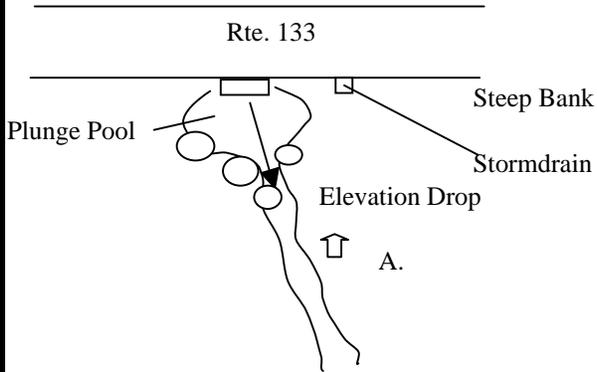
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	2	Walker Creek Trib.	Brackish Marsh	IM	Estuarine	None	Unknown	3
<b>Notes</b>				<b>Photo</b>				
Transition zone area (salt to fresh water)				A.				
No clear channel definition adjacent to <i>Phragmites</i> growth area								
Watershed has a slight elevation drop								
Little natural disturbance								
As one moves up watershed more of a defined stream channel								
Phragmites stand approx. 30'x 30'								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

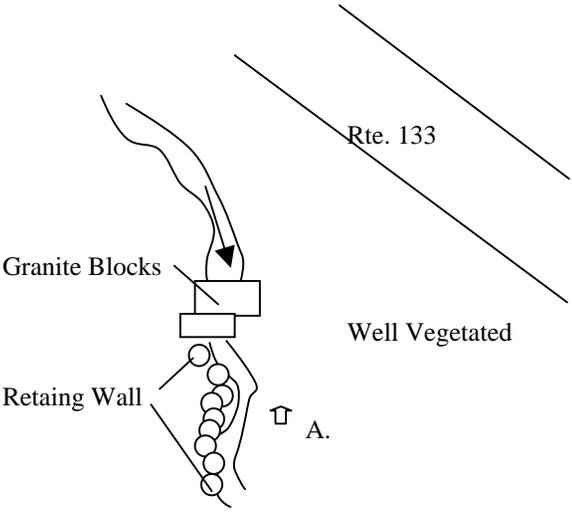
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	3	Walker Creek Trib.	Deep Marsh/Wooded Swamp Deciduous	FR	Riverine	None	Private	4
<b>Notes</b>				<b>Photo</b>				
Homeowner seems to have attempted to create a pond				<b>A.</b> 				
HDPE liner present								
Small stone dam								
75 yards behind private residence								
Property abuts and impacts Essex County Greenbelt Assoc. property								
Pond filling in - reverting to an emergent swamp								
Seems to have been some canopy removal								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

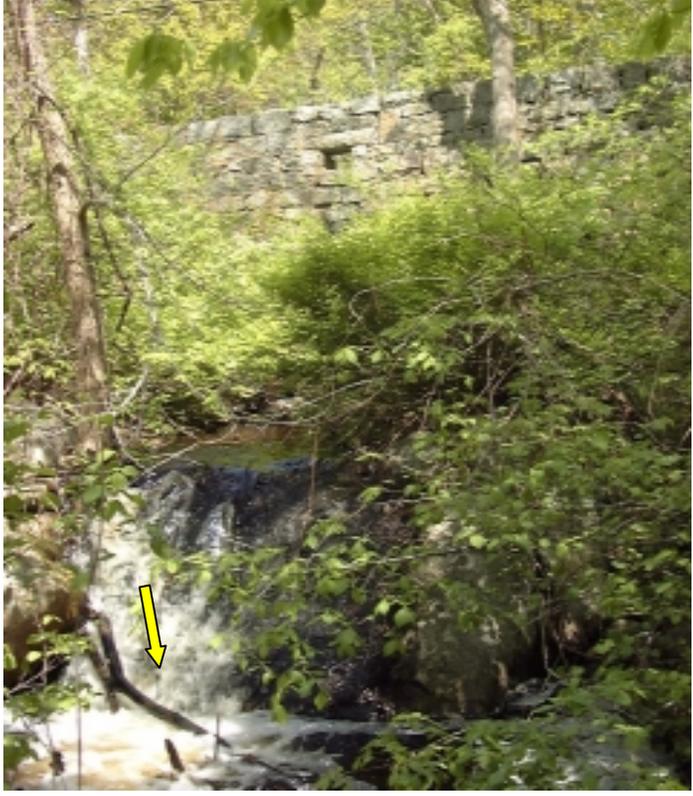
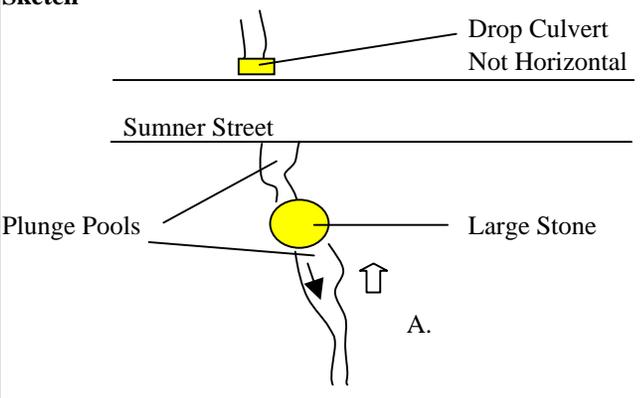
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	4	Ebben Creek Trib.	Deep Marsh/Wooded Swamp Deciduous	CU	Riverine	Unnamed	Private	5
<b>Notes</b>				<b>Photo</b>				
Stream flows under road, towards Essex not Walker Creek				A.				
Two small 12" culverts								
Small culverts as well as driveway restrict natural flow								
Upstream - small pool is formed								
Larger culvert would restore more natural flow but may reduce value of vernal pool like restricted area.								
Culvert set high								
Essex County Greenbelt Assoc. land adjacent to culvert								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	5	Walker Creek	Salt Marsh	BI	Estuarine	Concord St.	Private	6
<b>Notes</b>				<b>Photo</b>				
Appears to be a swimming area				A.				
Bank denuded due to apparent human use								
Limited restoration potential if continued use as swimming area								
Some trash could be removed from area								
At transition zone fresh to salt								
Probably within rainbow smelt spawning area								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

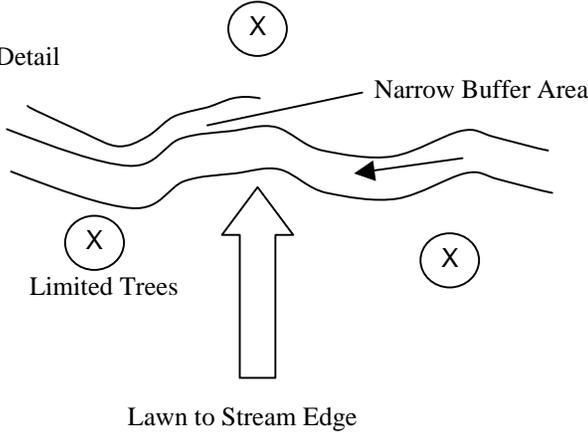
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	6	Walker Creek	Shrub Swamp	BI	Anadromous/Catadromous	Essex Ave.	Unknown	7
<b>Notes</b>				<b>Photo</b>				
Stream channelized, enhances deep water flow				<b>A.</b> 				
Below channel wetland stream conditions								
Area would provide sufficient depth for alewife passage								
Banks are loose stone								
If alewife passage is a goal this area may not need to change								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

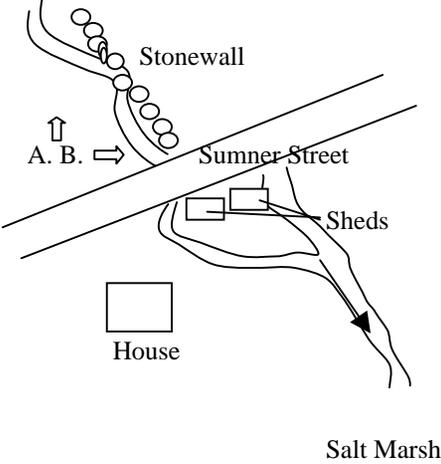
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	7	Walker Creek	Wooded Swamp Deciduous	CU, RR, BMP, FL	Anadromous/Catadromous	Essex Ave.	Public	8
<b>Notes</b>				<b>Photo</b>				
Culvert set too high for fish passage				A.				
Improvement to eliminate water fall would aid passage potential								
Approx. 4' steel culvert								
Plunge pool formed below culvert outlet								
Stormdrain outlet discharges untreated to stream								
Culvert upgrade or fish ladder to existing culvert may solve passage issues								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 165								

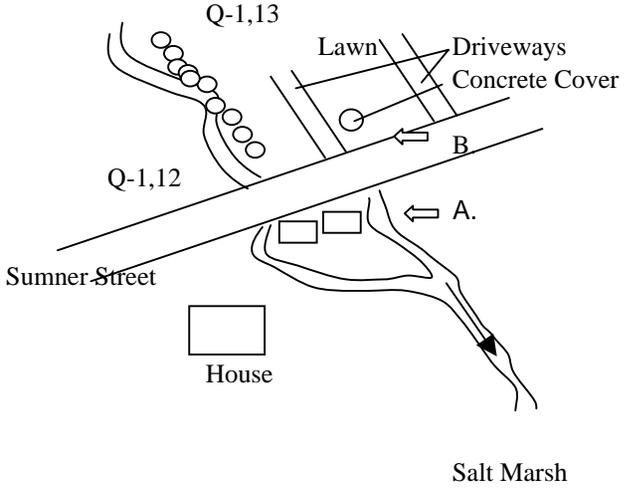
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	8	Walker Creek Trib.	Wooded Swamp Deciduous	FR	Riverine	Sumner St./Essex Ave.	Private	9
<b>Notes</b>				<b>Photo</b>				
Granite blocks in stream retard water flow				<b>A.</b> 				
Blocks create small water fall								
Impact to resource area slight due to no anadromous fish usage								
Need to determine impact to eels								
Possibly an old mill site								
Good canopy along stream								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

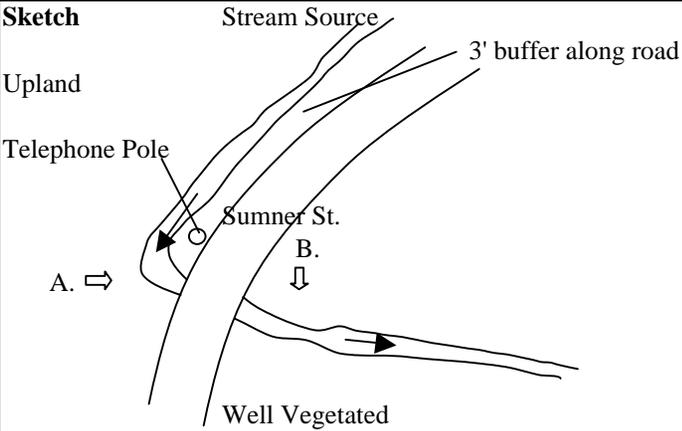
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	9	Walker Creek Trib	Shrub Swamp	FR, CU	Riverine/Catadromous	Sumner St.	Unknown	10
<b>Notes</b>				<b>Photo</b>				
Large elevation drop from across the street								
Road appears to be an old mill foundation								
Elevated box culvert creates waterfall								
Large stone in stream retards flow								
Plunge pools are present								
Upstream water flows through flat drop culvert								
Granite box culvert								
<b>Sketch</b>				A.				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

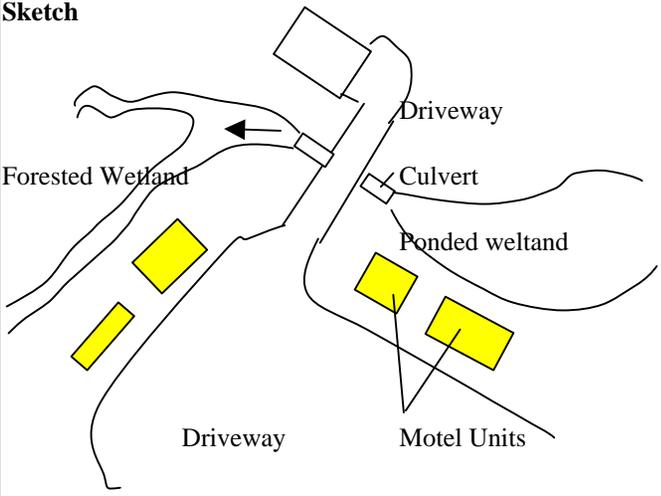


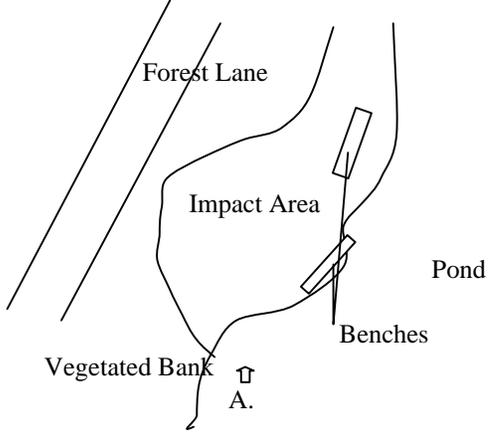
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	11	Walker Creek Trib.	Shallow Marsh Meadow	BE	Riverine	Lincoln St./Walker St.	Private	12,13
<b>Notes</b>				<b>Photo</b>				
Along stream many areas where lawn comes to stream edge or near stream edge				A.				
Education campaign about importance of natural riparian buffers								
Reduced canopy								
Structures and debris to stream edge								
Entire length of creek could be inventoried for buffer enhancement opportunities								
Waypoints indicate upper and lower end of extent of buffer reduction								
Photo taken at Lincoln Street culvert looking upstream								
<b>Sketch</b>								
Typical Detail								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	12	Walker Creek Trib.	Shallow Marsh Meadow/Wooded Swamp Deciduous	CU, BE, BMP	Catadromous	Sumner St.	Public/Private	14
<b>Notes</b>				<b>A.</b>				
Upstream horizontal drop culvert								
Downstream waterfall								
Upstream stream buffer reduced by cutting								
Stonewall criss crosses stream, upstream								
Drop culvert on upstream								
Transition zone between salt and fresh								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	13	Walker Creek Trib.	Shrub Swamp	DL, BMP, CU, BE	Catadromous	Sumner St.	Public/Private	15
<b>Notes</b>				<p>A.</p>  <p>B.</p> 				
Upstream - no inlet culvert found								
Downstream - waterfall								
Transition zone between salt and fresh								
Site adjacent to Q-1, 12								
Concrete pad may cover stream								
Amount of potential daylight not known, over 100 yards								
Lawn replaces stream								
Flow seen downstream indicates probably intermittent stream or small perennial stream similar to Q-1,12								
Typical steep elevation drop from salt to fresh seen along								
Discharge to north bank of Walker Creek								
Young trees over approximate area of fill (see photo)								
Pond shown on USGS upstream								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	14	Walker Creek Trib.	Shrub Swamp	BMP, BE	Riverine	Sumner St.	Public	16
<b>Notes</b>				A.	 			
Upstream flow along street								
Low flow stream								
Natural stream is probably part of roadside drainage								
Steep drop to Walker Creek								
Could do stormwater enhancement along road								
Limited restoration potential due to proximity to road								
Swale and banks are vegetated								
Culvert outlet - drop flow								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	GPS - ID
Q-1	15	Walker Creek Trib.	Shrub Swamp/Wooded Swamp Deciduous	BE, CU	Riverine	Essex Ave.	Private	17
<b>Notes</b>				<b>Air Photo</b>				
Area altered by close development to stream				<p>A.</p>  <p>Motel Driveway</p>				
Area most likely historic fill								
Stream flows against edge of motel buildings								
Recently installed culvert too small, creates wetland stream above								
Dense residential activity adjacent to stream								
Larger culvert or bridge may reduce upstream wetlands								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

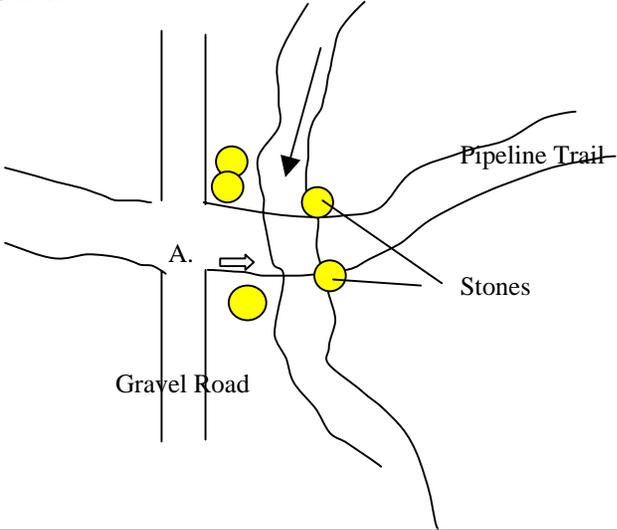
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	16	Walker Creek	Wooded Swamp Deciduous	BE	Riverine	Forest Lane	Public	18
<b>Notes</b>				<b>Photo</b>				
Impact from human use				<b>A.</b> 				
Area might be restricted access during growing season								
Soil compaction may exacerbate problems of re-growth								
High visibility potential								
Stewardship of area may be a problem								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

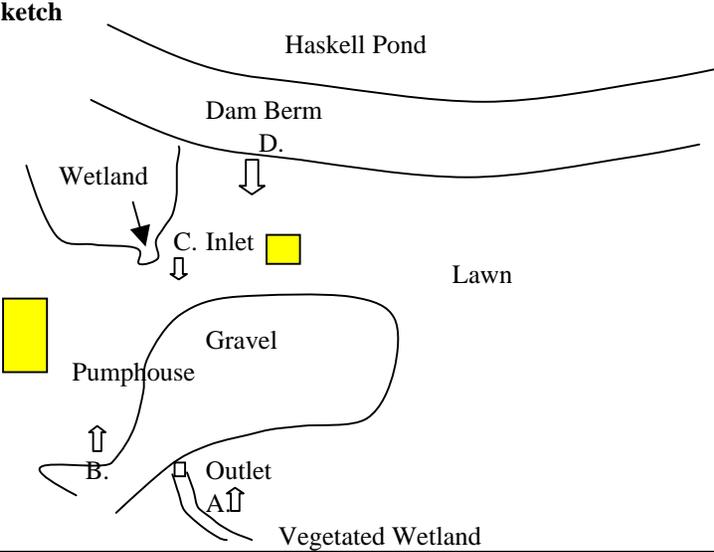
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	17	Walker Creek	Wooded Swamp Mixed Trees	CU,FR	Riverine	Forest Lane	Unknown	19
<b>Notes</b>				A.				
Bridge may serve private property								
Steal pipes probably do not contain utilities								
Bridge could be improved to reduce potential for stream blockage								
Low priority site								
Stream may have potential for native trout if adequate base flow								
Stream has good canopy								
Alewife run may not likely due to lack of base flow								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

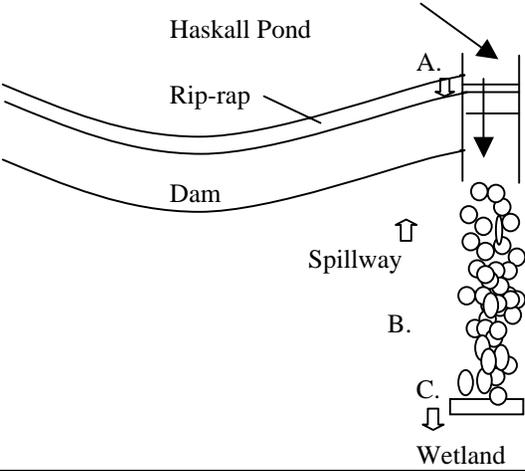


Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	18	Walker Creek	Wooded Swamp Coniferous	DL, TR	Riverine	Forest Lane	Unknown	20
<b>Notes</b>				<b>Photo</b>				
Appears to be an old bridge				A.				
Trees growing on bridge aid overall canopy								
Limited impact								
Water cooling effect do to shelter, may be positive								
Flow not retarded (high flows only)								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								



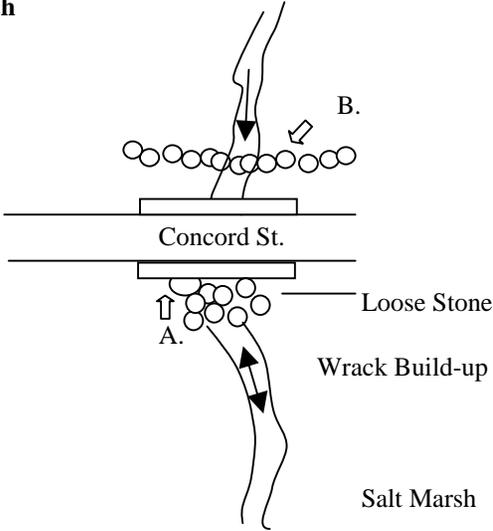
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	19	Walker Creek	Wooded Swamp Mixed Trees	BE, TR	Riverine	Forest Lane	Unknown	21
<b>Notes</b>				<b>Photo</b>				
Area used for recreational access to pipeline right-of-way				A.				
Bank degradation causes stream sedimentation								
Area prone to dumping due to proximity to road								
Culvert may not needed, need to limit area of denudation								
River becomes wider due to impact								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

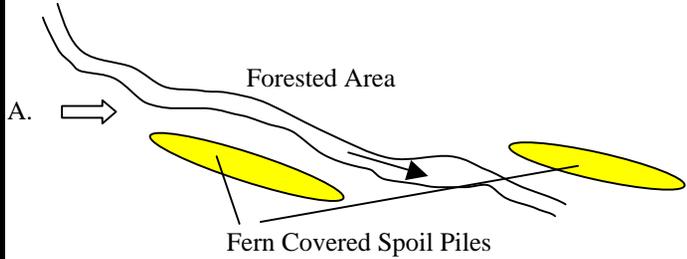
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	20	Walker Creek	Shallow Marsh Meadow	DL, BE	Riverine	Forest Lane	Municipal	22
<b>Notes</b>								
Stream runs under lawn				A.				
Outlet culvert approx. 1' in diameter				B.				
Approx. 100' of buried culvert								
Source is small wetland that is probably feed by dam seep								
Daylighting could be allowed with small bridge for access needs								
Walker Creek source (also spillway during high lake levels)								
Good potential to create resource area and replace upland								
Restoration could reduce stormwater build-up at dam base								
<b>Sketch</b>				C.				
								
<b>Restoration Priority</b>				D.				
<i>General Classification: major</i>								
<i>Restoration Potential Score:</i>								

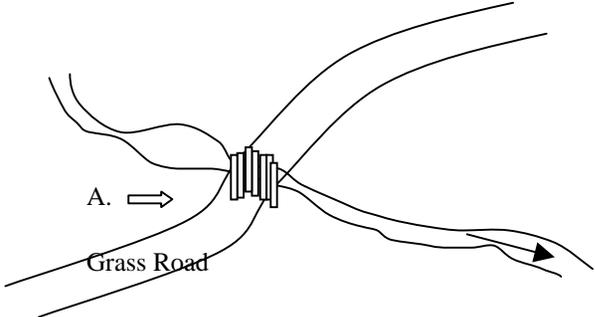
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	21	Walker Creek	Shrub Swamp	FL	Anadromous	Forest Lane	Municipal	23
<b>Notes</b>				A.				
Spillway for overflow								
Not designed for anadromous fish								
Flashboards regulate flow								
Spillway drains to wetland - not main stream								
Steep run								
Could be retrofitted for alewife if good base flows are present and other improvements are made								
Intensive engineering requirements								
Approx. 30' elevation drop over a approx. 50' run								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>				C.				
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

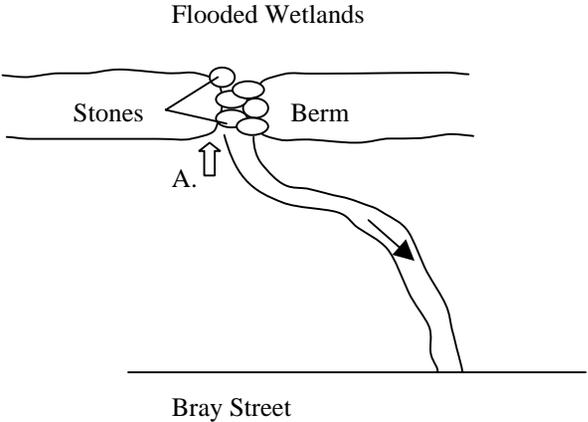
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	22	Walker Creek Trib.	Shrub Swamp/Wooded Swamp Deciduous	CU,BE	Riverine	Overlook Ave.	Public	24
<b>Notes</b>				<b>A.</b>				
Rip-rap bank stabilization effort reduces natural values								
Lawn comes to edge of stream								
Culvert is adequately sized								
Some ponding upstream								
Stream becomes more of a wetland stream upstream from culvert								
Natural buffer would enhance stream values and functions								
<b>Sketch</b>				<b>B.</b>				
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

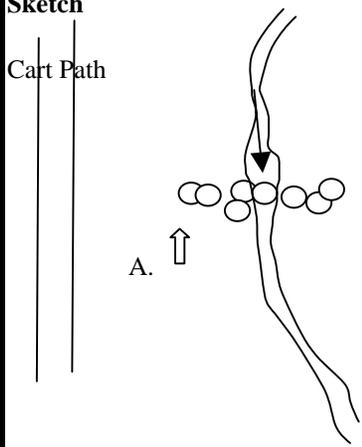


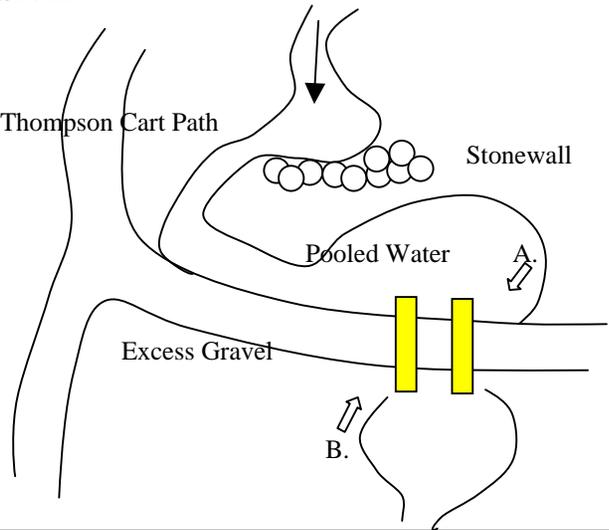
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	23	Unnamed	Shrub Swamp/Brackish Marsh	CU	Anadromous/Catadromous	Concord St.	Public	25
<b>Notes</b>				<p>A.</p>  <p>B.</p> 				
Granite box culvert in disrepair								
Potential smelt spawning area								
Heavy tide wrack build-up in area								
Just upstream of culvert stonewall runs across the stream								
Eel passage impeded								
Alewife potential - probably none - no headwater pond								
Water seeps through rocks								
<i>Phragmites australis</i> noted downstream								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

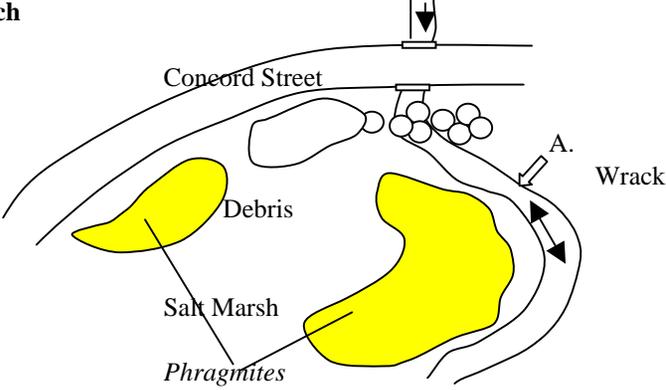
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	24	Unnamed	Wooded Swamp Deciduous	FR	Riverine	Concord St.	Unknown	26
<b>Notes</b>				<b>Photo</b>				
Bank looks like the excavation spoils from stream dredging or a drainage project				<p>A.</p> 				
Creates upland fill in area of natural stream bank								
Area has good canopy cover								
Two berms are 50' to 100' in length								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

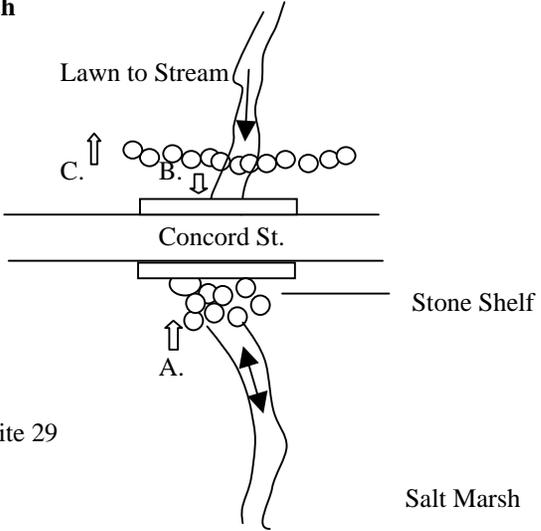
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	25	Unnamed	Wooded Swamp Deciduous	FR	Riverine	Concord St.	Unknown	27
<b>Notes</b>				<b>Photo</b>				
Minor stream disturbance				A.				
Leaf buildup upstream of bridge								
Small corduroy bridge								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

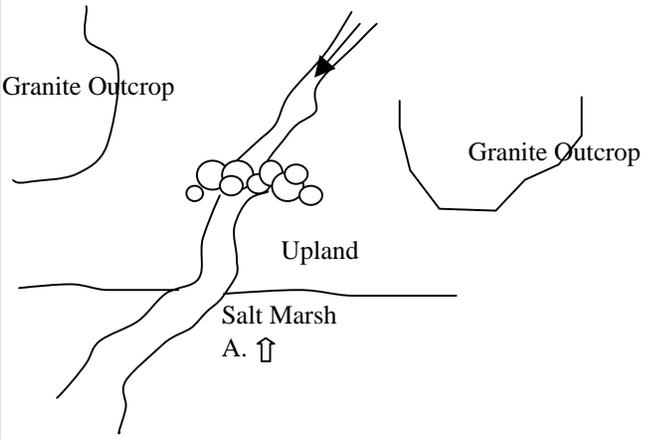
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	26	Unnamed	Wooded Swamp Deciduous	FR, FL	Riverine	Bray St.	Private	28
<b>Notes</b>				<b>Photo</b>				
Old earthen and stone dam creates impoundment for pond				<p>A.</p> 				
Berm is vegetated								
Impoundment creates healthy wetland system								
Limited need if no anadromous/catadromous fish passage								
Shrub swamp upstream								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	27	Unnamed	Wooded Swamp Deciduous	FR	Riverine	Thompson Cart Path	Municipal	29
<b>Notes</b>				<b>Photo</b>				
Stonewall across stream				<b>A.</b> 				
Passage obstruction								
Water is detained								
Stream has potential for native brook trout with proper base flows								
Slight disturbance								
Restoration needs to be looked at in context of entire watershed								
Plunge pool formed below								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	28	Unnamed	Wooded Swamp Deciduous	FR , CU, BE	Riverine	Thompson Cart Path	Municipal	30
<b>Notes</b>				<p>A.</p>  <p>B.</p> 				
Two steel, 2' culverts								
Fish passage obstruction								
Water is detained								
Stream has potential for native brook trout if proper base flows								
Stonewall as well as culverts detain flow								
Repair needs to be looked at in context of entire watershed								
Gravel from trail slumping into stream								
Sedimentation from trail impacting stream								
Culverts elevated								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

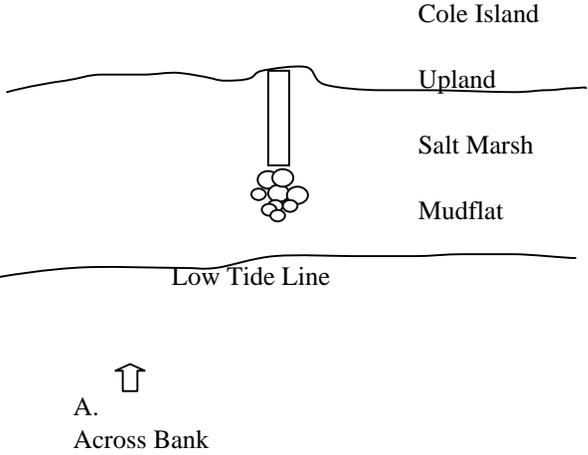
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	29	Unnamed	Salt Marsh	BMP, IM, TR	Anadromous/Estuarine	Concord St.	Unknown	31
<b>Notes</b>				<b>Photo</b>				
<i>Phragmites australis</i> growth area								
Area of <i>Phragmites</i> limited - 50' x 50' (average of two areas)								
Wrack build-up along road and into salt marsh								
No stormdrains noted								
Area could be cleaned out periodically to keep elevations low to discourage <i>Phragmites</i> growth								
Area may be smelt spawning area								
Granite box culvert above (see site 30 and tidal restriction report)								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

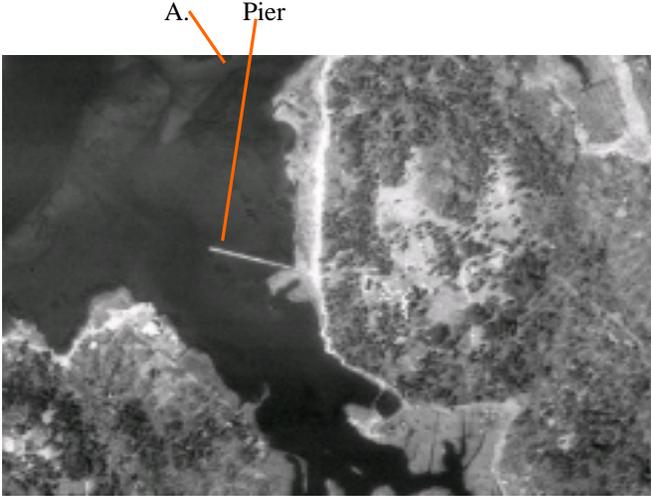
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	30	Unnamed	Shrub Swamp/Brackish Marsh	CU	Anadromous/Catadromous	Concord St.	Public	32
<b>Notes</b>				<p>A. </p> <p>B. </p> <p>C. </p>				
Granite box culvert in disrepair (see tidal restriction study)								
Possible smelt spawning area								
Approx. 7' elevation drop from fresh to salt								
Heavy tide wrack build-up in area								
Just upstream of culvert stonewall runs across the stream								
Eel passage impeded								
Alewife potential - limited - no headwater pond								
Water seeps through rocks								
Phragmites noted downstream								
Upstream buffer enhancement lawn to stream edge								
<b>Sketch</b>								
 <p>Lawn to Stream</p> <p>C. ↑</p> <p>B. ↓</p> <p>Concord St.</p> <p>Stone Shelf</p> <p>A. ↑</p> <p>See Site 29</p> <p>Salt Marsh</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

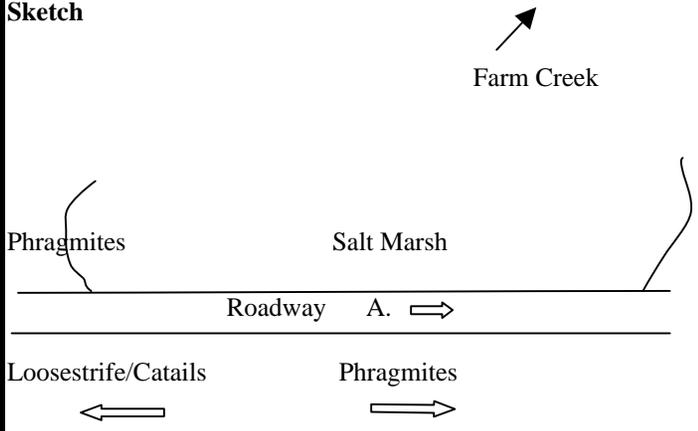
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	31	Unnamed	Shrub Swamp/Brackish Marsh	FR	Catadromous	Concord St.	Unknown	33
<b>Notes</b>				<b>Photo</b>				
Stonewall across stream				A.				
Stone fill in sensitive transition zone								
Removal of stones would establish natural flow								
Easy restoration potential								
Minor disturbance								
Creek downstream is wide and deep, may be smelt spawning area								
Significant elevation change								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

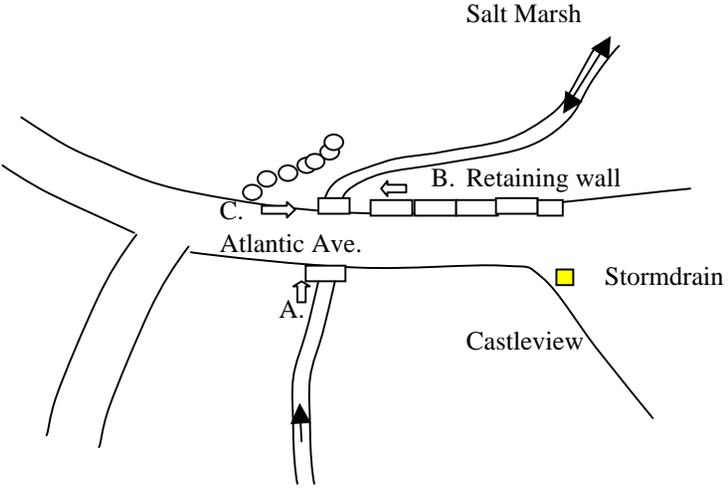
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	32	Unnamed	Shrub Swamp	CU, BE	Catadromous	Concord St.	Public/Private	34
<b>Notes</b>				<b>Photo</b>				
Inlet of culvert upstream is completely submerged				A.				
Small waterfall created downstream								
Upstream a wetland is formed								
Water seeps through the collapsed culvert								
Downstream lawn to stream edge, need for a greater buffer								
Culvert under private driveway downstream								
Due to restriction - wetland created upstream								
Need to consider improved drainage with wetland loss								
Salt marsh (Site 31) approx. 200 yards below site								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

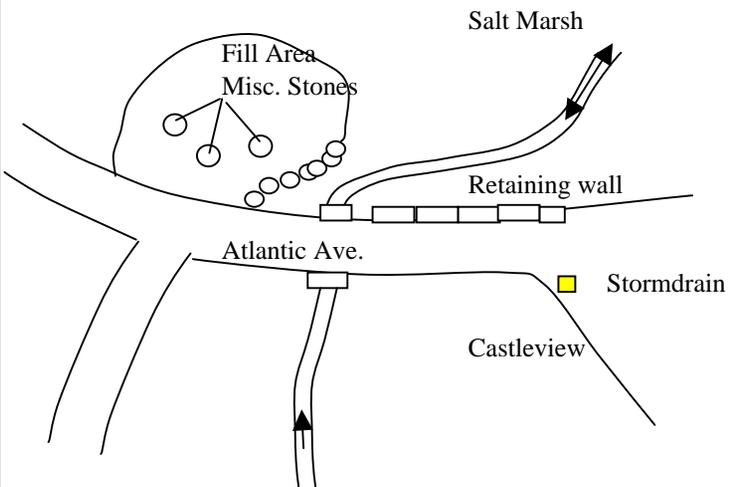


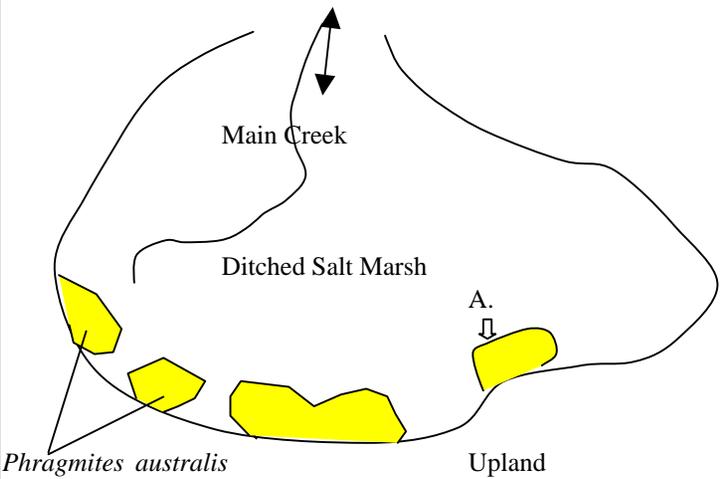
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	33	Farm Creek	Salt Marsh	FR	Estuarine	Unnamed	Unknown	35 (150' away)
<b>Notes</b>				<b>Photo</b>				
Old concrete pier, not used				<p>A.</p> 				
End extends to mudflat								
Extension of concrete slab across salt marsh								
Coastal access barrier								
Approx. 30-40 foot structure, 5' feet wide								
Waypoint taken across Farm Creek								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

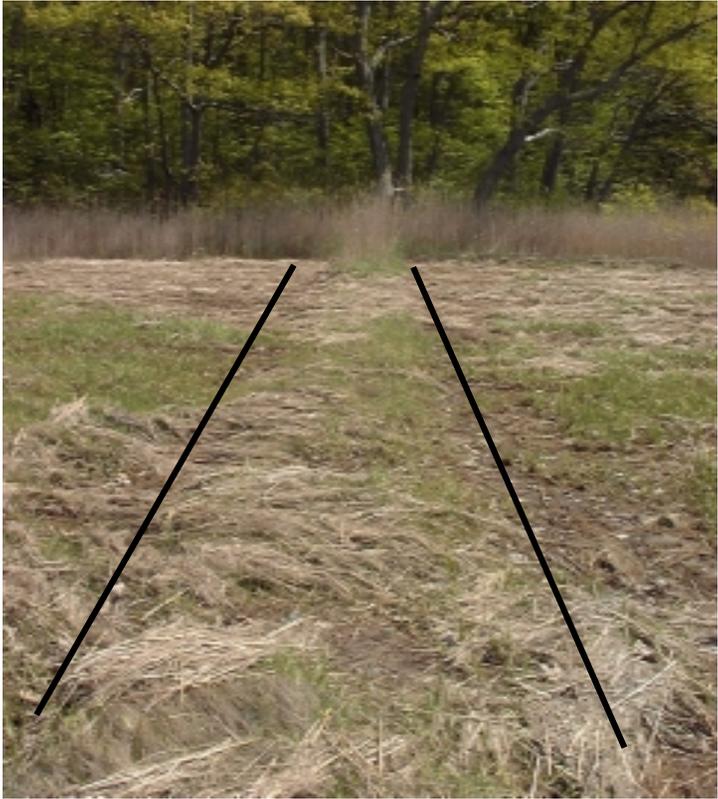
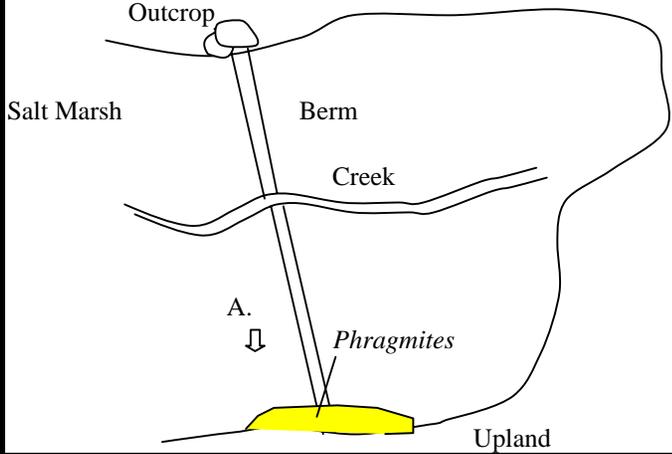
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	34	Farm Creek	Salt Marsh	FR	Estuarine	Cole Island	Unknown	NA
<b>Notes</b>				<b>Photo</b>				
Sizable pier shown on USGS				A.				
Historic structure composed of granite blocks								
Length approximately 400-500 feet								
Pier not inspected close-up								
Pier may have influenced dispersal of sediment and mudflat locations								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

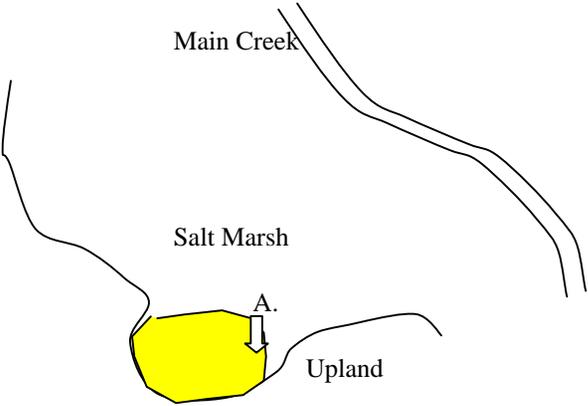
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	35	Farm Creek	Salt Marsh/Brackish Marsh	FR, CU, IM	Estuarine	Massachusetts Ave.	Unknown	36
<b>Notes</b>				<b>Photo</b>				
Road limits sheet flow across marsh to impacted area								
A series of French drains may improve conditions, rather than a single culvert (or paved cross swales)								
Road elevation is low								
Road's utility not known seems low								
Area will probably always remain brackish even with tidal flow improvements								
Feeder creeks or ditches from salt marsh not apparent								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

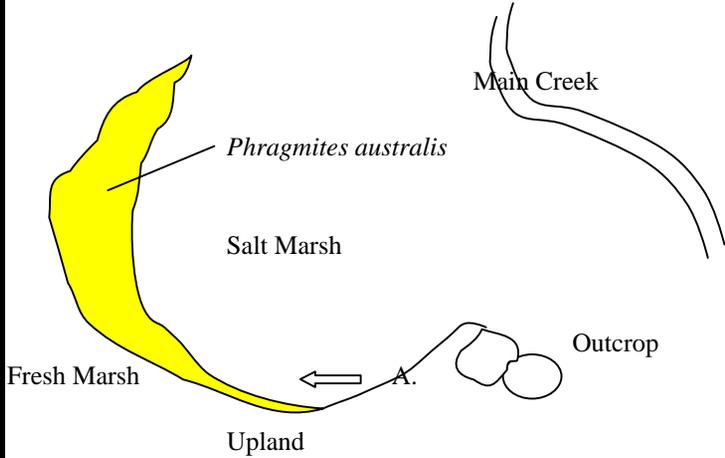
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	GPS - ID
Q-1	36	Sleepy Hollow Pond	Salt Marsh/Brackish Marsh	FL, CU, BMP	Anadromous	Atlantic St.	Public	37
<b>Notes</b>				<b>A.</b>				
Granite culvert, slumped and in poor repair								
Low flow may reduce alewife passage								
Culvert improvements could be done in conjunction with stormwater improvements								
Erosion along roadway, sedimentation and siltation noted								
Approximately 2'x2' box culvert (upstream)								
Downstream side almost completely blocked								
Downstream stream channel may need to be improved for fish passage								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>				<b>C.</b>				
General Classification: major								
Restoration Potential Score: 160								

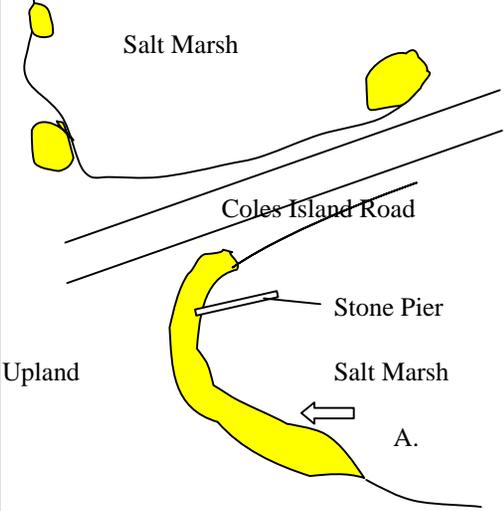
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	37	Sleepy Hollow Pond	Salt Marsh	FR	Estuarine	Atlantic St.	Public	38
<b>Notes</b>				<b>Photo</b>				
Area of historic fill				A.				
Upland plants dominate disturbed area								
Approx. fill limits - 50' x 50'								
Site could be a good mitigation site or a BMP location								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

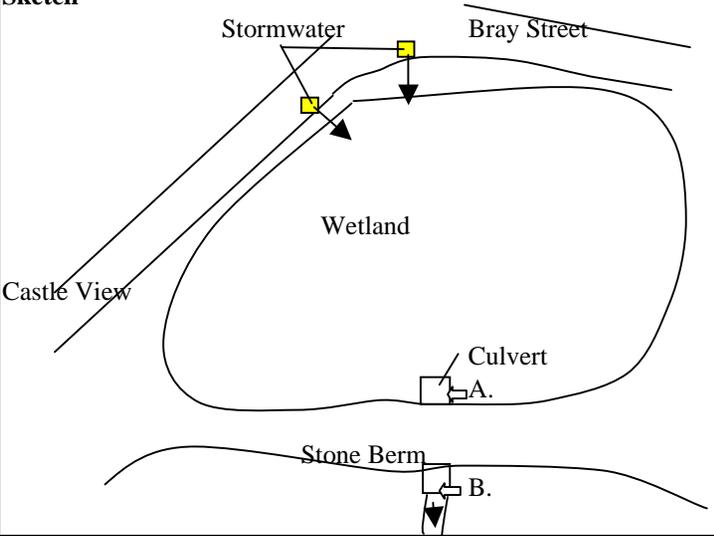
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	38	Farm Creek	Salt Marsh	IM, OMWM	Estuarine	Bray St.	Unknown	39
<b>Notes</b>				<b>Photo</b>				
Transition zone of <i>Phragmites australis</i> (upland vs. wetland)				A.				
Series of 4-5 small areas (approx. 40'x60') along transition zone								
Well defined series of ditches in salt marsh area								
Litter ditches may reduce <i>Phragmites</i> expansion								
Restoration should include all <i>Phragmites</i> areas in marsh area								
Project could be done in conjunction with mosquito control								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

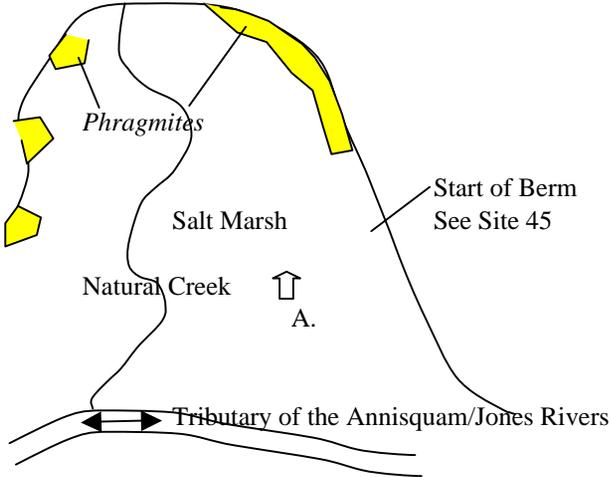
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	39	Farm Creek	Salt Marsh	FR	Estuarine	Bray St.	Unknown	40
<b>Notes</b>				<b>Photo</b>				
Old berm in salt marsh				A.				
Berm approx. 4' wide								
At Bray St. edge Phragmites advancing along berm								
Approx. 6" elevation difference								
Berm collects wrack								
Berm supports high marsh plant species								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

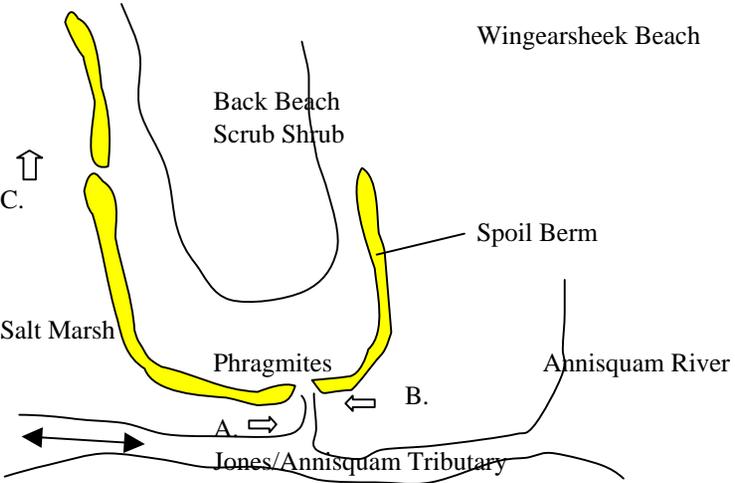
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	40	Farm Creek	Salt Marsh	IM	Estuarine	Bray St.	Unknown	41
<b>Notes</b>				<b>Photo</b>				
<i>Phragmites australis</i> patch measuring approx. 100' x 75'				A.				
In transition zone between upland (freshwater) and salt marsh								
Limited restoration potential								
Isolated area								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

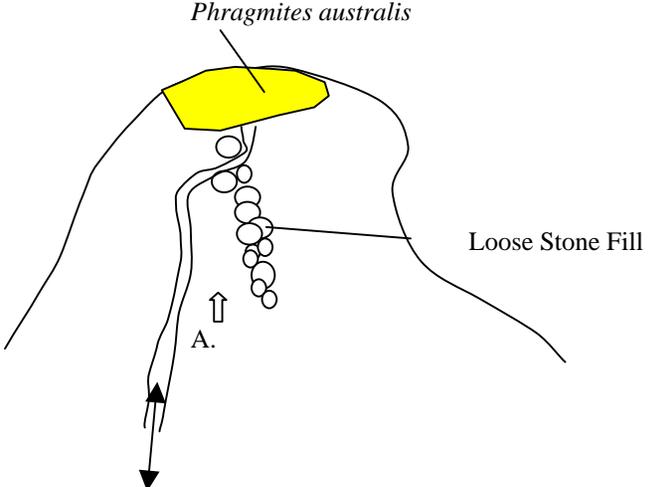
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	41	Farm Creek	Salt Marsh	IM	Estuarine	Coles Island	Unknown	42
<b>Notes</b>				<b>Photo</b>				
Sizable stand of <i>Phragmites australis</i>				A.				
Heavy tide wrack build-up along edge (see photo)								
Transition zone (upland and wetland)								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

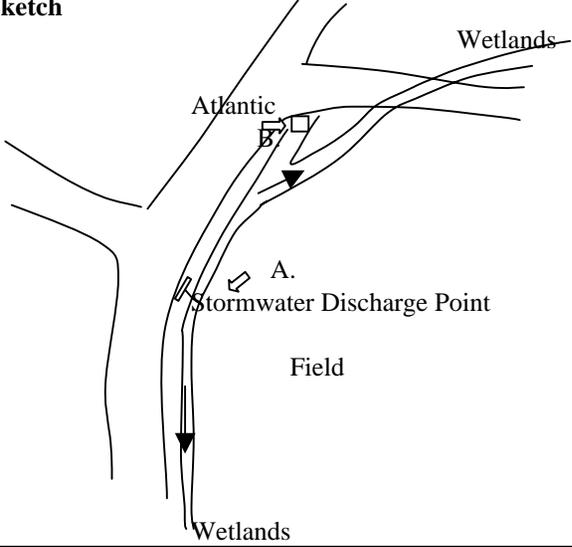
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	42	Farm Creek	Salt Marsh	IM, FR	Estuarine	Coles Island	Unknown	43
<b>Notes</b>				<b>Photo</b>				
Sizable stand of <i>Phragmites australis</i> on either side of road				A.				
Heavy tide wrack build-up along edge								
Transition zone variable thickness of Phragmites area								
(varies 10-50 feet)								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

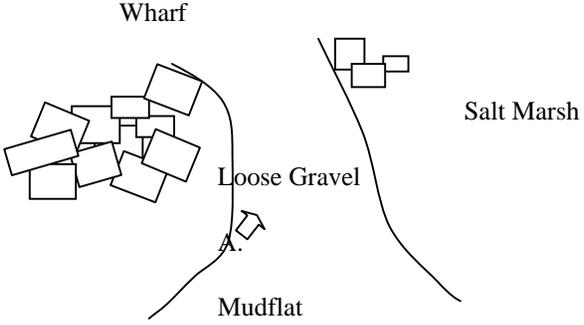
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	43	Farm Creek	Deep Marsh	DL, IM	Estuarine	Bray St.	Unknown	45
<b>Notes</b>				<p>A.</p>  <p>B.</p> 				
Culvert part of constructed stormwater basin								
Stream culverted for 40', 2' concrete culvert								
Berm part of detention system								
Upstream marsh contains invasive								
Direct stormwater discharge contributes to wetland area								
Low priority due to stormwater detention need								
Natural drainage area converted for stormwater management								
Berm constructed of large stone								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

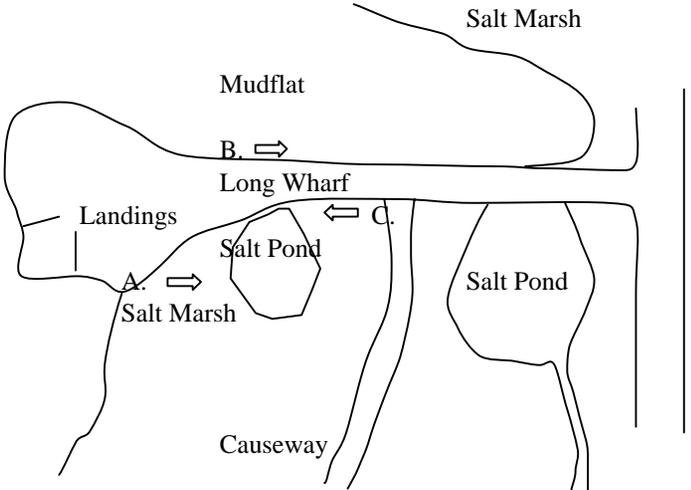
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	44	Jones/Annisquam Riv.	Salt Marsh	IM, OMWM	Estuarine	Atlantic St.	Unknown	48
<b>Notes</b>				<b>Photo</b>				
Four major areas of <i>Phragmites australis</i> growth				A.				
Thin transition zone patches								
Some ditches extend to Phragmites								
Potential for combined restoration and mosquito control								
Site should be combined with restoration at site 45								
Perimeter or litter ditches possible								
Salt marsh provides excellent shorebird habitat due to extensive ditches that expose mudflats								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

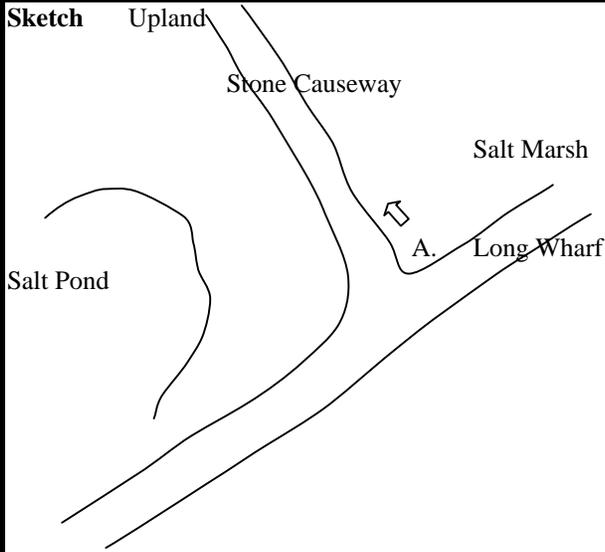
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	45	Jones/Annisquam Riv.	Salt Marsh	IM, FR	Estuarine	Atlantic St.	Municipal	46-47
<b>Notes</b>				<p>A.</p> 				
Long spoil berm limits tidal flow								
Berm is vegetated, supports beach grass, woody species								
Pockets of salt marsh grass present inside of berm								
Proximity of main creek enhances restoration potential								
Spoils could be used to create back dune system								
Breaks in berm allow some tidal flooding								
Multiple acres of <i>Phragmites</i>								
Site has high potential for restoration								
<b>Sketch</b>				<p>B.</p> 				
				<p>C.</p> 				
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 170								

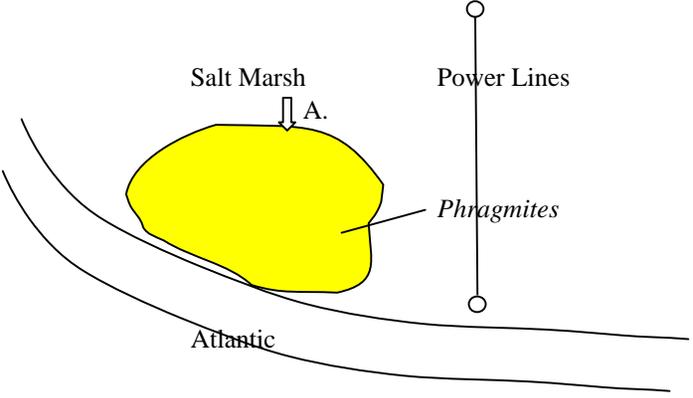
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	46	Jones/Annisquam Riv.	Salt Marsh	FR, IM	Estuarine	Atlantic St.	Unknown	49
<b>Notes</b>				<b>Photo</b>				
Old pier or foundation on the salt marsh				A.				
Pier extends to <i>Phragmites australis</i> patch								
75 to 100' of loose stone								
Fairly easy to remove with limited disturbance								
Near transition zone upland/wetland								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint	
Q-1	47	Jones/Annisquam Riv.	Salt Marsh	BMP	Estuarine	Atlantic St.	Unknown	50	
<b>Notes</b>				A.	 				
Ditch may have replaced natural stream									
Ditch may have been excavated to allow for better drainage									
Stream runs across paved area into wetlands									
Stormwater input noted from adjacent roadway									
<b>Sketch</b>				B.					
									
<b>Restoration Priority</b>									
<i>General Classification:</i> minor									
<i>Restoration Potential Score:</i> NA									

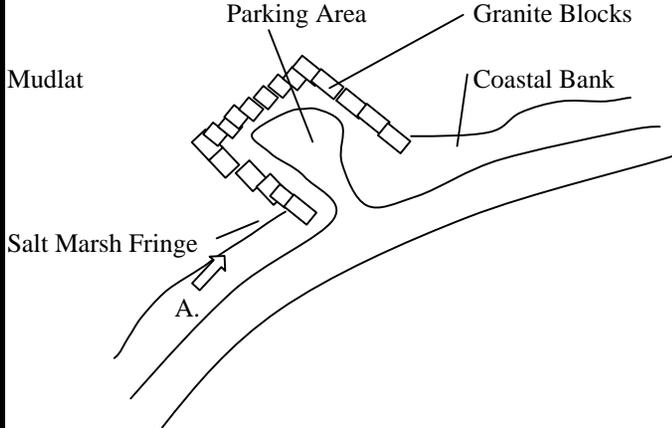
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	48	Jones River	Salt Marsh/Tidal Flat	BMP, FR	Estuarine	Long Wharf	Municipal	51
<b>Notes</b>				<b>Photo</b>				
Disposal point for clam shells				A.				
Access for clamming and recreational boating								
Limited restoration potential								
Some sedimentation from loose gravel ramp to wetlands								
Ramp could be paved to limit fill								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

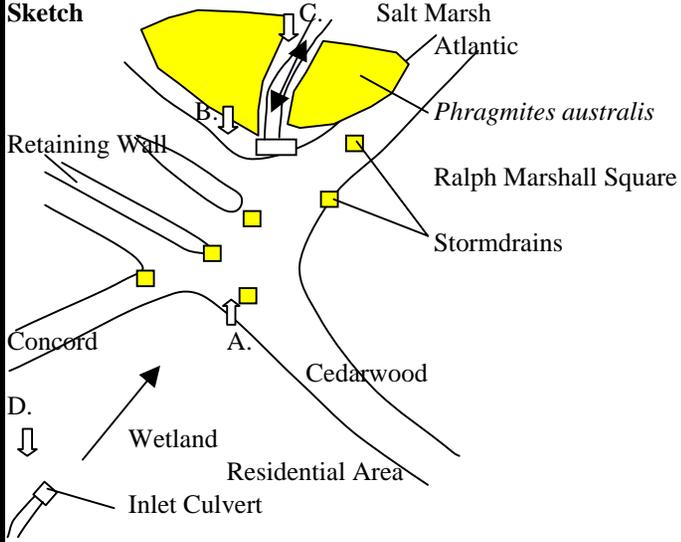
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	49	Jones River	Salt Marsh/Tidal Flat	FR, CU	Estuarine	Long Wharf	Municipal	52
<b>Notes</b>				<b>A.</b>				
Opportunities along wharf to limit stone fill and improve hydrologic conditions								
A series of culvert could be installed along wharf								
Need to balance draining of salt pond and maintaining existing high habitat values								
Many stones have spilled out onto marsh, destroying vegetation								
Site should be considered in reference to anadromous fish restoration (Sleepy Hollow Pond)								
Wharf should be analyzed for larger fill removal opportunities								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>				<b>C.</b>				
								

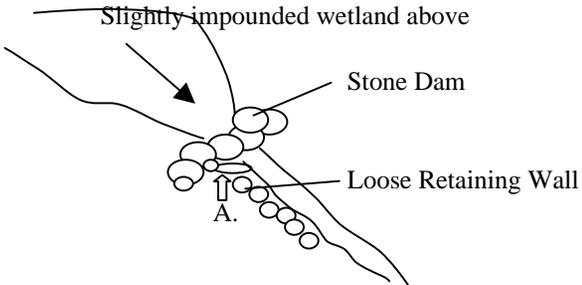
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	50	Jones River	Salt Marsh	FR, CU	Estuarine	Long Wharf	Private	53
<b>Notes</b>				<b>Photo</b>				
Causeway does not allow natural sheet flow across marsh				A.				
A series of small culverts may improve tidal flushing								
No invasive impacts from fill or tidal alteration noted								
Causeway is slumped to allow some storm flow								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

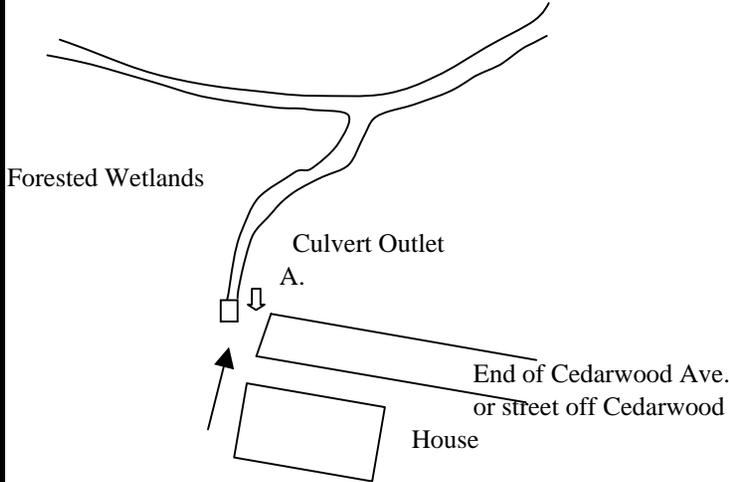
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	51	Jones River/Sleepy Ho	Salt Marsh	IM	Estuarine	Atlantic St.	Unknown	54
<b>Notes</b>				<b>Photo</b>				
<p><i>Phragmites australis</i> area, approximately 75' x 150'</p> <p>Typical transition zone <i>Phragmites</i> growth pattern</p> <p><i>Phragmites</i> growth encouraged by road runoff and tidal restriction from Jones Wharf</p> <p>Area might have slight elevation difference favoring the growth of <i>Phragmites</i></p> <p>Site could be addressed in conjunction with a mosquito control project</p>				A.				
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<p><i>General Classification:</i> minor</p> <p><i>Restoration Potential Score:</i> NA</p>								

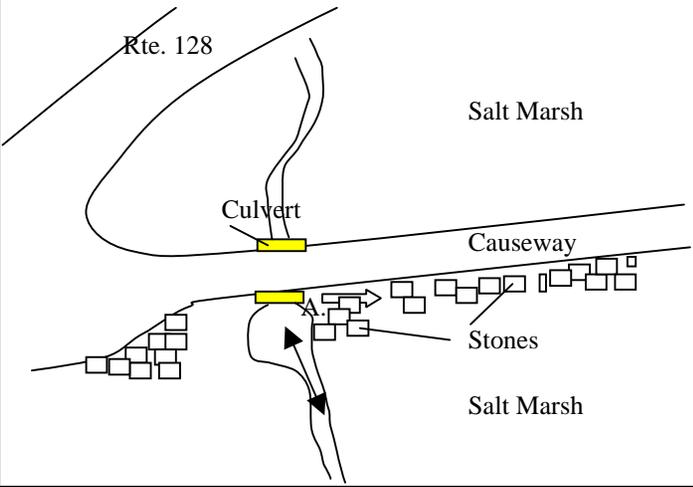
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	52	Jones River	Salt Marsh	FR, CU	Estuarine	Atlantic St.	Private	55
<b>Notes</b>				<b>Photo</b>				
Causeway is significantly elevated above marsh				A.				
No culverts noted under roadbed								
Causeway acts to reduce ditch flow and over marsh flow								
Approx. 300' x 10'								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

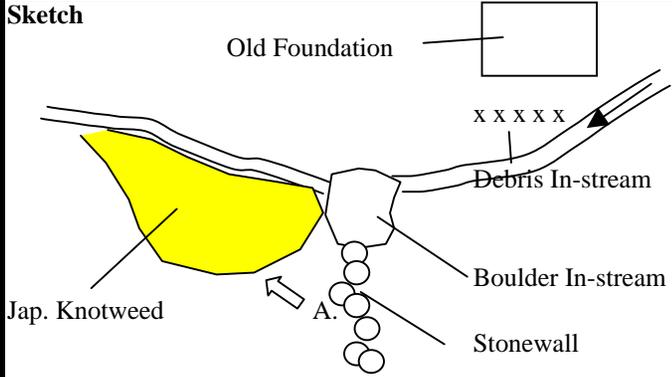
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	53	Jones River	Salt Marsh/Tidal Flat	FR	Estuarine	Atlantic St.	Unknown	56
<b>Notes</b>				<b>Photo</b>				
Potential to restore coastal bank, tidal flat and salt marsh				A.				
Approximately 50' x 75' of fill area								
Historic structure								
<b>Sketch</b>								
Mudlat								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

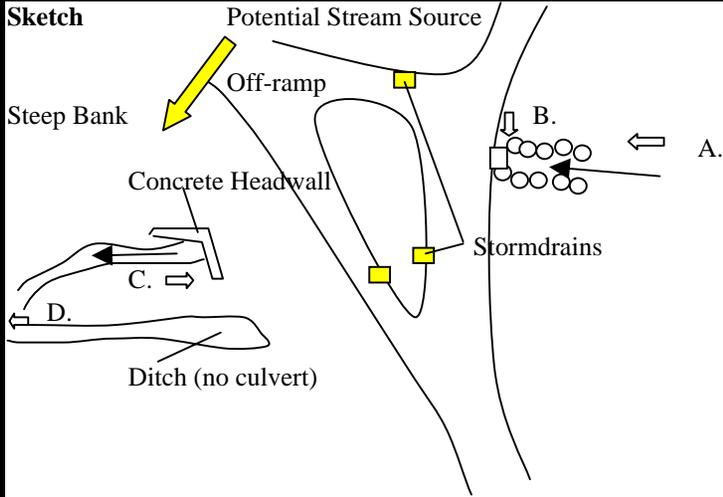
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint					
Q-1	54	Unnamed	Brackish Marsh	DL, BE, IM	Anadromous/Riverine	Concord St./Cedarwood Rd.	Public/Private	57, 58					
<b>Notes</b>				<b>A.</b>									
Stream diverted under intersection and behind houses													
Approximately 500' of stream bed is culverted													
18" culvert, too small for storm flows													
Culvert continuously clogged													
Wetland has formed over culvert													
Thick bed of <i>Phragmites australis</i> at outlet													
Outlet culverts set too high													
Stormwater from intersection mixed with streamwater													
Contributing watershed relatively pristine													
Houses and lawn area right to edge of old stream													
<b>Sketch</b>				<b>B.</b>									
													
<b>Restoration Priority</b>									<b>C.</b>				
General Classification: major													
Restoration Potential Score: 120				<b>D.</b>									
													

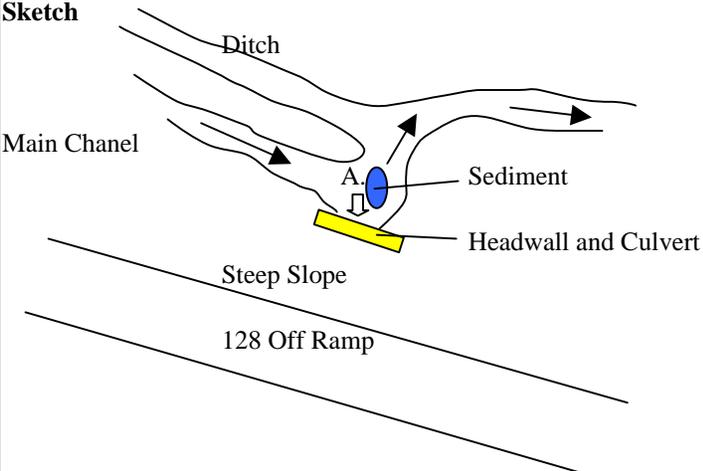
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	55	Unnamed	Wooded Swamp Deciduous	FR	Riverine	Concord St.	Unknown	59
<b>Notes</b>				<b>Photo</b>				
Stone dam in stream				A.				
Originally created to hold back ice pond								
Maintains wetland area above								
Dam area vegetated								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

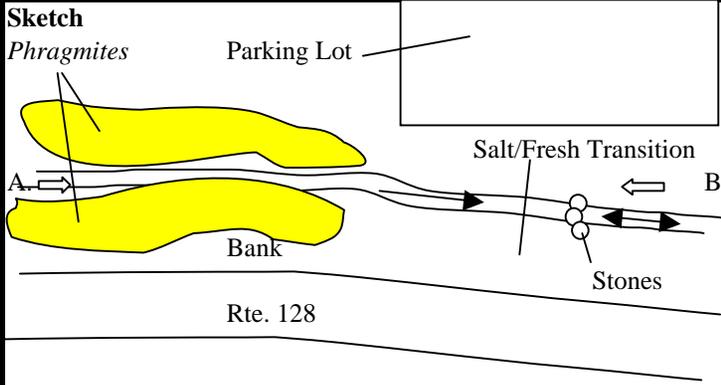
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	56	Unnamed	Wooded Swamp Deciduous	DL	Riverine	Cedarwood Rd.	Unknown	60
<b>Notes</b>				<b>Photo</b>				
Upstream end of culvert not found, on private property				A.				
Slash and debris piled on top of culvert inlet								
Approx. 8" concrete culvert								
Stream is tributary of the main stream below								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

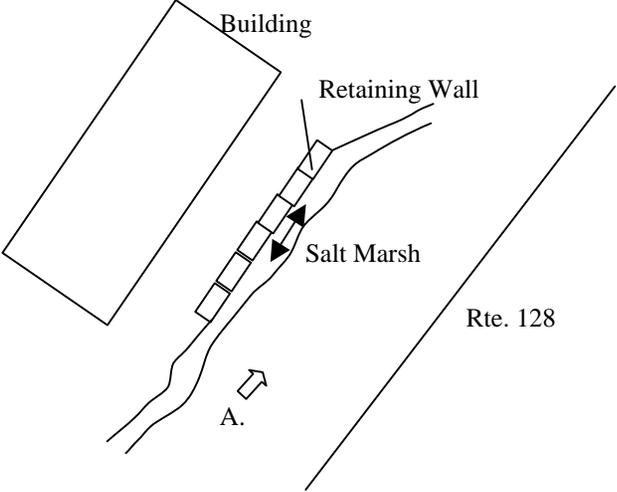
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	57	Jones/Annisquam Riv	Salt Marsh	FR, CU	Estuarine	Causeway St.	Municipal	61
<b>Notes</b>				<b>Photo</b>				
Granite blocks along causeway spilling onto salt marsh				<p>A.</p> 				
Causeway blocks tidal flow, small culverts placed along causeway may help tidal flushing								
No stormwater infrastructure noted								
Heavy tidal wrack build-up along causeway								
Upstream marsh small, isolated and impounded by Rte. 128								
Culvert causes tidal restriction								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

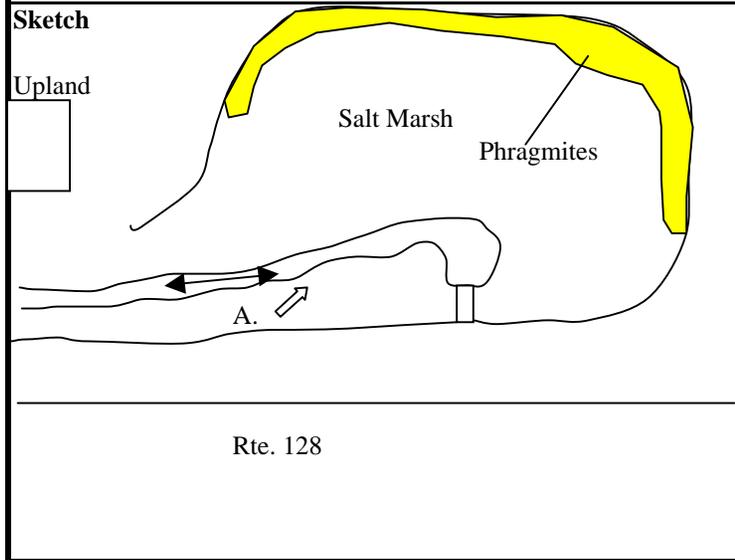
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	58	Unnamed	Wooded Swamp Deciduous	BE, IM, TR	Riverine	Concord St.	Unknown	62
<b>Notes</b>				<b>Photo</b>				
Robust growth of Japanese knotweed along bank				A.				
Large elevation drop above								
Trash in stream (tires)								
Dumping site along south bank								
Upstream relatively pristine								
Apparent clearing along bank								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

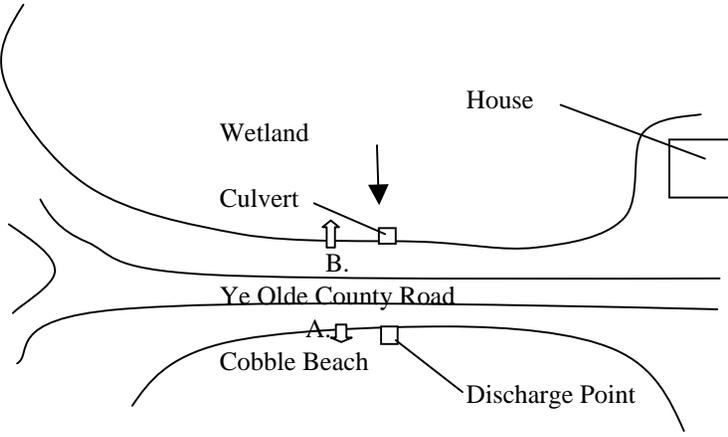
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	59	Unnamed	Brackish Marsh	DL, CR, CU, BMP	Riverine	Concord St.	State	63
<b>Notes</b>				<b>A.</b>		<b>B.</b>		
Part of 128 off-ramp infrastructure								
Stream culverted for approx. 75-100 yards								
Stream channelized above with 2-3' granite rocks								
Stream bottom is gravelly								
Culvert size is approx. 3.5'								
Downstream the stream channel is wider to possibly account for stormwater input								
Downstream odd stream bed configuration (see sketch)								
Stream configuration complicated and further study needed								
<b>Sketch</b>				<b>C.</b>		<b>D.</b>		
								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

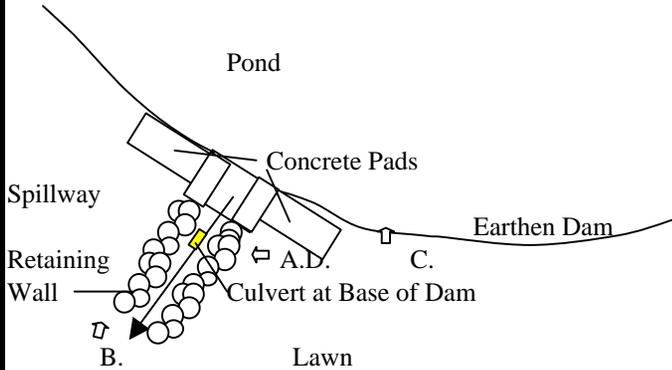
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	60	Unnamed	Brackish Marsh	BMP	Riverine	Rte. 128	State	64
<b>Notes</b>				<b>Photo</b>				
Slumped concrete headwall				A.				
Stormwater discharge, sediment plume from culvert								
At point where ditch and stream converge								
Densely vegetated wetland stream								
Thick invasive along bank								
Steep bank (highway)								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

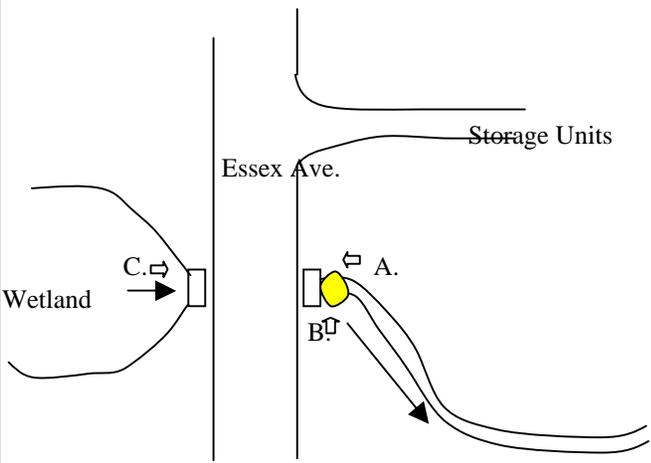
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	61	Unnamed	Brackish Marsh	BE, CR	Anadromous	Rte. 128	State	65
<b>Notes</b>				A.				
Dense <i>Phragmites australis</i> along both banks								
Stretch may be productive smelt spawning area								
Stream bottom variable cobble and stone								
Stream should be monitored and obstructions removed to increase spawning area/potential								
Long/small culvert under Rte. 128 may limit fish passage								
Stream seems ditched - banks are linear								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>								
<i>General Classification: major</i> <i>Restoration Potential Score: 175</i>								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	62	Unnamed	Salt Marsh	BE, BI	Anadromous	Rte. 128	Private	66
<b>Notes</b>				<b>Photo</b>				
Fill critical to structural integrity of warehouses				A.				
If redone, toe of slope could be pulled back to form a natural stream bank								
Retaining wall acts as stream bank								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

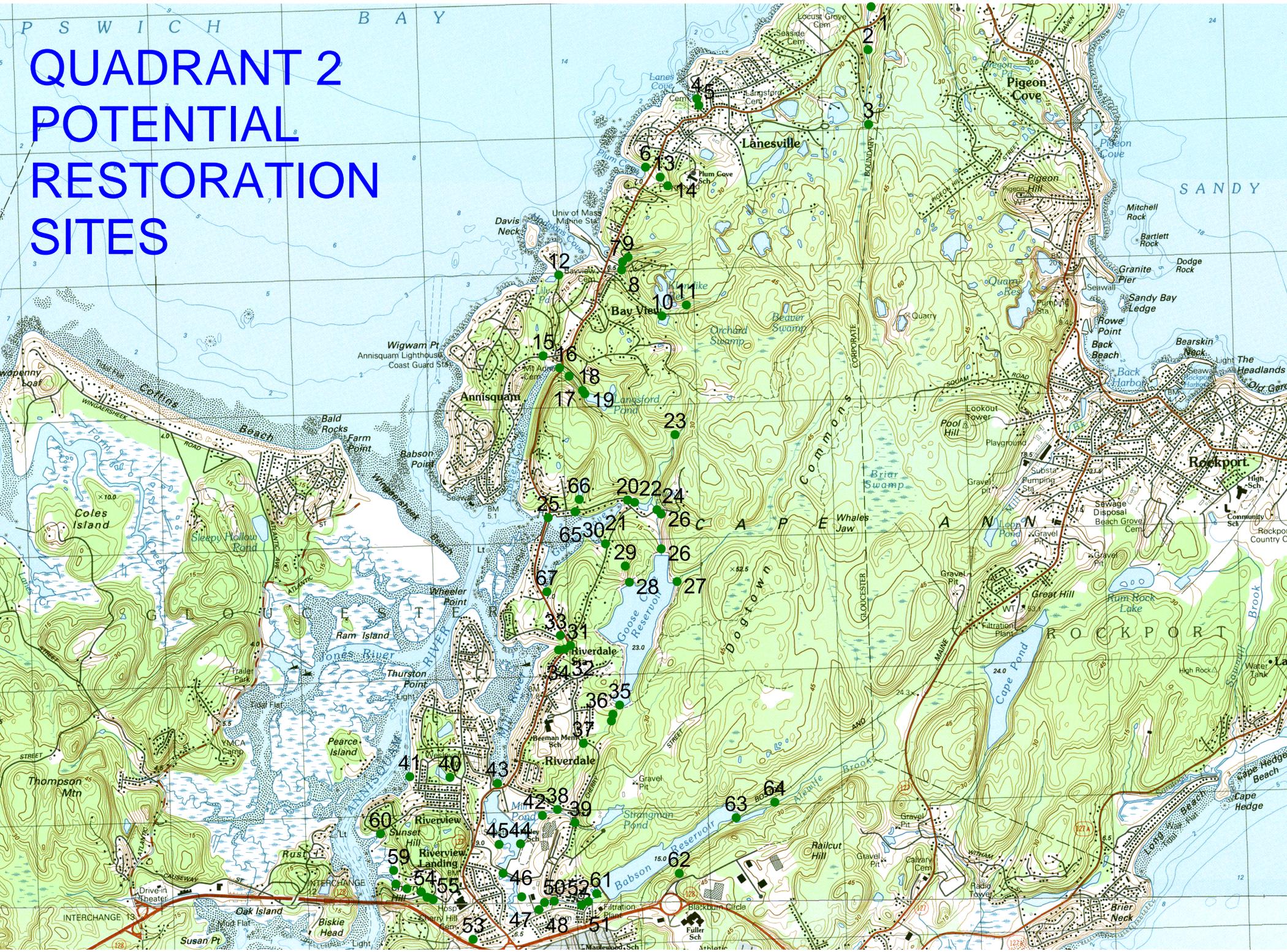
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	63	Unnamed	Salt Marsh	IM, CU	Anadromous	Rte. 128	Private/State	67
<b>Notes</b>				<b>Photo</b>				
Culvert may need to be improved to promote smelt spawning								
<i>Phragmites australis</i> present at salt marsh transition zone								
may be due to tidal restriction								
Fringe almost completely ringed with Phragmites								
<b>Sketch</b>								
Upland								
Rte. 128								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

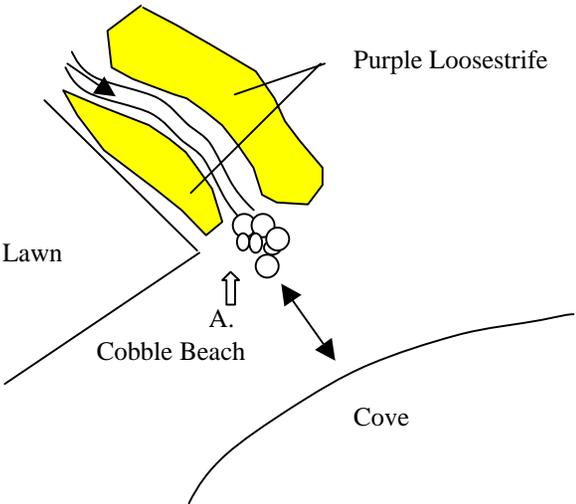
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	64	Annisquam River	Brackish Marsh	IM, CU	Estuarine	Ye Olde County Rd.	Public/Private	68
<b>Notes</b>				<p>A.</p>  <p>B.</p> 				
Small degraded culvert could be easily upgraded								
Evidence of salt marsh plants in impounded area								
Increased tidal flow would reduce <i>Phragmites australis</i>								
Native salt marsh grasses present upstream								
Series of small filled in ditches in upstream wetland								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 145								

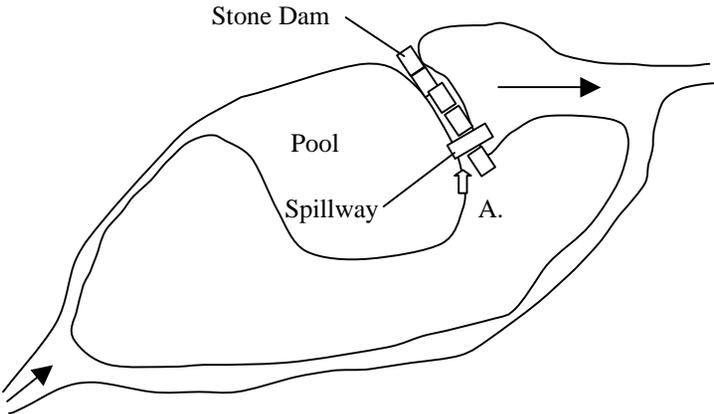
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	65	Walker Creek	Open Water	FL, RR	Anadromous/Catadromous	Essex Ave.	Municipal	223
<b>Notes</b>				<b>Photo</b>				
Ownership of dam in question between adjacent landowner and city				<b>A.</b>				
Dam is not that tall (6-8') and could take a steep pass fish ladder								
Pond may be too small to support alewife				<b>B.</b>				
More information about pond size and depth is needed to determine usefulness of enhanced fish passage								
Base of dam - in stream a blocked culvert is present				<b>C.</b>				
Slight flow in stream despite low pond level								
A roughed ramp could be installed to enhance eel passage				<b>D.</b>				
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> NA								

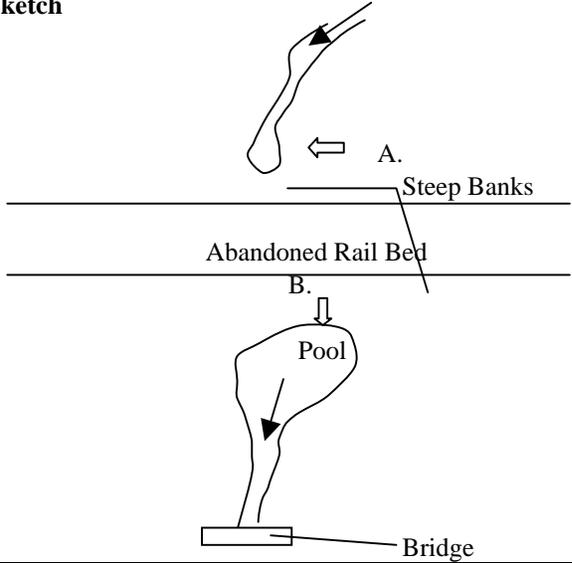
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-1	66	Unnamed	Wooded Swamp Deciduous	BMP	Riverine	Essex Ave.	Unknown	203
<b>Notes</b>				<b>Photo</b>				
Site impacted by stormwater and sediment from stormwater discharge				A.				
Downstream culvert plugged up so only 1" of opening remains								
Culvert size: 1-1.5'								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>				C.				
General Classification: minor								
Restoration Potential Score: NA								

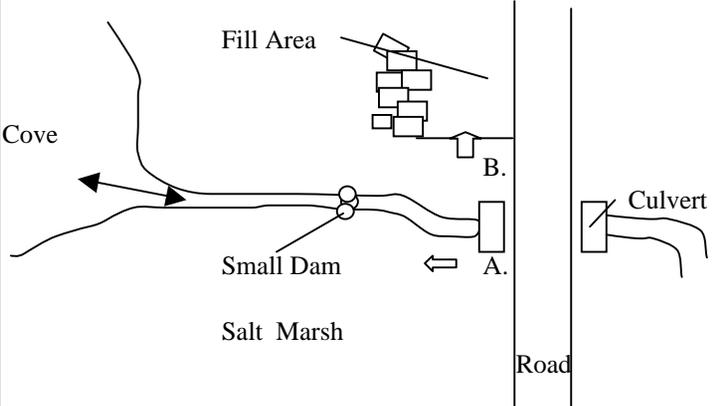
# QUADRANT 2 POTENTIAL RESTORATION SITES

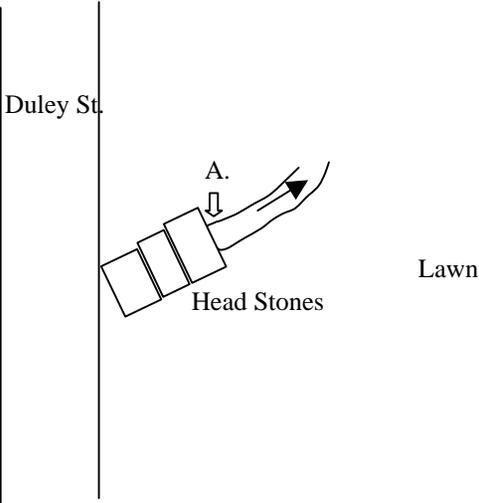


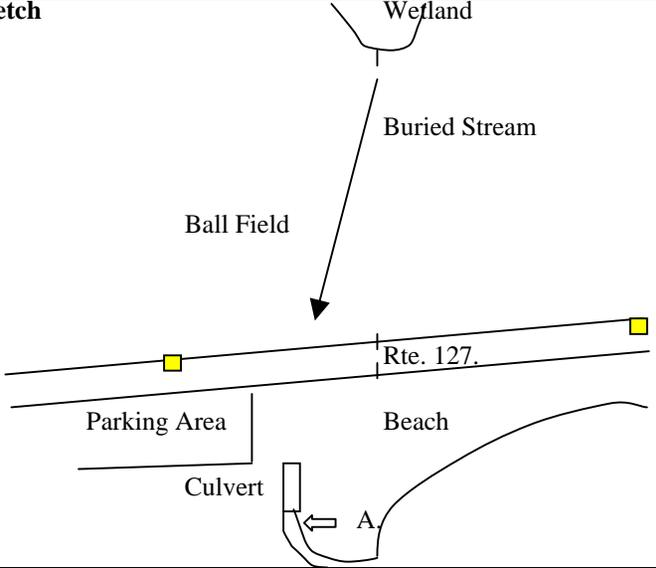
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	1	Folly Cove/Stony Brook	Brackish Marsh/Coastal Beach	FR, RR, BE, IM	Anadromous/Catadromous	Folly Cove Beach	Private	69
<b>Notes</b>				<b>Photo</b>				
Area above seems to be potential smelt spawning habitat								
A roughed ramp would assist eel passage								
Stream may be accessible to fish at high tides								
Stream above has a dense shrub canopy which keeps temps. low								
Some lawn to stream edge above restriction								
Purple loosestrife present								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

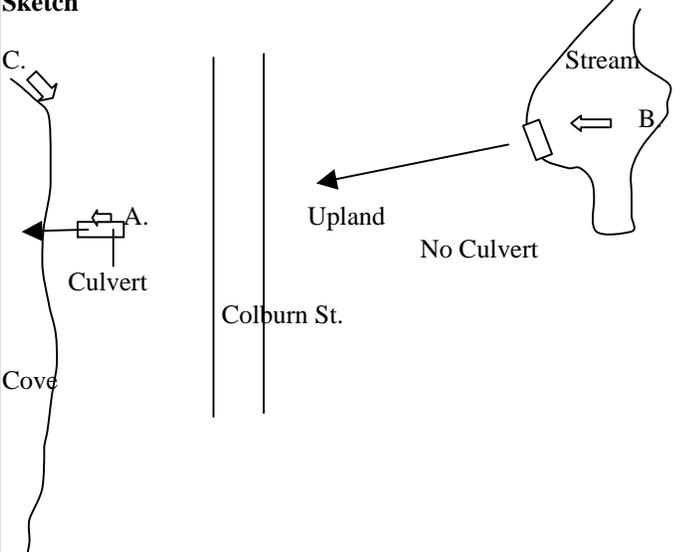
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	2	Stony Brook	Wooded Swamp Deciduous	DR	Riverine	Woodward Ave.	Private	71
<b>Notes</b>				<b>Photo</b>				
Stone dam probably built for aesthetic reasons				A.				
Shallow small pond (50'x50')								
Minor disturbance if no fish passage								
Small raceway/spillway built on one edge of dam								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

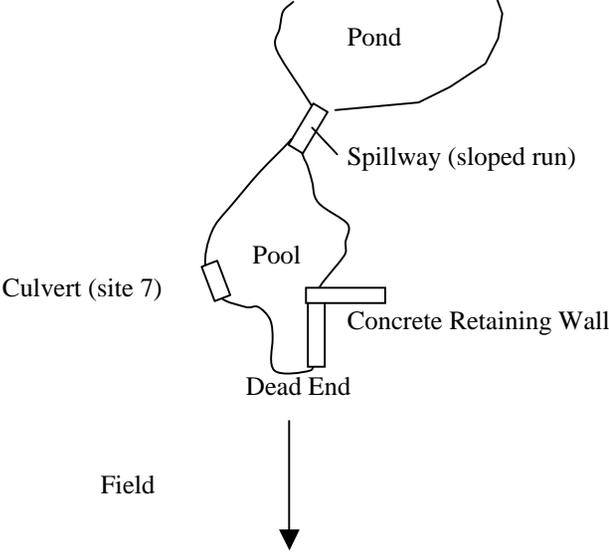
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	3	Stony Brook	Wooded Swamp Deciduous/Shrub Swamp	CU, BE	Riverine	Railbed	Private	72
<b>Notes</b>				<b>Photo</b>				
Debris in upstream wetlands, dumping area due to slope and access				<p>A.</p>  <p>B.</p> 				
Upstream culvert not found, completely collapsed								
Downstream landowners have mowed to stream edge and channelized the stream								
Larger buffer recommended downstream								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

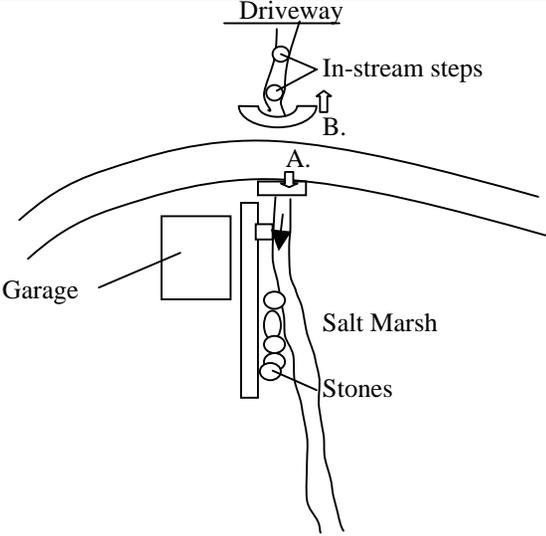
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	4	Lanes Cove	Salt Marsh	FR	Anadromous/Catadromous	Lanes Cove	Municipal	73
<b>Notes</b>				<b>Photo</b> A. 				
Small dam in waterway								
Fill area in marsh 25'x50' (old town landing)								
Minor habitat disturbances								
On site granite culvert is sized correctly								
<b>Sketch</b>				<b>B.</b> 				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

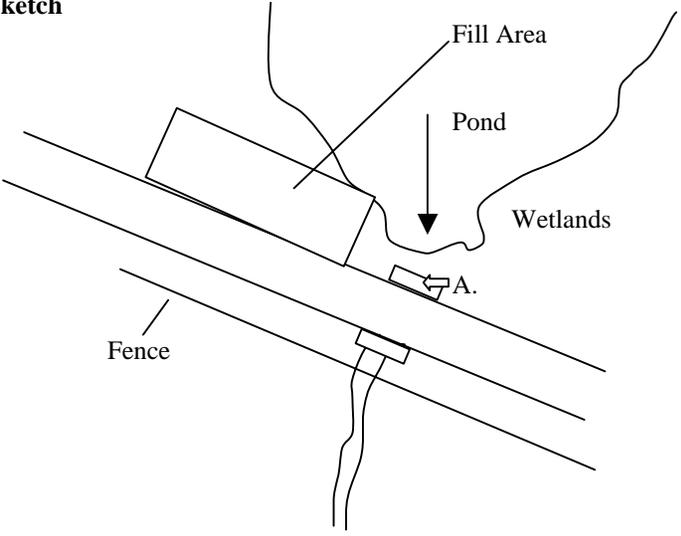
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	5	Lanes Cove	Brackish Marsh	DL	Estuarine	Duley St.	Private	74
<b>Notes</b>				<b>Photo</b>				
Steam runs through residential property				<b>A.</b> 				
Source not found (above Rte. 127 per local information)								
Stream mixes with stormwater								
Potentially large scale daylighting project								
Water flowing indicates potentially perennial stream								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

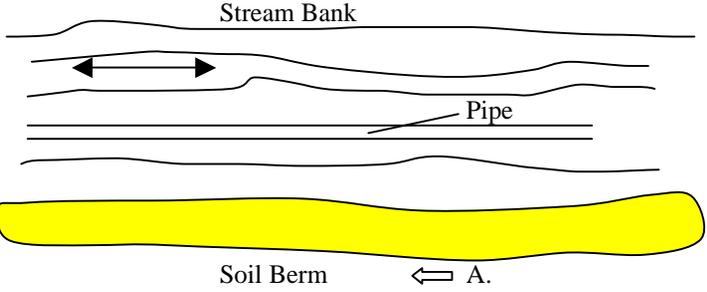
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	6	Plum Cove	Coastal Beach/Shallow Marsh Meadow	DL, BMP	Anadromous/Catadromous	Plum Cove Beach	Municipal	75
<b>Notes</b>				<b>Photo</b>				
Fresh water stream drains to Plum Cove				<b>A.</b> 				
Buried stream for over 100 yards								
Critical habitat area for smelt spawning								
Culvert blocked								
Partial daylighting project								
Stormwater should be treated if stream is daylighted								
16-18" concrete culvert								
Inlet is a stormdrain, draining wetland, not stream								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

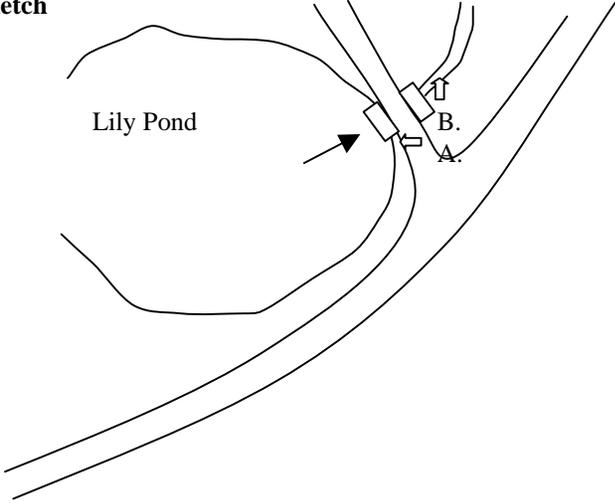
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	7	Hodgkins Cove	Wooded Swamp Deciduous/Brackish Marsh	CU, DL	Catadromous	Colburn St.	Unknown	76
<b>Notes</b>				<b>Photo</b>				
2' corrugated aluminium pipe discharges to cove				A.				
Steep drop from culvert to cove				C.				
Flow in dry weather indicats culvert serves natural stream flow								
Watershed source is Klondike Reservoir								
Site connects with site 8				B.				
Discharge to salt marsh								
Culvert too high for tidal influence								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

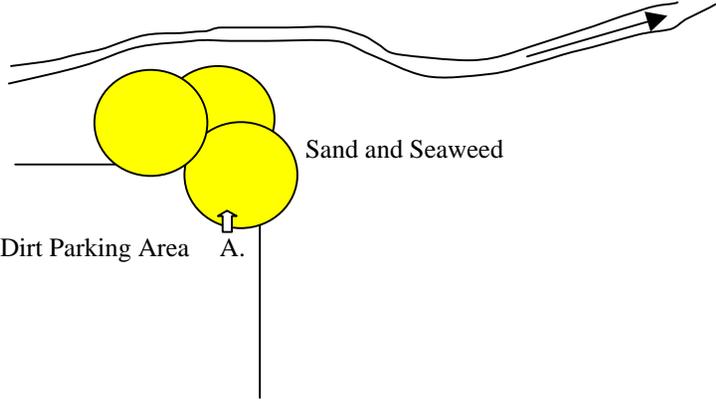
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	8	Klondike Reservoir	Wooded Swamp Deciduous	FL, DL, CR	Catadromous	Colburn St.	Unknown	77
<b>Notes</b>				<b>Photo</b>				
Major stream bed alteration				<b>A.</b>				
Natural stream appears to have flowed across the field to the coast				<b>B.</b>				
Daylight section may provide habitat for smelt				 				
Strong flows from pond								
Natural outlet near Umass Station (field area/private beach)								
<b>Sketch</b>				<b>C.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

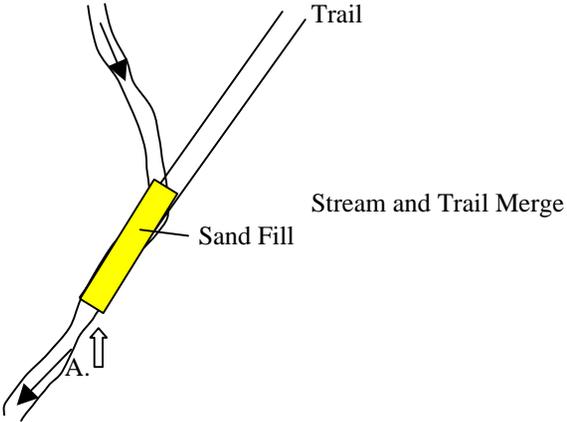
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	9	Hodgkins Cove	Brackish Marsh/Shrub Swamp	CU, BMP, BE, DL	Catadromous	N. Kilby St.	Private/Public	78
<b>Notes</b>				<b>Photo</b>				
Channel has been reconfigured for apparently aesthetic reasons				A.				
Downstream retaining wall has been rebuilt, old stones left on marsh				B.				
Area of concern for smelt habitat								
Culvert under driveway, inlet not seen, amount of daylight potential not known								
Culvert set too high								
2-2.5' culvert								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

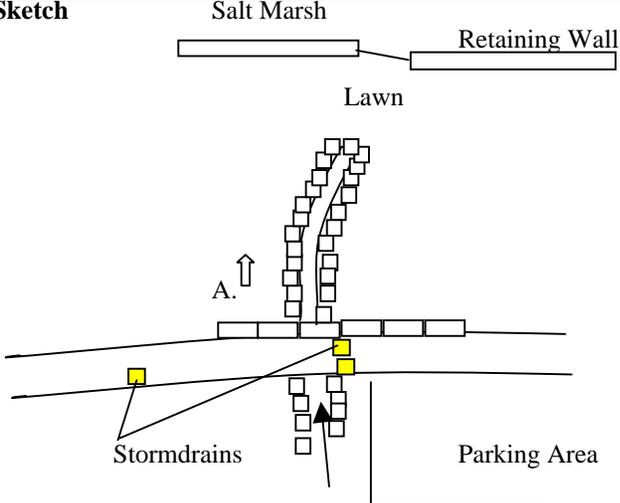
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	10	Unnamed	Shrub Swamp	CU, FR	Catadromous	Quarry St.	Municipal	79
<b>Notes</b>				<b>Photo</b>				
Stream not flowing from pond				A.				
Pond infilling with emergent vegetation, seems shallow								
No flow conditions suggest not a good anadromous fish run site								
Klondike Reservoir not examined in relationship with this site								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	11	Unnamed	Wooded Swamp Deciduous	FR	Riverine	Quarry St.	Municipal	80
<b>Notes</b>				<b>Photo</b>				
Trench dug for water supply purposes				A.				
Supply pipe in stream								
Stream not flowing								
Long linear berm along stream bed presumably dredge material								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

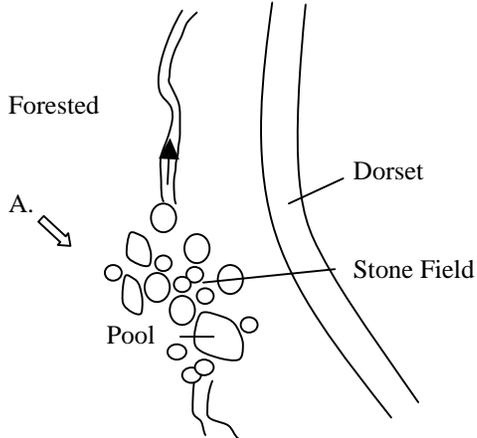
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	12	Lily Pond	Open Water	CR, IM, CU	Anadromous/Catadromous	Stonehouse Lane	Private	81
<b>Notes</b>				<b>Photo</b>				
Pond may have limited potential for alewife due to size				<p><b>A.</b></p>  <p><b>B.</b></p> 				
Eel potential high if not already present								
Unique brackish pond habitat								
Improvement in tidal flow may reduce invasive								
Pond ringed with purple loosestrife								
Culvert allows limited flow (clogged)								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

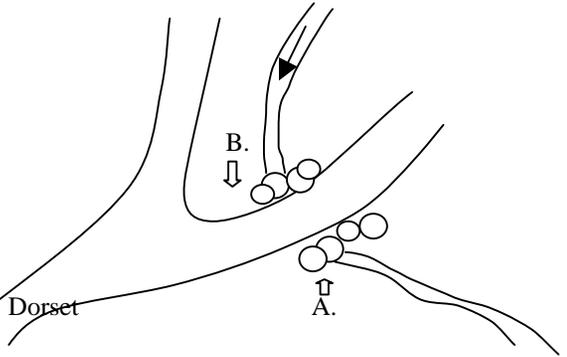
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	13	Plum Cove	Shrub Swamp	FR, BE	Riverine	Western Ave.	Municipal	82
<b>Notes</b>				<b>Photo</b>				
Beach debris dumped along stream (15'), upslope				A.				
Primarily management issue								
Area drains to ball field stormdrains								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

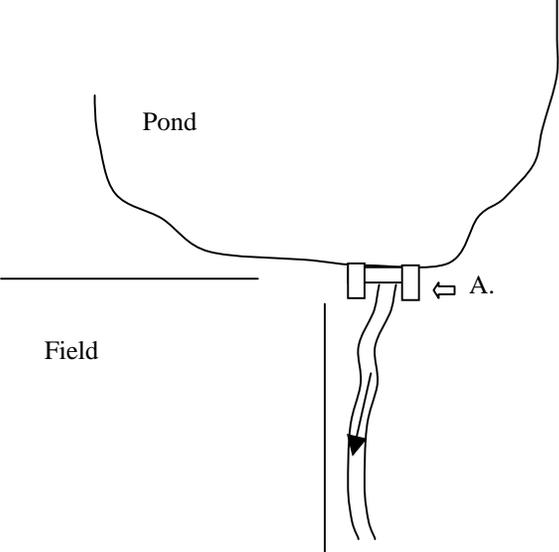
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	14	Unnamed	Wooded Swamp Deciduous	FR	Riverine	Western Ave.	Municipal	83
<b>Notes</b>				<b>Photo</b>				
Trail cuts through stream				A.				
Stream filled with beach sand to allow/improve access								
Sedimentation problem transferred downstream								
Remove sand and place a boardwalk to eliminate/reduce impact								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

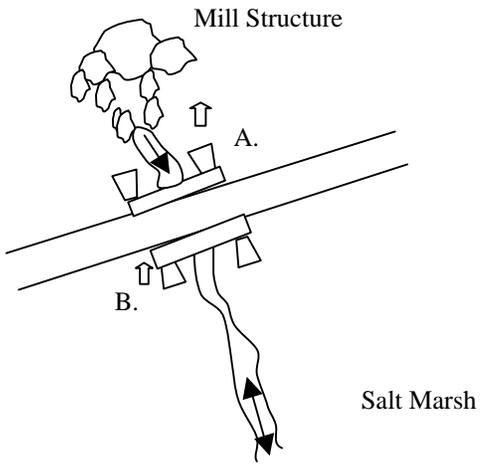
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	15	Lobster Cove	Brackish Marsh	BI, BE, BMP, DL	Anadromous/Catadromous	Annisquam Road	Private/Public	84
<b>Notes</b>				<b>Photo</b>				
Creek channelized, natural buffer destroyed				<b>A.</b> 				
Creek could be altered to form a smelt run if one does not exist								
Upstream driveway abuts creek								
Stream is buried for 50' to make way for lawn								
Small pond upstream could be eel habitat								
Outlet to marsh not seen								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

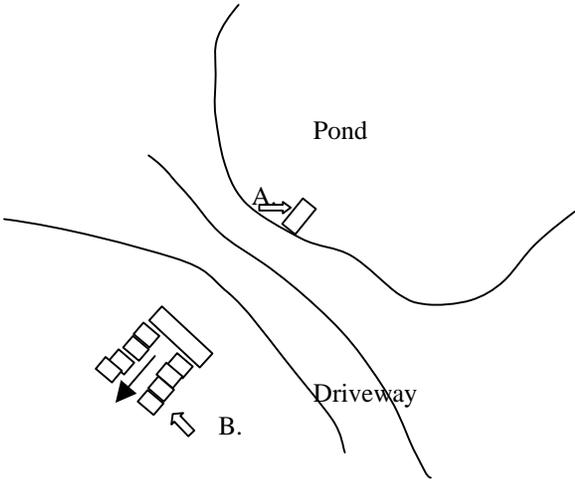


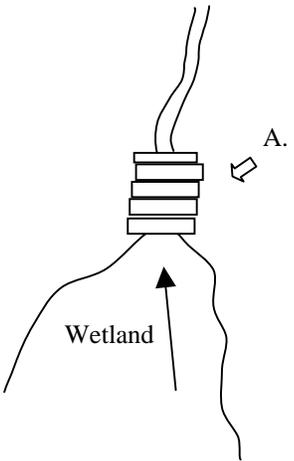
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	17	Langsford Pond	Wooded Swamp Deciduous	FR, DL	Anadromous/Catadromous	Dorset St.	Unknown	86
<b>Notes</b>				<b>Photo</b>				
Stream disappears under a pile of stones				A.				
Low flow due to dispersal of stream								
Stream emerges, forms small pools								
Field of stone fill								
Upstream there is good flow from pond								
Field of stones approx. 100 yards long								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

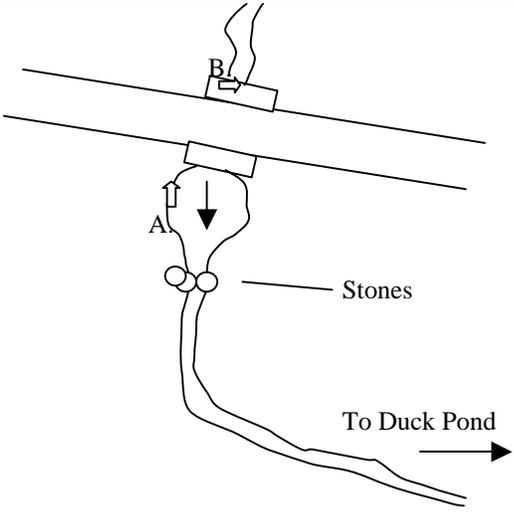
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	18	Langsford Pond	Wooded Swamp Deciduous	CU	Anadromous/Catadromous	Dorset St.	Unknown	87
<b>Notes</b>				<b>Photo</b>				
Culvert under driveway is collapsed and needs to be improved if there is potential for fish passage to pond				<b>A.</b> 				
Size of opening not measured								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	19	Langsford Pond	Wooded Swamp Deciduous/Open Water	FL	Anadromous/Catadromous	Dorset St.	Private	88
<b>Notes</b>				<b>Photo</b>				
Pond levels could be managed for alewife passage				A.				
Pond may be too small to support alewife								
Slight elevation drop from pond outlet								
Project should only be done in conjunction with downstream improvements								
Pond appears to be owned by Essex County Greenbelt Assoc.								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	20	Duck Pond	Brackish Marsh	RR, FL	Anadromous/Catadromous	Dennison St.	Unknown	89
<b>Notes</b>				<b>Photo</b>				
Possible smelt spawning habitat below culvert				<p>A.</p>  <p>B.</p> 				
Two new corrugated plastic 3' culverts								
Significant elevation change from fresh water to salt water								
Site is problematic due to steep drop and configuration of stream								
Culverts set too high								
<b>Sketch</b>								
 <p>Mill Structure</p> <p>A.</p> <p>B.</p> <p>Salt Marsh</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	21	Duck Pond	Open Water	DL	Anadromous/Catadromous	Dennison St.	Unknown	91
<b>Notes</b>				<b>Photo</b>				
Outlet for Duck Pond				<p><b>A.</b></p>  <p><b>B.</b></p> 				
30-40' potential daylight opportunity								
Culvert may be undersized								
Weir board in place - limits pond level								
Approx. 2.5' concrete culvert								
Pond should be studied to determine alewife potential								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

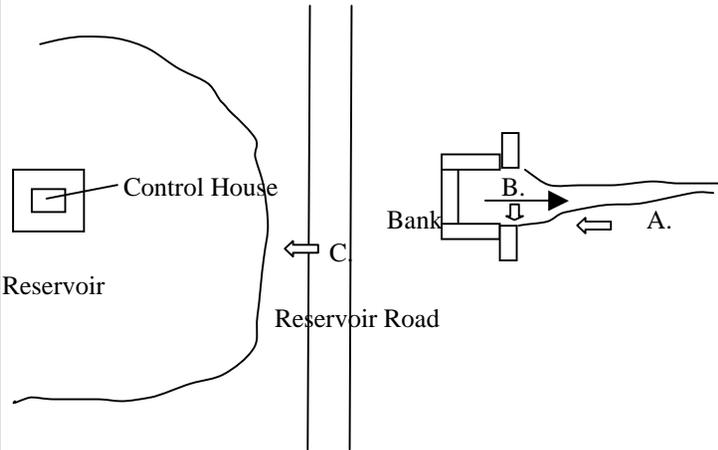
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	22	Unnamed	Wooded Swamp Deciduous	FR	Riverine	Dennison St.	Unknown	92
<b>Notes</b>				<b>Photo</b>				
Minor disturbance				<b>A.</b> 				
Old bridge slumped into stream								
Creates more wetlands upstream								
Restricts natural flow								
10-15' in length								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

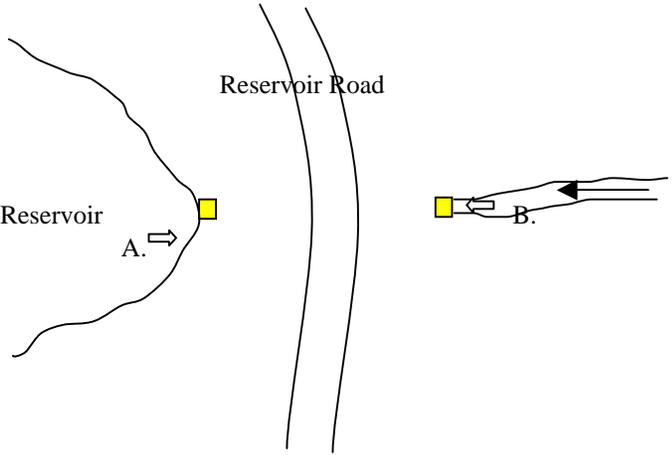
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	23	Goose Cove	Shrub Swamp	CU, FR	Riverine	Dennison St.	Public/Private	93
<b>Notes</b>				<b>Photo</b>				
Culvert slightly undersized and in poor shape				<p>A.</p>  <p>B.</p> 				
Granite box culvert roughly 2' x 2'								
Rocks in stream below culvert retard natural flow								
Low impact, minor disturbance								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

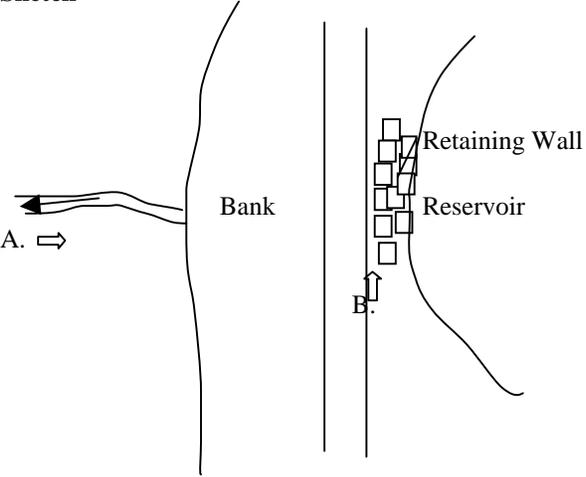


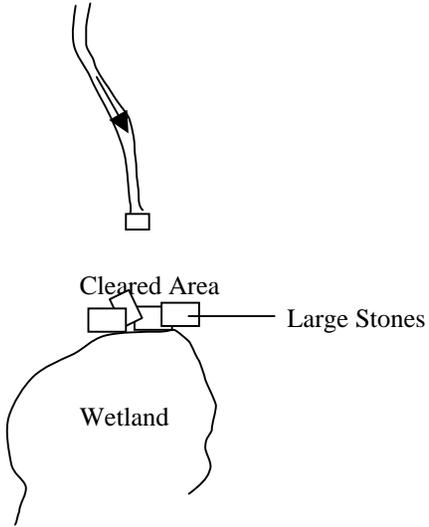
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	25	Unnamed	Wooded Swamp Deciduous	FR	Riverine	Dennison St.	Private	95
<b>Notes</b>				<b>Photo</b>				
Old bridge across stream has slumped				A.				
Bridge could be removed to restore natural flow patterns								
Formally a trail bridge								
Minimal disturbance								
Stream is loosely channelized below the bridge								
Approx. 5-6' wide and long								
Site might be owned by Essex County Greenbelt Assoc.								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

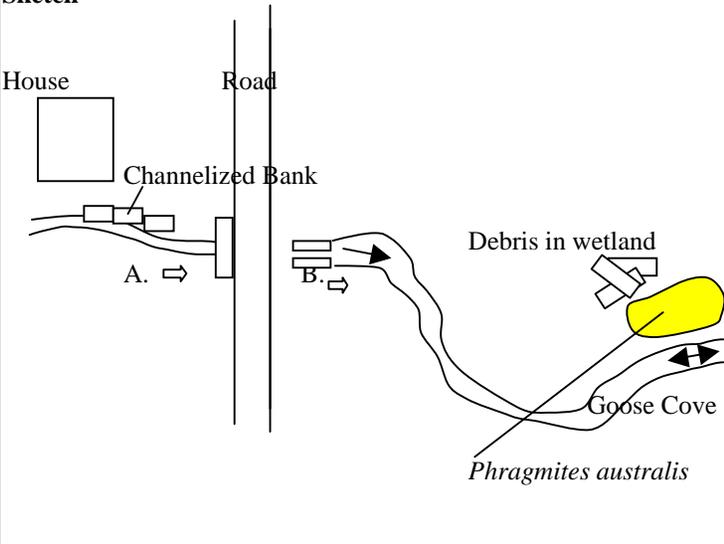


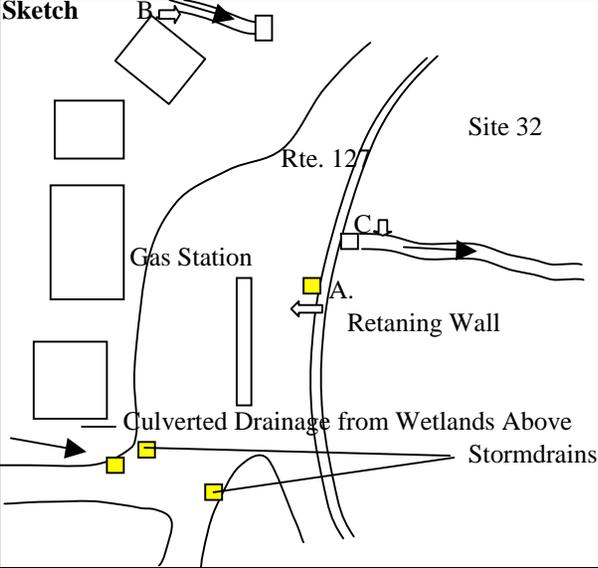
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint	
Q-2	26	Goose Cove Reservoir	Wooded Swamp Deciduous	CU, FL	Riverine	Reservoir Road	Municipal	96	
<b>Notes</b>				<b>Photo</b>					
Control structure for reservoir				<b>A.</b> 					
Main 3' culvert in center of concrete retaining wall									
Only flowing culverts are side smaller culverts									
Vital structure to dam and water supply									
Stream may not be large enough to support alewives									
Stream channelized below dam									
<b>Sketch</b>				<b>B.</b>					
									
				<b>C.</b>					
									
<b>Restoration Priority</b>									
General Classification: minor									
Restoration Potential Score: NA									

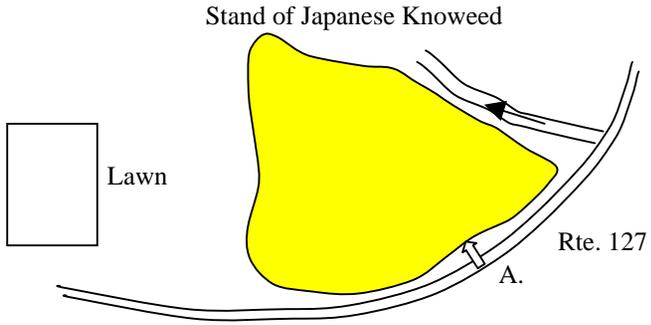
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	27	Goose Cove Reservoir.	Wooded Swamp Deciduous	DL, CU	Riverine	Reservoir Road	Municipal	97
<b>Notes</b>				<b>Photo</b> A.				
3.5' concrete culvert								
Culvert set too high								
Culvert too long, 45' to 50' total length, road approx. 20' wide								
Culvert could be shortened to daylight more stream								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

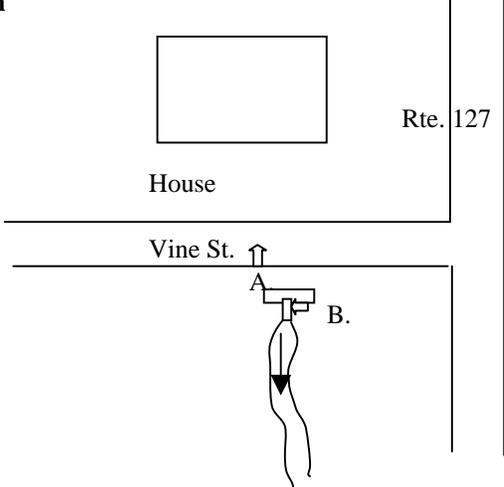
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	28	Unnamed	Wooded Swamp Deciduous/Open Water	FL	Riverine	Reservoir Road	Unknown	99
<b>Notes</b>				<b>Photo</b>				
Almost dry stream bed due to lack of flow from dam				<p>A.</p>  <p>B.</p> 				
Slight runoff from reservoir would return some stream functions								
Difficult to engineer site, need to assess flooding potential								
Check historic maps								
No culvert seen emanating from bank								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

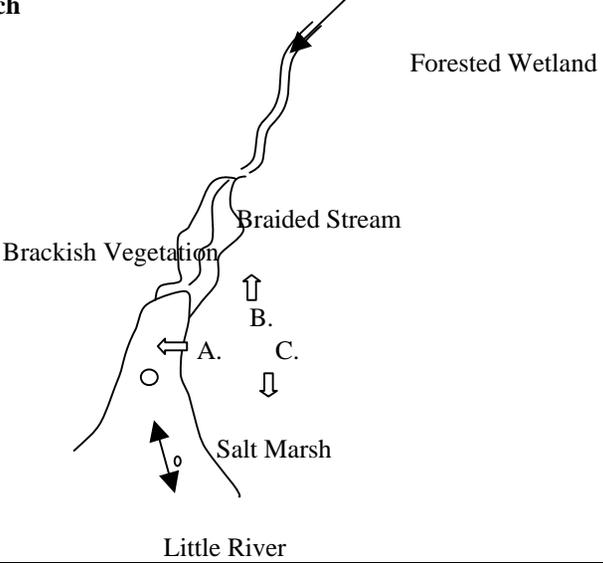
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	29	Unnamed	Wooded Swamp Deciduous/Shrub Swamp	DL	Riverine	Reservoir Road	Unknown	98
<b>Notes</b>				<b>Photo</b>				
Stream disappears under area of old fill				<b>A.</b>				
Stream culverted for about 125-150'				<b>B.</b>				
Low flow stream								
Stream emerges into wetland								
Slash deposited in wetlands								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

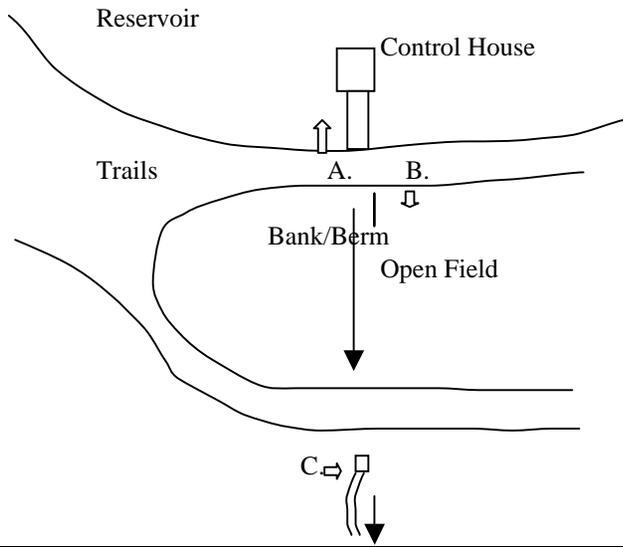
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	30	Unnamed	Brackish Marsh	CU, FL, BMP, BI	Estuarine/Riverine	Holly St.	Unknown	100
<b>Notes</b>				<b>Photo</b>				
Double corrugated metal culverts (~14")				<p><b>A.</b></p>  <p><b>B.</b></p> 				
Culverts may be too small								
Debris in stream below culverts								
Sensitive area, potential for smelt spawning (if it does not exist)								
Culvert outlet extended too far								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

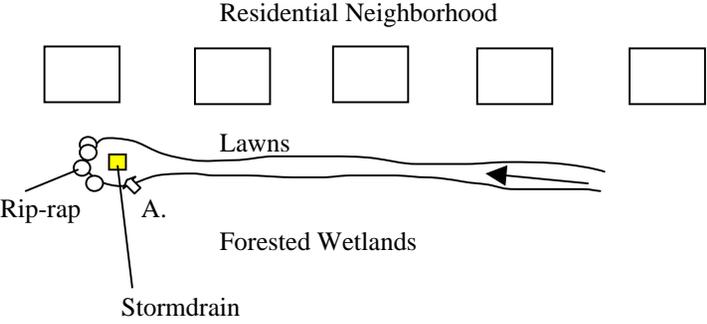
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	31	Unnamed	Brackish Marsh	DL, BMP	Riverine	Washington St.	Municipal	101
<b>Notes</b>				<b>Photo</b>				
Large disturbance area				A.				
Stormwater part of natural stream				B.				
Source of discharge - Goose Gove Reservoir								
Low flow stream								
Final discharge - 2' culvert								
Retaining wall contains 4 discharge culverts of various sizes								
Main stream runs along garden (B) and is channelized (stone)								
<b>Sketch</b>				C.				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

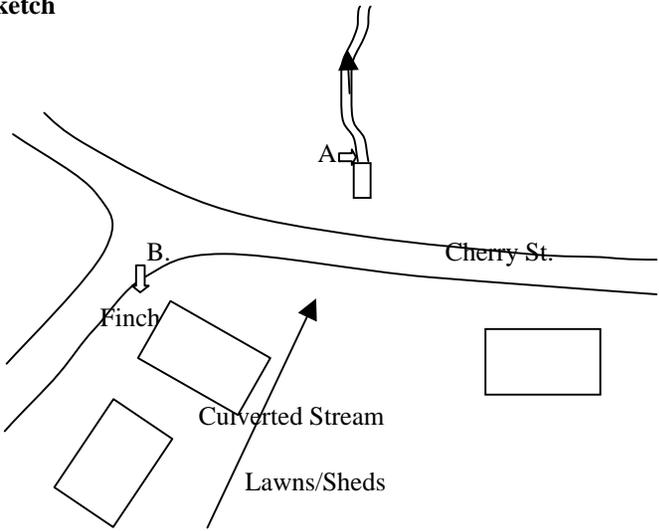
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	32	Mill River Trib.	Shrub Swamp	IM	Riverine	Washington St.	Unknown	102
<b>Notes</b>				<b>Photo</b>				
Large area of Japanese knotweed				A.				
Area approx. 100' x 100'								
Immediately adjacent to stream bank								
Area may be potential smelt spawning habitat								
Private ownership								
Area adjacent to site 31								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

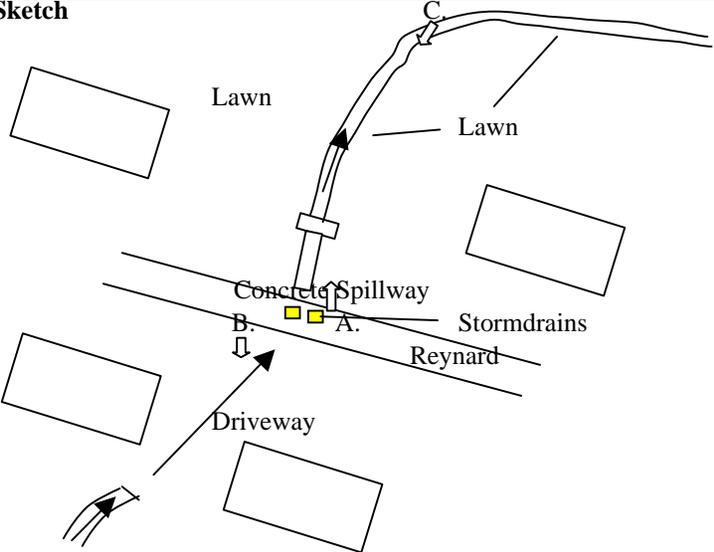
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint	
Q-2	33	Mill River Trib.	Shrub Swamp	DL	Riverine	Vine St.	Public/Private	103	
<b>Notes</b>				<b>Photo</b>					
2' black corrugated culvert recently installed				A.					
Presumably part of stormwater infrastructure									
Upstream - stream not found									
Stream appears to go under residential area									
Potential for daylighting not known									
<b>Sketch</b>				B.					
									
<b>Restoration Priority</b>									
<i>General Classification:</i> minor									
<i>Restoration Potential Score:</i> NA									

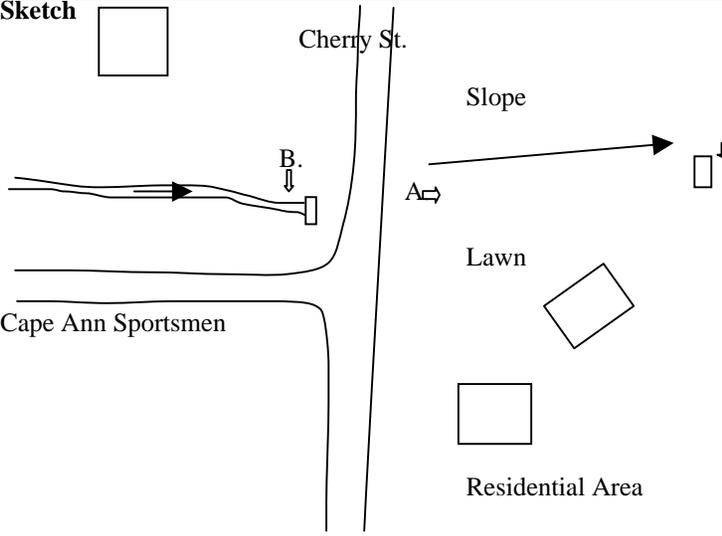
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	34	Mill River Trib.	Brackish Marsh	RR, IM, CR	Andromous/Estuarine	Washington St.	Unknown	104
<b>Notes</b>				<b>Photo</b>				
Approx. 4' drop - fresh to salt water				<b>A.</b>				
Fresh water channel is braided and poorly formed								
A ramp for eels or channel alteration for smelt may be possible				<b>B.</b>				
Approx. 200 yards of restoration area for smelt (to Rte. 127)								
Excellent canopy upstream								
Base flows may be too low for smelt								
Base flows may be enhanced with stormwater redirection and more salt water influence								
<b>Sketch</b>				<b>C.</b>				
 <p>Forested Wetland</p> <p>Brackish Vegetation</p> <p>Braided Stream</p> <p>A.</p> <p>B.</p> <p>C.</p> <p>Salt Marsh</p> <p>Little River</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

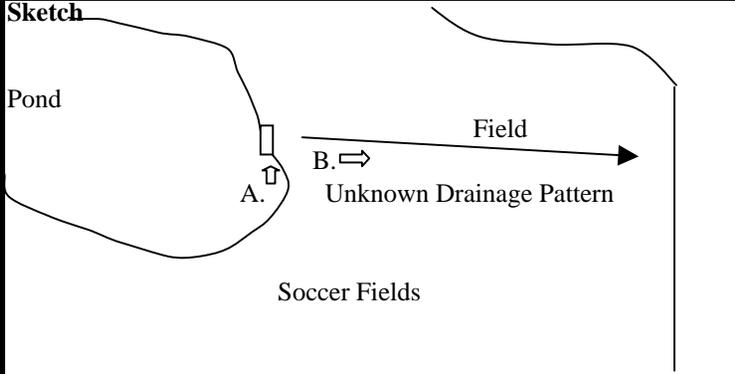
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	35	Goose Cove Res.	Wooded Swamp Deciduous/Open Water	DL	Riverine	Reservoir Road	Municipal	105
<b>Notes</b>				<b>Photo</b>				
Controlled outlet from reservoir				A.				
1' culvert, low flow				C.				
Flow is probably seep rather than any controlled escape				  				
Approx. 200' of culverted stream								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

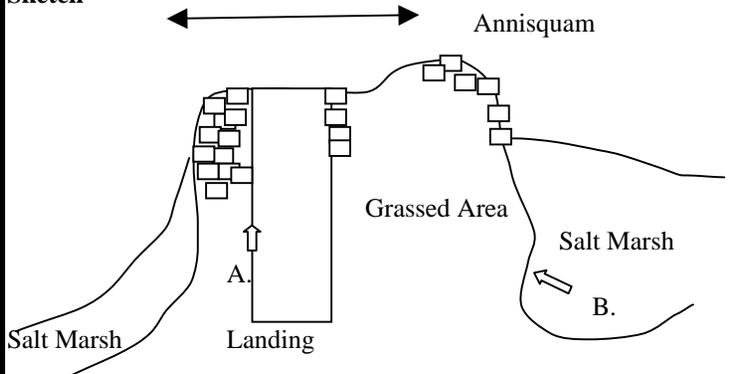
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	36	Goose Cove Res.	Wooded Swamp Deciduo	BE, DL	Riverine	Reservoir Road	Unknown	106-107
<b>Notes</b>				<b>Photo</b>				
Stream runs along backyards, lawns to stream drain				<b>A.</b> 				
Stream dead-ends into a stormdrain that goes under a cul-de-sac								
Site connects to site 37								
Stream has been piped under residential subdivision								
Stream side buffer should be expanded (20' minimum)								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

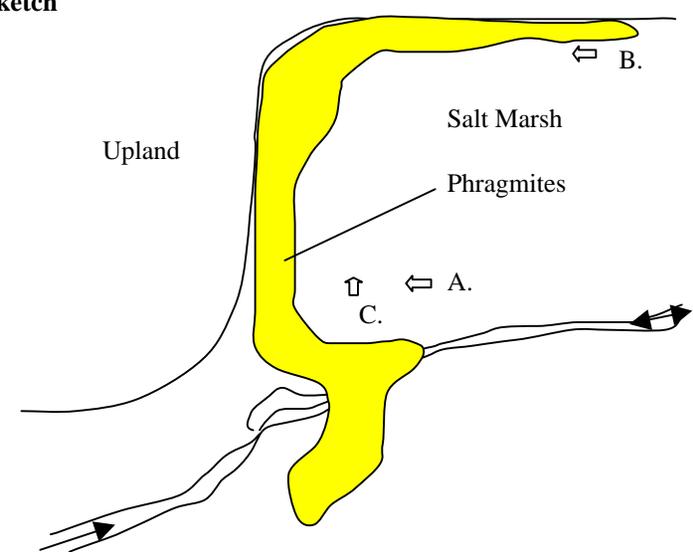
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	37	Unnamed	Shrub Swamp	DL	Riverine	Cherry St.	Public/Private	108
<b>Notes</b>				<b>Photo</b>				
Stream buried under residential neighborhood				<b>A.</b> 				
Stream shown on 1982 USGS								
Stream discharges to 3.5' concrete culvert								
Land ownership needs to be studied to determine how to daylight (partially or full) stream, if possible								
Major impact area, total resource loss								
Stream may be culverted up to a couple hundred yards or more								
<b>Sketch</b>				<b>B.</b> 				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

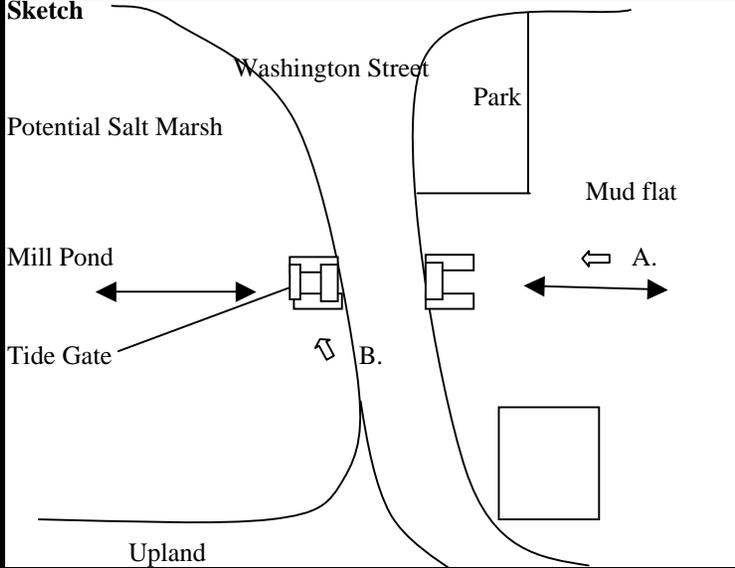
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	38	Mill River Trib.	Shallow Marsh Meadow	DL, BE, BMP	Anadromous/Riverine	Reynard St.	Public/Private	109
<b>Notes</b>				<b>Photo</b>				
Stream has been converted to lawn and other developed uses				A. 				
Stream culverted for ~100'				B. 				
Stream appears ditched downstream (too linier)				C. 				
Direct stormwater discharge								
Culvert inlet not found, no public access								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

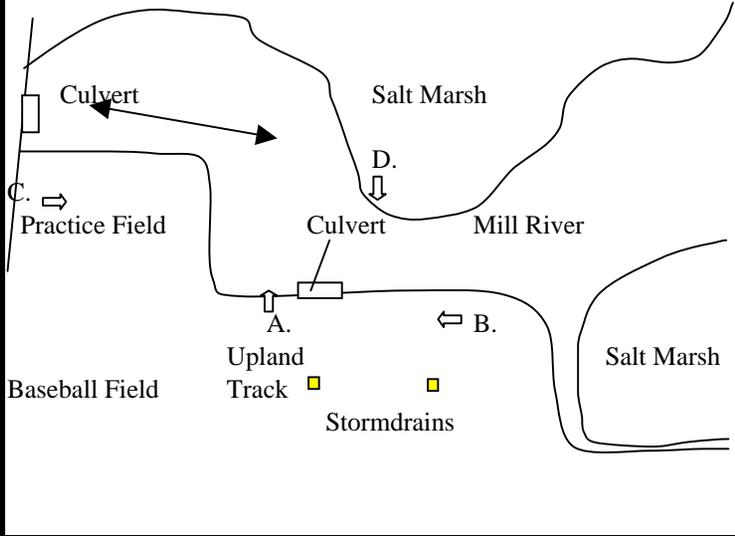
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	39	Mill River Trib.	Brackish Marsh	FL, DL, BE, CU	Catadromous/Riverine	Cherry St.	Private/Public	110
<b>Notes</b>				<b>Photo</b>				
Site drains to site 38 via 1.5' corrugated culvert								
Low flow conditions								
Strangman pond is source water								
Former stream channel filled, steep slope								
Alewife passage probably not possible under flow conditions and given extent of culverted stream								
Downstream - potential smelt spawning area								
Stream enters slumped granite culvert								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

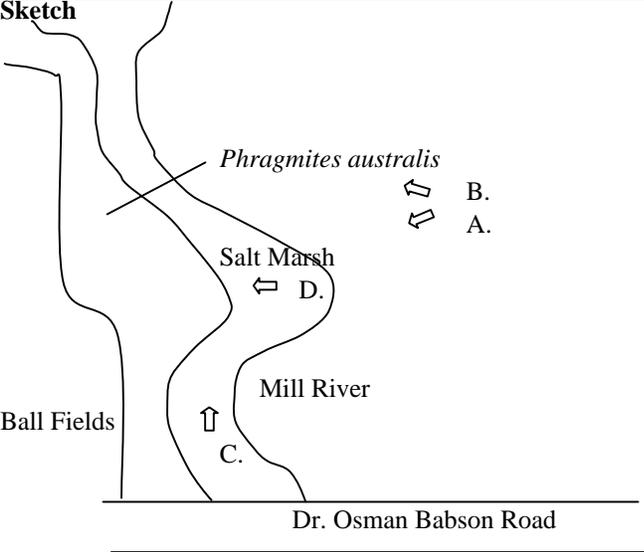
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint					
Q-2	40	Mill River Trib.	Shallow Marsh Meadow/	DL	Riverine	Honeysuckle Rd.	Municipal	111					
<b>Notes</b>				<b>Photo</b>									
200' of daylight potential													
Pond outlet/stream is culverted													
Outlet not found may be along Mill River Causeway													
Opportunity to daylight along field edge													
<b>Sketch</b>				<b>A.</b>									
									<b>B.</b>				
<p>Unknown Drainage Pattern</p>													
<p>Restoration Priority</p> <p>General Classification: minor</p> <p>Restoration Potential Score: NA</p>													

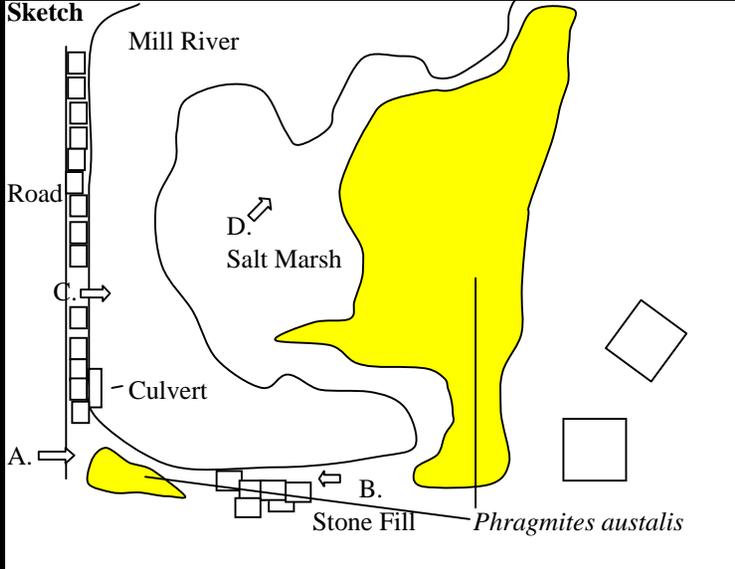
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	41	Annisquam River	Salt Marsh/Tidal Flat	FR	Estuarine	Corliss Landing	Municipal	112
<b>Notes</b>				<b>Photo</b>				
Portion of landing could be removed for restoration				<b>A.</b> 				
Salt marsh could be planted, tide flat created								
Restoration and continued use of site could coexist								
Historic structure								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

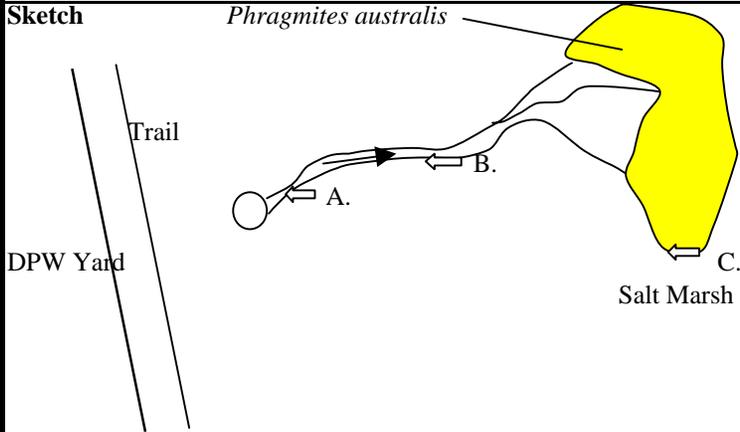
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	42	Mill River	Salt Marsh	IM, TR, OMWM	Estuarine	O'Maley School	Municipal	113
<b>Notes</b>				<b>Photo</b>				
Area is impacted by <i>Phragmites australis</i> growth				<b>A.</b>				
Litter ditch could reduce Phragmites salt marsh advance								
Stream has braided channels - not one defined channel				<b>B.</b>				
Approx. 1-3 acres of Phragmites								
Removal or opening of tide gate needs to be considered downstream								
Site has restoration potential if salinities are high								
Very shallow creek area, if drained would provide habitat for shorebirds								
<b>Sketch</b>				<b>C.</b>				
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 135								

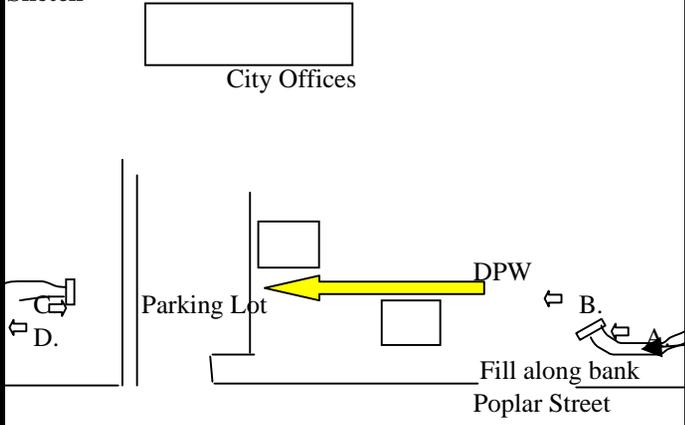
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	43	Mill River	Salt Marsh/Tidal Flat	CU	Anadromous/Estuarine	Washington St.	Municipal	114
<b>Notes</b>				<b>Photo</b>				
Project has been identified in the tidal restriction report				<p><b>A.</b></p> 				
Opening the gate would create mudflat and salt marsh								
It may be possible to lower opening to allow same amount of retained water but it would be more saline (reduce <i>Phragmites australis</i> )								
Tide gate probably adversely effects anadromous and catadromous fish by restricting passage to certain tides								
Restoration of this site is going to effect upstream restoration projects								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 140								

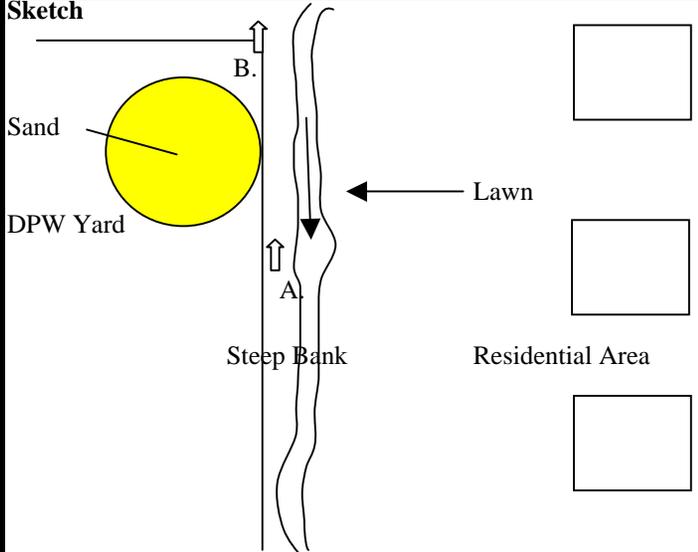
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	44	Mill River	Salt Marsh/Tidal Flat	FR, BMP	Estuarine	O'Maley School	Municipal	116
<b>Notes</b>				<b>Photo</b>				
Large fill removal potential				<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%; text-align: center;">A.</div> <div style="width: 50%; text-align: center;">B.</div> </div>  				
Toe of slope could be pulled back								
Should be done in conjunction with tide gate opening (site 43)								
Couple fill removal with BMP installation								
Transfer of upland to wetland								
Approx. 1-3 acre restoration potential								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 120								

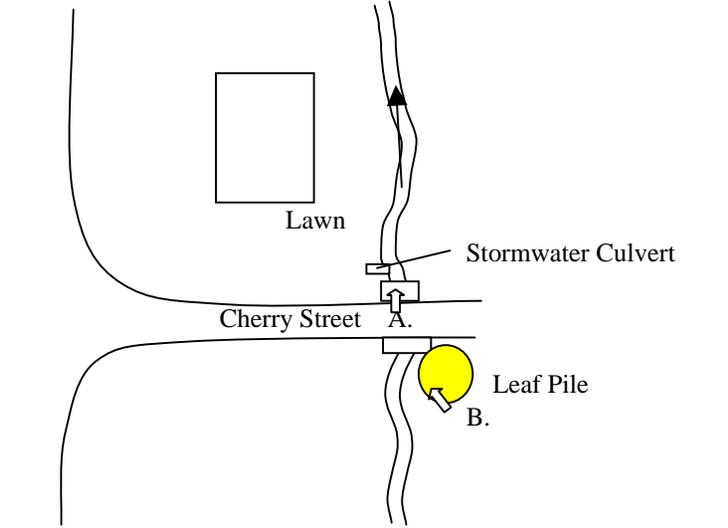
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	45	Mill River	Salt Marsh/Tidal Flat	FR, IM	Estuarine	Dr. Osman Babson Rd.	Municipal	NA
<b>Notes</b>				<b>Photo</b>				
Extensive Phragmites growth along Mill River				A.				
Ditching may reduce Phragmites in conjunction with tide gate opening				B.				
Re-alignment of ball fields could provide an opportunity for fill removal								
Project could be done in conjunction with OWMM/Mosquito control								
<b>Sketch</b> 								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 115								

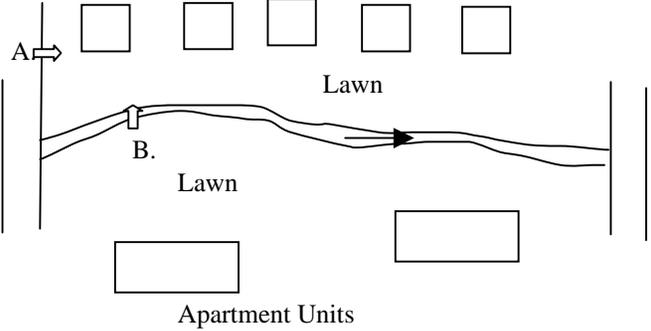
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	46	Mill River	Salt Marsh	IM, FR,TR	Estuarine	Dr. Osman Babsor	Unknown	117
<b>Notes</b>				<b>Photo</b>				
Transition zone <i>Phragmites</i> growth				A.				
Growth encouraged by alteration of tidal flow downstream				B.				
Stones litter wetland edge								
Creek shallow, acts like a large salt panne system								
Shallow creek area may revert to salt marsh with sufficient drainage				C.				
Approx. 3-5 acres of <i>Phragmites</i>				D.				
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 150								

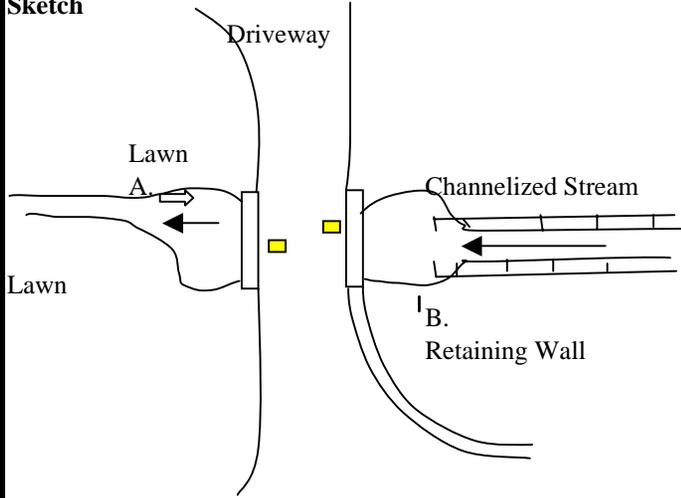
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	47	Mill River Trib.	Brackish Marsh	IM, BMP	Riverine	Poplar St.	Municipal	118
<b>Notes</b>				<b>Photo</b>				
Heavy sediment discharge - in-stream plume noted				<b>A.</b>				
Water seeps from base of concrete cistern				<b>B.</b>				
Stormwater discharge, watershed presumably DPW yard								
Not known if a stream once existed on site								
Good opportunity for stormwater BMP given ownership								
Discharge of sediment and fresh water enhances Phragmites growth								
<b>Sketch</b>								
 <p>Trail</p> <p>DPW Yard</p> <p><i>Phragmites australis</i></p> <p>Salt Marsh</p> <p>A.</p> <p>B.</p> <p>C.</p>								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 120								

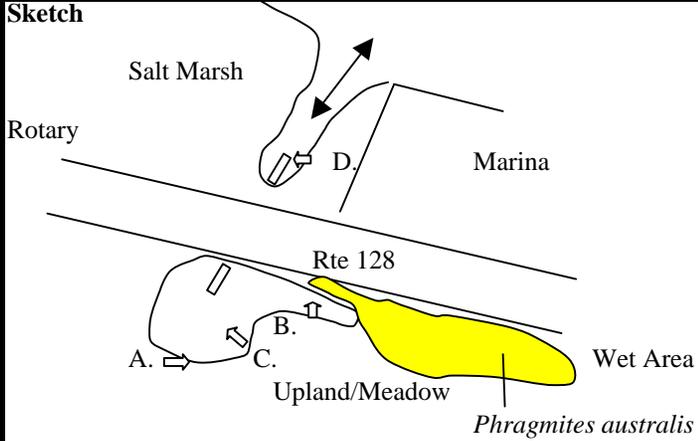
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	48	Mill River	Brackish Marsh	FR, BMP, DL	Anadromous/Catadromous	Poplar St.	Municipal	119
<b>Notes</b>				<b>Photo</b>				
Inlet, ~ 4' Concrete Culvert				A.				
Good base flow				B.				
Fill replaces potential/natural smelt spawning area								
Partial daylight may be possible								
Fill along bank upstream				D.				
Approx. 100 yards of daylight potential								
Culvert discharges to salt marsh								
High visibility site								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 165								

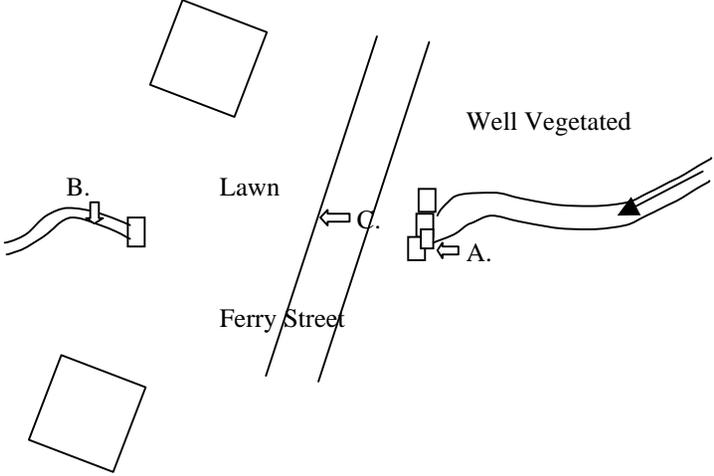
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	49	Mill River	Shrub Marsh	BE, BI, IM FR	Anadromous/Riverine	Poplar St.	Municipal	120
<b>Notes</b>				<b>Photo</b>				
Houses have lawn to stream edge				<p><b>A.</b></p>  <p><b>B.</b></p> 				
DPW storage area comes to near stream edge								
Historic fill from DPW yard to stream edge								
Rubble and sand in stream								
Stream seems ditched due to linear shape								
Fence to stream edge, barrier to wildlife								
Clearing noted along stream								
Potential to pull back of toe of slope along DPW yard and recreate natural buffer and floodplain								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

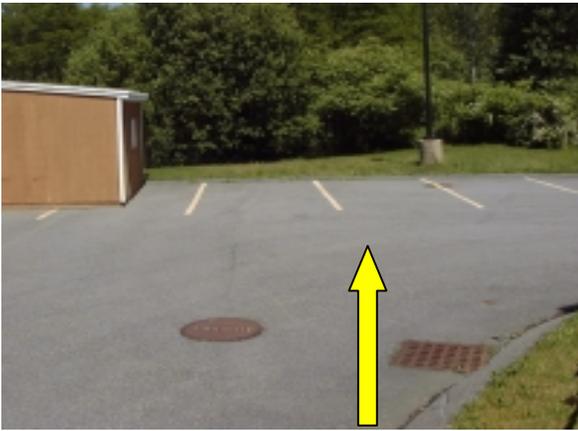
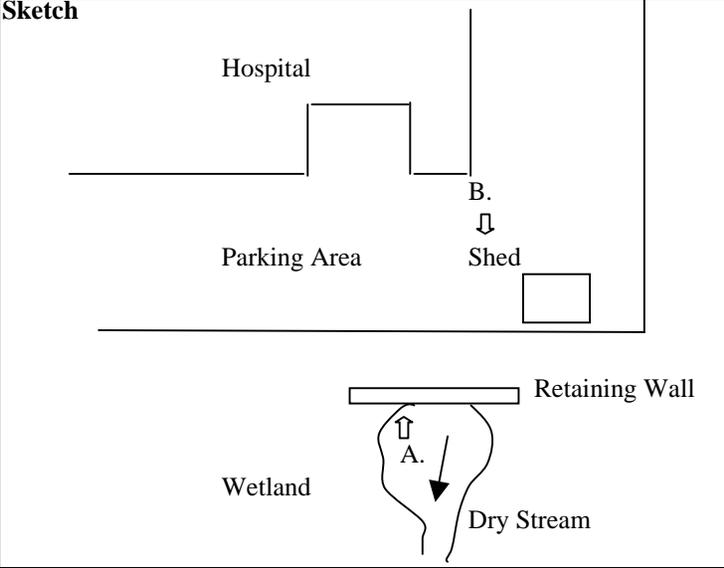
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	50	Mill River	Shrub Marsh	CU	Riverine	Cherry St.	Municipal	121
<b>Notes</b>				<b>Photo</b>				
Culvert set too high (downstream)				<b>A.</b> 				
Culvert size is adequate (3')								
Site priority should be considered in context with other adjacent sites (downstream)								
Leaf fill deposited on stream bank								
Anadromous potential limited, no headwater pond								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

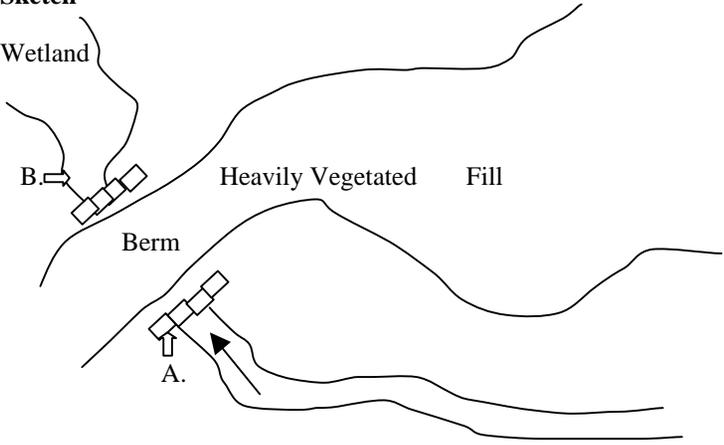
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	51	Mill River	Shrub Marsh	BE	Riverine	Poplar St.	Unknown/Private	122
<b>Notes</b>				<b>Photo</b>				
Dense residential development along river				<b>A.</b> 				
Lawn and fences reduce wildlife values								
Lawn debris seems to be thrown over fences in some areas								
Buffer could be enhanced along stream								
<b>Sketch</b>				<b>B.</b> 				
								
<b>Restoration Priority</b> <i>General Classification:</i> minor <i>Restoration Potential Score:</i> NA								

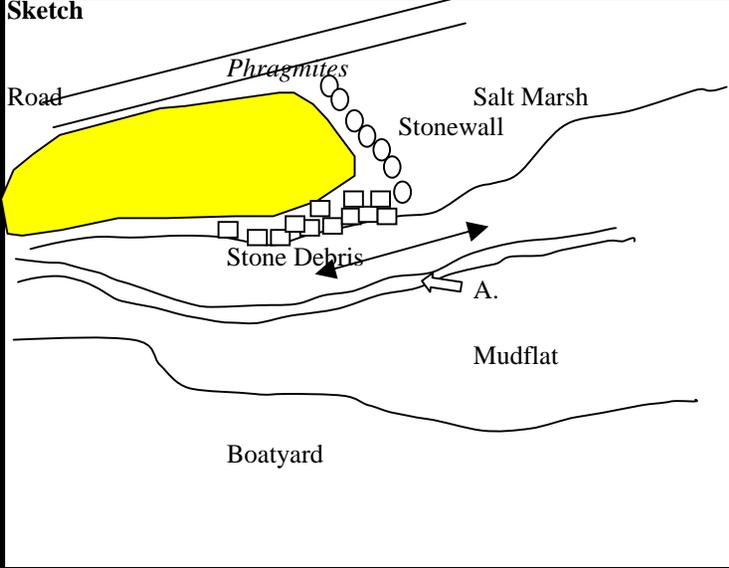
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	52	Mill River	Shallow Marsh Meadow/ Shrub Marsh	CU, BMP	Riverine	Poplar St.	Municipal	123
<b>Notes</b>				<b>Photo</b>				
Culvert opening not found				<p>A.</p>  <p>B.</p> 				
Lack of flow at either side								
Culvert may be clogged or lack of flow may be because of downstream obstruction								
Site should be considered in light of potential fish passage								
Stream channelized above								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

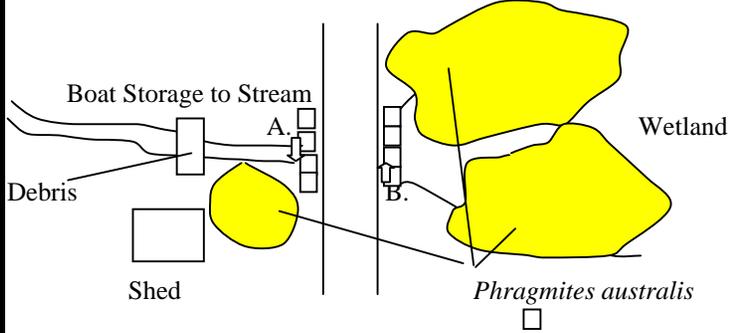
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	53	Annisquam River	Salt Marsh	CU, IM	Estuarine	Marsh Rd.	Private	124
<b>Notes</b>				<b>Photo</b>				
Salt marsh cut-off by Rte. 128				A.				
Approx. 10" steel culvert				B.				
Potential 1-5 acre restoration								
Private landowner								
Well developed high marsh on upstream side								
Removal of fill, without culvert upgrade could increase salt marsh								
Tidal flushing would reduce/stunt Phragmites								
Much of the Phragmites growth is result of stormwater from Rte. 128 - along bank								
<b>Sketch</b>				C.				
				D.				
								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

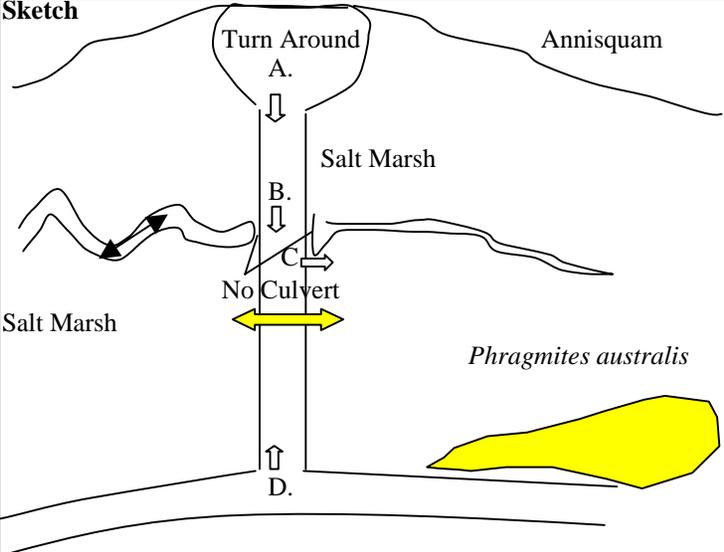
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	54	Annisquam River	Shrub Marsh	CU, DL	Riverine	Ferry St.	Public/Private	127
<b>Notes</b>				<b>Photo</b>				
Double culvert, 2' concrete				<b>A.</b>				
Steel excluder bars on upstream				<b>B.</b>				
Approx. 40' of daylight potential								
Low flow stream								
Headwater source seems to be the nursing home parking lot and associated stormdrains								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

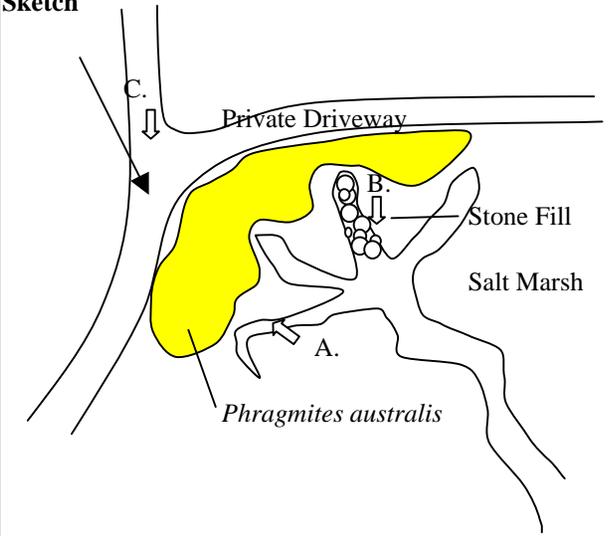
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	55	Annisquam River	Shrub Marsh	FR	Riverine	Ferry St.	Private	128
<b>Notes</b>				<b>Photo</b>				
Headwaters of stream altered and filled for development				<p>A.</p>  <p>B.</p> 				
Good site for stormwater BMP as source water comes from parking lot								
Main source water is probably stormwater as no flow from culvert was noted								
<b>Sketch</b>								
 <p>The sketch shows a site plan with the following features: <ul style="list-style-type: none"> <li><b>Hospital:</b> A large rectangular building at the top.</li> <li><b>Parking Area:</b> A large open area below the hospital.</li> <li><b>Retaining Wall:</b> A horizontal line below the parking area.</li> <li><b>Wetland:</b> An irregularly shaped area below the retaining wall.</li> <li><b>Dry Stream:</b> A narrow channel flowing from the wetland area towards the bottom right.</li> <li><b>Shed:</b> A small rectangular building to the right of the parking area.</li> <li><b>Arrows:</b> Arrow A points up from the wetland area, and Arrow B points down from the shed area.</li> </ul> </p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

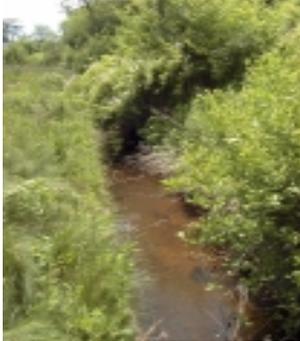
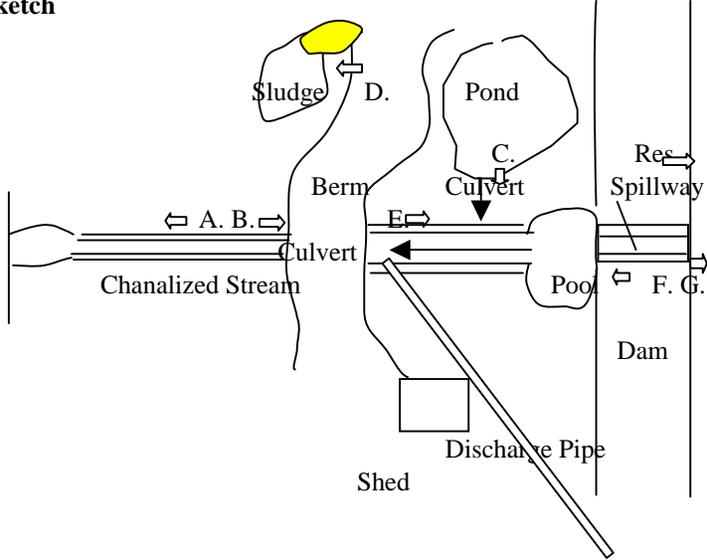
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	56	Annisquam River	Shrub Marsh	FR	Riverine	Ferry St.	Unknown	129
<b>Notes</b>				<b>Photo</b>				
Area is part of stormwater detention system				<b>A.</b> 				
2' concrete culvert								
Small amount of flow								
30' to 40' berm								
Stream converted to wetlands for stormwater retention/detention								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

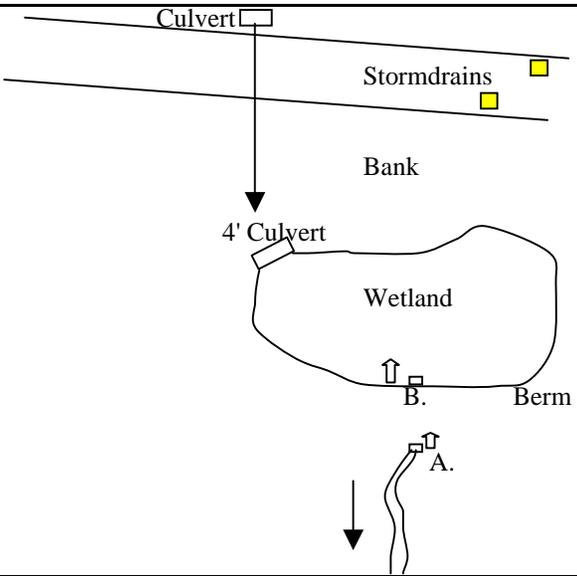
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	57	Annisquam River	Salt Marsh	IM, FR	Estuarine	Ferry St.	Private	130
<b>Notes</b>				<b>Photo</b>				
Fill along marsh and in the intertidal				A.				
<i>Phragmites australis</i> restricted to inside stonewall area								
Fill removal may aid marsh sheet flow reducing <i>Phragmites</i>								
Stream has potential for smelt (if not already)								
According to boatyard owner <i>Phragmites</i> is advancing								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

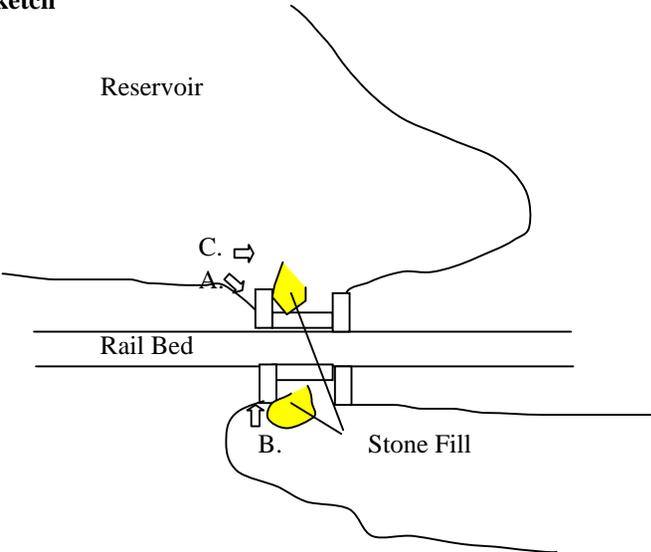
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	58	Annisquam River	Brackish Marsh	CU,TR	Anadromous/Estuarine	Ferry St.	Private	131
<b>Notes</b>				<b>Photo</b>				
Double 2' concrete culvert				<b>A.</b> 				
Headwall falling apart								
Japanese knotweed and Phragmites present								
One culvert blocked								
Stream has lots of trash, limited stream buffer								
Upstream residential activity near stream edge								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

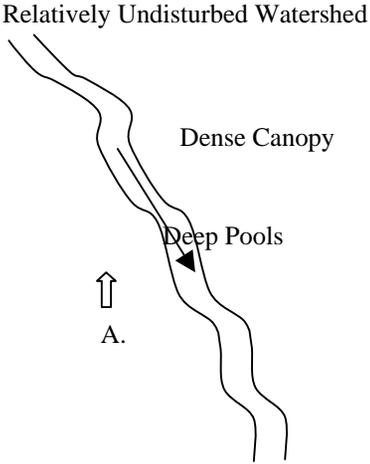
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	59	Annisquam River	Salt Marsh	FR	Estuarine	Perrywinkle Way	Private	132
<b>Notes</b>				<b>Photo</b>				
Old dirt/gravel causeway across marsh				A.				
Need for road not clear, replace with boardwalk				B.				
No culverts across road								
Creeks on either side terminate at road - indicate need for culvert								
Easy restoration, grade elimination								
Phragmites present on transition zone on upstream side of road								
Road is approx. 30' in width								
<b>Sketch</b>								
 <p>Turn Around A.</p> <p>↓</p> <p>Salt Marsh</p> <p>B.</p> <p>↓</p> <p>C.</p> <p>No Culvert</p> <p>↔</p> <p>Phragmites australis</p> <p>↑</p> <p>D.</p>								
<b>Restoration Priority</b>								
General Classification: major				C.				
Restoration Potential Score: 125				D.				

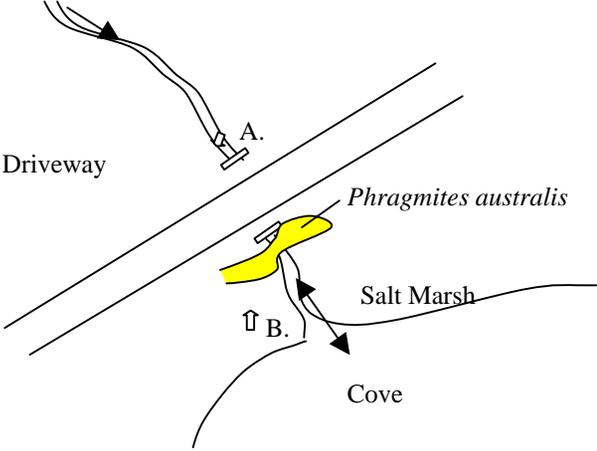
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	60	Annisquam River	Brackish Marsh	IM, FR, CU	Estuarine	Riverview Rd.	Public/Private	133
<b>Notes</b>				<b>Photo</b>				
Phragmites along transition zone				<p><b>A.</b></p>  <p><b>B.</b></p>  <p><b>C.</b></p> 				
No clear channel - stream ends at road								
Water runs across street								
Series of braided channels to road edge								
Creek section has been filled in with stone for about 40'								
Site may be better served as a mitigation project								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

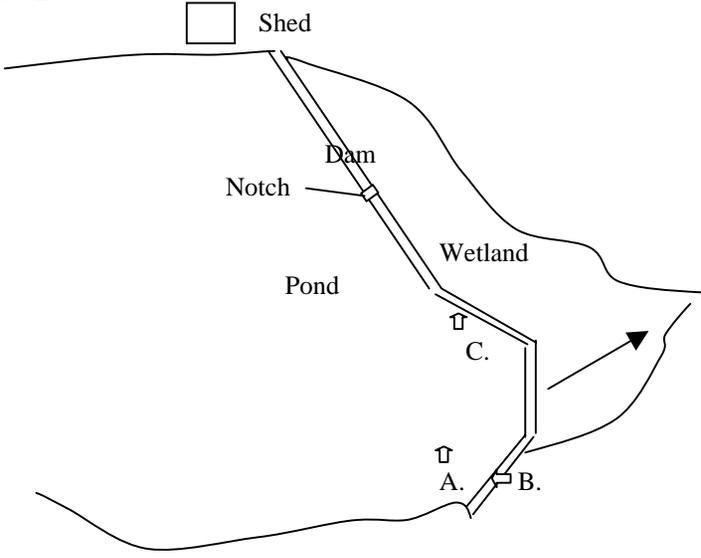
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	61	Mill River	Shallow Marsh Meadow	BI, FL	Anadromous/Catadromous	Poplar St.	Municipal	134
<b>Notes</b>				<b>Photo</b>				
Major water supply dam				A. 				
Very difficult engineering for fish ladder				B. 				
Sludge lagoon too small to convert to headwater pond				D. 				
Channel coming out of dam is 3.5' wide, channelized bank				E. 				
Phragmites growing in spoil deposition area				C. 				
4' Arch culvert under berm				F. 				
2' and 1' culverts discharging into stream downstream of berm				G. 				
				H. 				
<b>Sketch</b>								
 <p>The sketch illustrates the site layout. From left to right: a 'Channelized Stream' with a 'Culvert' (marked A, B) discharging into a 'Berm'. Under the berm, there are two smaller culverts (marked E) and a 'Discharge Pipe' leading to a 'Shed'. To the right of the berm is a 'Pond' (marked C) with a 'Culvert' (marked D) leading to a 'Sludge' area. Further right is a 'Dam' with a 'Spillway' and a 'Pool' (marked F, G). A 'Re...' (likely Reservoir) is indicated to the right of the dam.</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

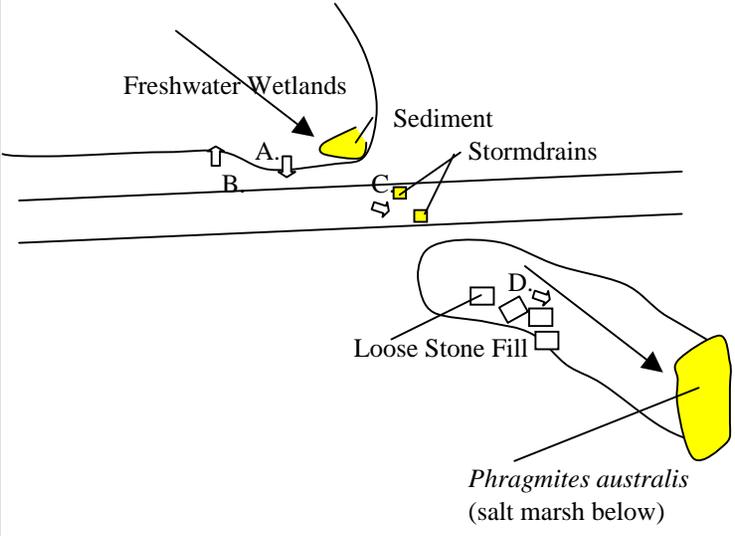
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	62	Babson Reservoir Trib.	Wooded Swamp Deciduous	BMP, FR	Riverine	Old Rockport Rd.	Unknown	135
<b>Notes</b>				<b>Photo</b>				
Stormwater detention system replaces stream				A.				
Culverts set on top of each other				B.				
Water quality is a concern since site drains to reservoir								
Iron staining in water								
Detention area near natural transition between stream and wetland								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	63	Alewife Brook	Open Water	FR	Riverine	Old Rockport Rd.	Public	136
<b>Notes</b>				<b>Photo</b>				
Stone from railbed has filled the outlet and inlet of the culvert almost restricting flow				<b>A.</b>				
Culvert size is good (5'x9')								
Potential mitigation/enforcement issue				<b>B.</b>				
								
				<b>C.</b>				
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

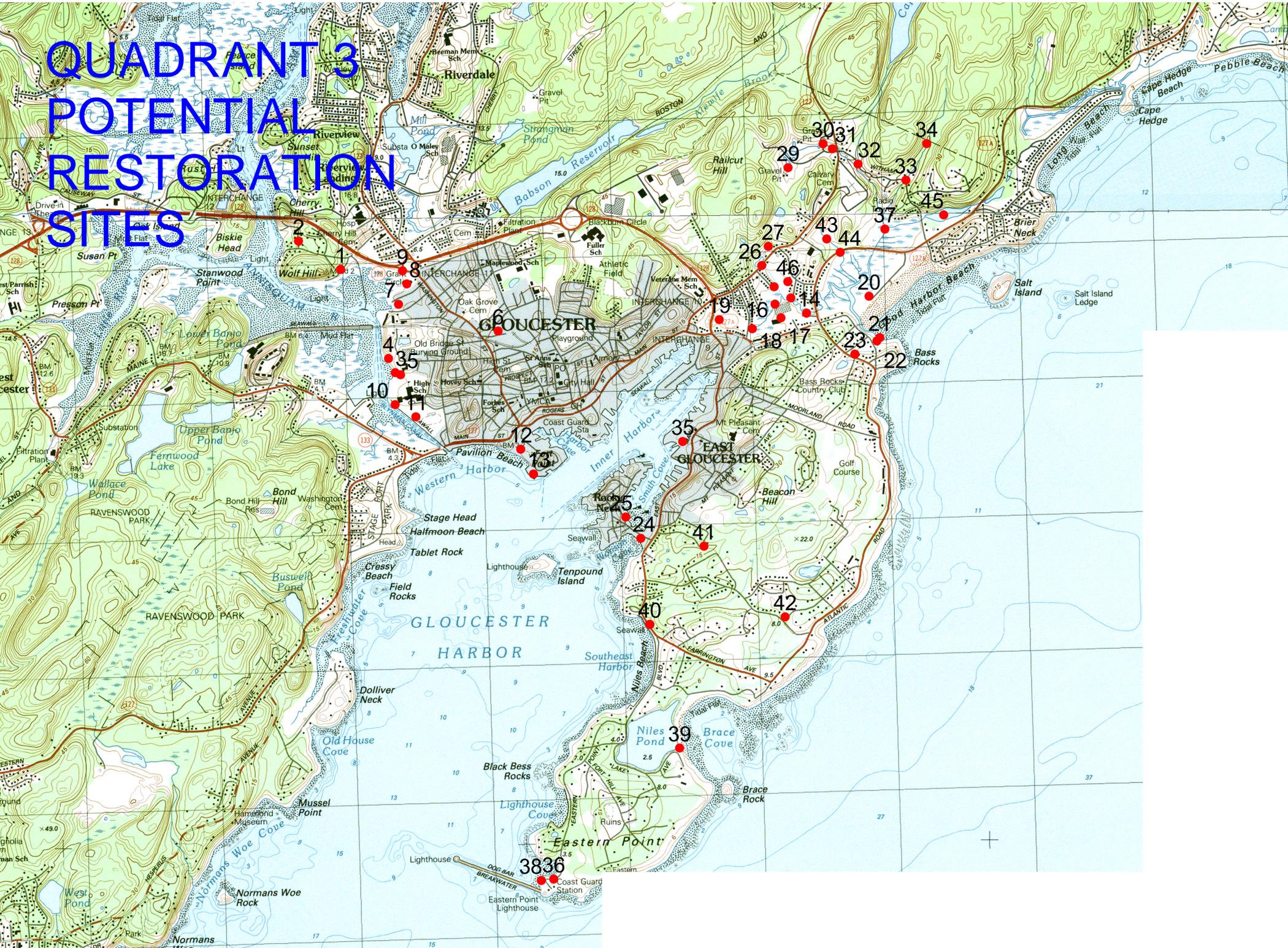
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	64	Alewife Brook	Wooded Swamp Mixed Trees	S	Riverine	Old Rockport Rd.	Unknown	137
<b>Notes</b>				<b>Photo</b>				
Stream has excellent canopy and pool and riffle system				A. 				
Watershed is relatively undisturbed								
Water quality seems good								
Stream may hold some native trout								
Snags in stream increase habitat potential								
Approx. 1/2 mile of healthy stream								
Stream 4'-5' wide and has good base flow								
<b>Sketch</b>								
<p>Relatively Undisturbed Watershed</p> 								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 135								

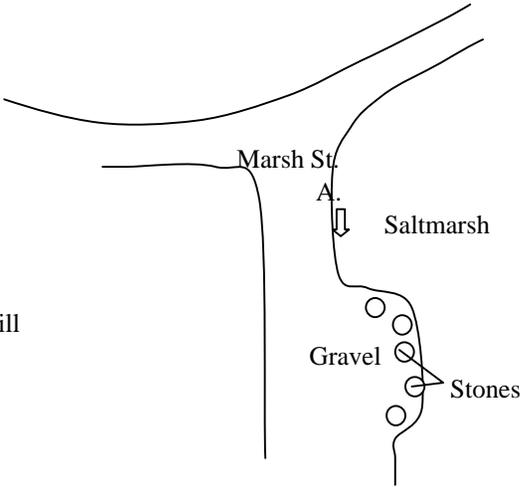
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	65	Sheep Pond	Brackish Marsh	CU, FL	Anadromous/Catadromous	Dennison St.	Municipal	225
<b>Notes</b>				<b>Photo</b>				
12" metal culvert blocked at outlet				<b>A.</b>				
Potential for fish passage to Sheep Pond, alewife and eel								
Short run from Goose Cove to Sheep Pond								
Flow in stream regulated by dam configuration								
Pocket of Phragmites at outlet along bank								
If pond upstream has alewife potential project should have elevated priority status								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

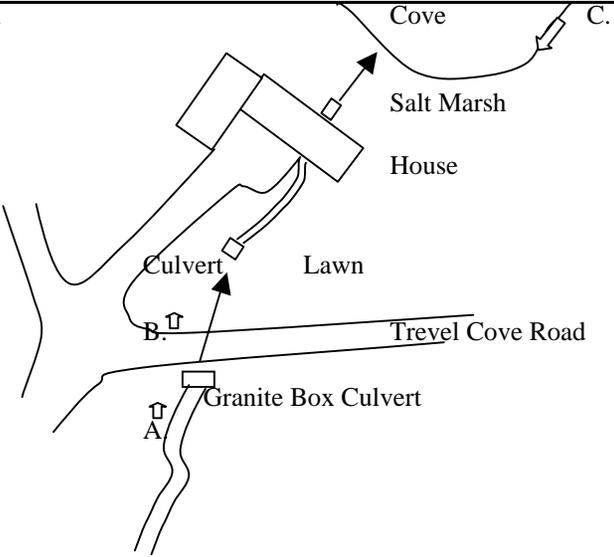
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint					
Q-2	66	Sheep Pond	Open Water	FL, DR	Anadromous/Catadromous	Dennison St.	Unknown	226					
<b>Notes</b>				<b>Photo</b>									
Dam in poor shape				<b>A.</b>									
Not a clear point of discharge from dam/spillway				<b>B.</b>									
Approx. 3' thick concrete retaining wall acting as dam													
Pond size is small but may have some habitat value for alewife													
Wetlands below dam feed by weep at dam base				<b>C.</b>									
Pond may be too shallow to support alewife													
If pond has alewife potential project should have elevated priority status													
<b>Sketch</b>													
													
<b>Restoration Priority</b>													
General Classification: minor													
Restoration Potential Score: NA													

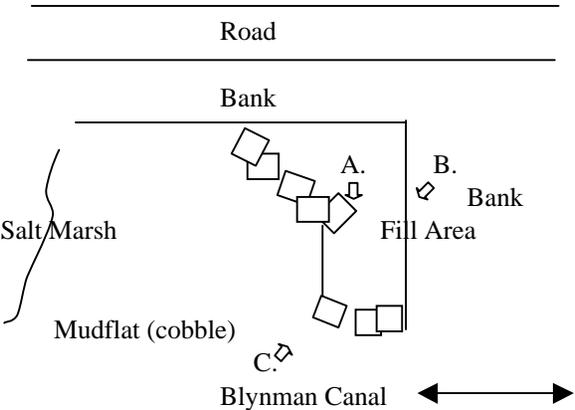
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-2	67	Goose Cove	Shrub Swamp/Brackish Marsh	CU, FR	Estuarine	Washington St.	Unknown	227
<b>Notes</b>				<b>Photo</b>				
Area may have been extension of Goose Cove salt marsh				A.				
Culvert not found upstream/downstream				B.				
Wetlands seem filled in below Rte. 127.								
Heavy sediment buildup								
Upstream wetlands impacted by invasive species				C.				
Downstream wetlands, large stand of <i>Phragmites australis</i> present				D.				
Upstream wetlands may be restored by allowing tidal flow from cove to flush the area								
Portion of stream bank downstream filled								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

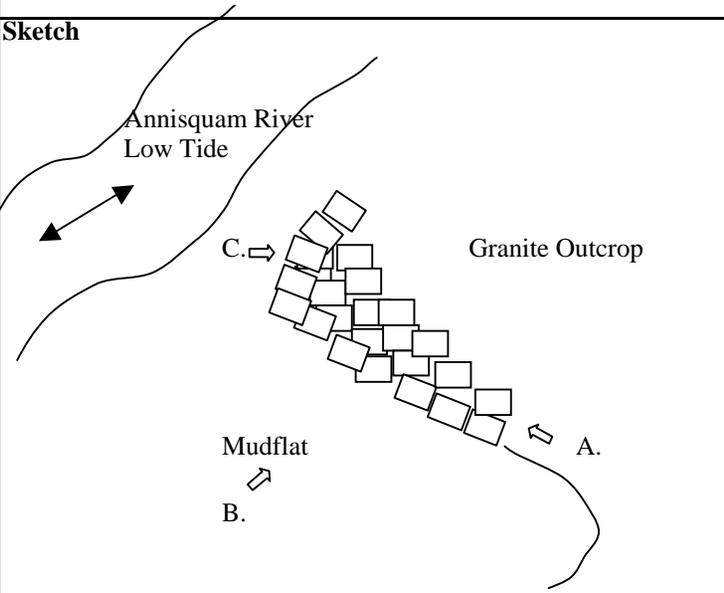
# QUADRANT 3 POTENTIAL RESTORATION SITES



Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	1	Annisquam River	Salt Marsh	FR	Estuarine	Wolf Hill Rd.	Unknown	125
<b>Notes</b>				<b>Photo</b>				
Approx. 2 to 3' elevation difference between upland and wetland				A.				
Turn around could be reduced in favor of salt marsh restoration								
Area may be privately held								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

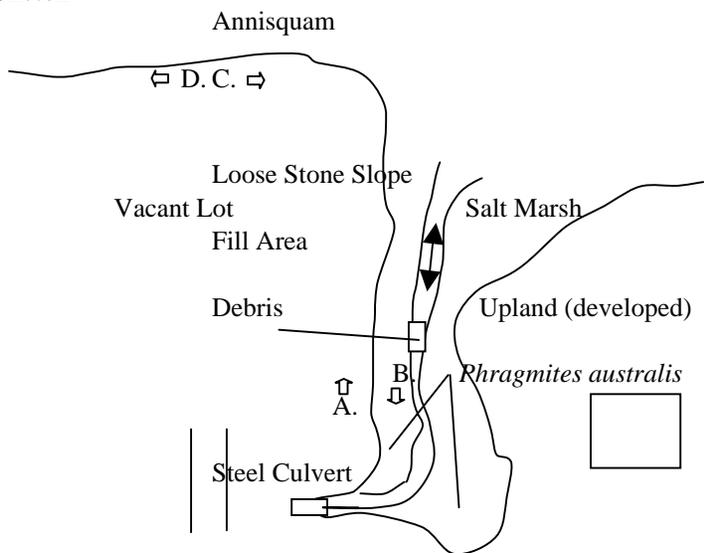
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	2	Annisquam River	Brackish Marsh	DL	Anadromous/Estuarine	Trevel Cove Rd.	Unknown	126
<b>Notes</b>				<b>Photo</b>				
Small stream flows under house				A.		B.		
Upstream box culvert collapsed								
Stream culverted before outlet for approx. 100'								
House re-replaces salt/fresh water interface								
<b>Sketch</b>				C.				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

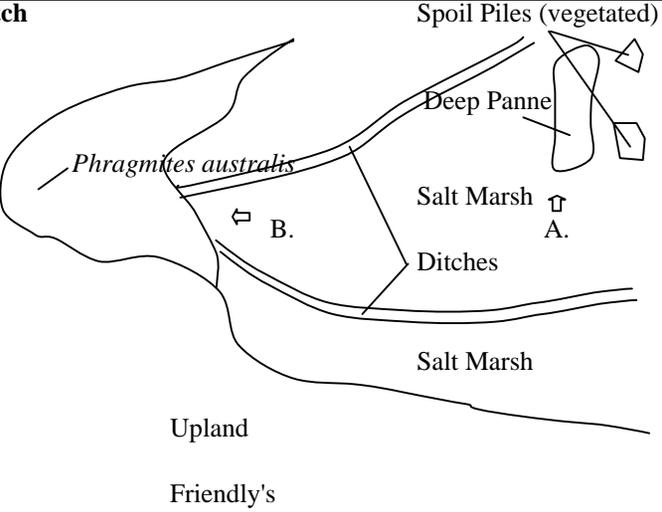
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	3	Blynman Canal	Salt Marsh	FR	Estuarine	High School	Unknown	138
<b>Notes</b>				<b>Photo</b>				
Approx. 50' x 25' fill area				<b>A.</b>				
Appears to be an old concrete foundation (swimming pool)								
High marsh restoration site				<b>B.</b>				
Mudflat could be improved to encourage shellfish, area disturbed								
Bituminous, concrete and stone fill								
Need to alter elevation and re-vegetate								
Site could be done in terms of high school area enhancements								
<b>Sketch</b>				<b>C.</b>				
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 140								

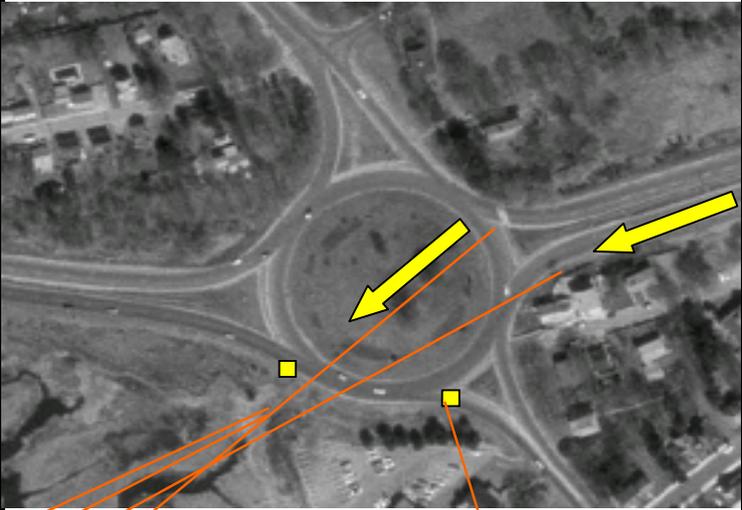
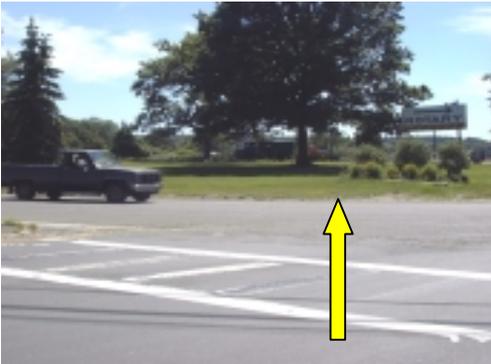
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	4	Blynman Canal	Salt Marsh/Tidal Flat	FR	Estuarine	High School	Unknown	139
<b>Notes</b>				<b>Photo</b>				
Historic fill area, probably a pier				<b>A.</b>				
Structure composed of granite blocks				<b>B.</b>				
Potential for salt marsh and tide pool restoration								
3' to 4' elevation change from natural contours								
Site is a barrier to public access								
Blunt end is approx. 30-40'. Length is approx. 125'								
Site should be considered with site 3								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

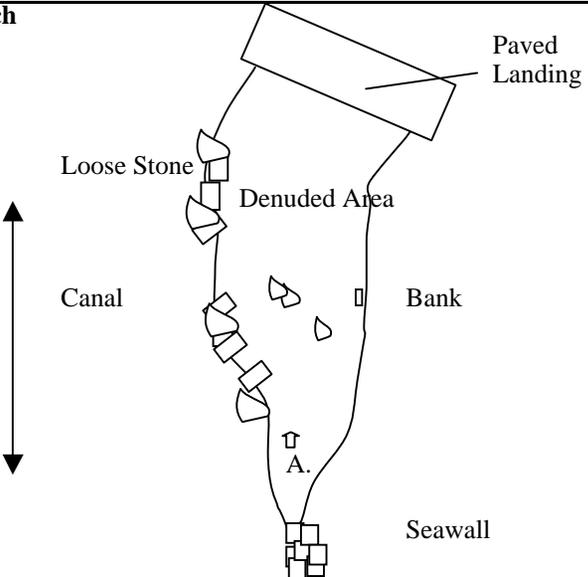
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	5	Blynman Canal	Salt Marsh/Brackish Marsh	IM, DL, BMP	Estuarine	High School	Municipal	140
<b>Notes</b>								
Watershed source not found								
Area - historic salt marsh fill								
Stormdrain system for high school and adjacent streets								
2' concrete culvert at outlet								
Salt marsh plant species found in wetland area shown below								
Dry weather flow evident								
Restoration potential limited due to spatial considerations and land use								
<b>Sketch</b>								
<p>The sketch illustrates the site layout. At the top is the Upland area. A Stormdrain runs from the Upland down to a concrete Culvert. To the right of the culvert is a Driveway/Parking Lot containing Japanese Knotweed. A Wetland area, containing <i>Phragmites australis</i>, is located between the culvert and the driveway. Six waypoints (A-F) are marked: A and B are within the wetland; C is at the culvert; D, E, and F are in the driveway/parking lot area. To the left of the culvert is a Mudflat. Below the driveway is a Parking Area, and further down are Tennis Courts.</p>								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								
				A.			B.	
				C.			D.	
				E.			F.	

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	6	Emerald Forest	Wooded Swamp Deciduous/Shrub Swamp	IM, FR, TR, BE	Riverine	Railroad Ave.	Public/Private	141
<b>Notes</b>				<b>Photo</b>				
Drainage problems exist, good opportunity to dovetail restoration with infrastructure change				A.				
Flow towards Railroad Ave.				B.				
Many trails exist inside "forest"				C.				
Area predominantly wetland, with possible vernal pool habitat								
No clear stream channel, series of pools								
Once part of much larger wetland complex (1,500 acres)								
Area heavily impacted by invasive								
Fill removal opportunities exist for more water storage								
Old berm runs through center of thicket								
Old foundation noted (see photo D.)								
<b>Sketch</b>				D.				
								
A. B. C. D. E. F. G. H.				E.				
<b>Restoration Priority</b>				F.				
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 125								
				G.				
								
				H.				
								

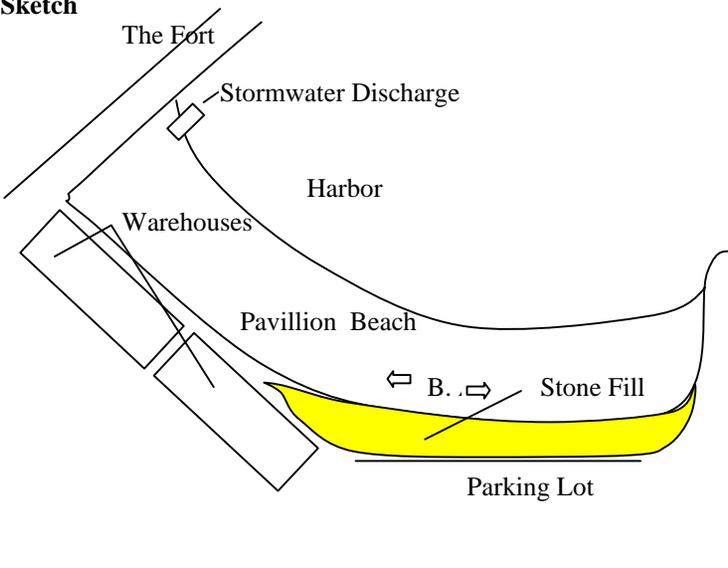
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	7	Annisquam River	Salt Marsh	FR, IM, BMP	Estuarine	Whittemore St.	Unknown	142
<b>Notes</b>				<b>Photo</b>				
Area could be improved for smelt (limited potential)				A.				
Opportunity for fill removal along slope to encourage salt marsh				B.				
Land privately held								
BMP possible at stream discharge								
8" steel culvert provides site with stormwater discharge								
				C.				
				D.				
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

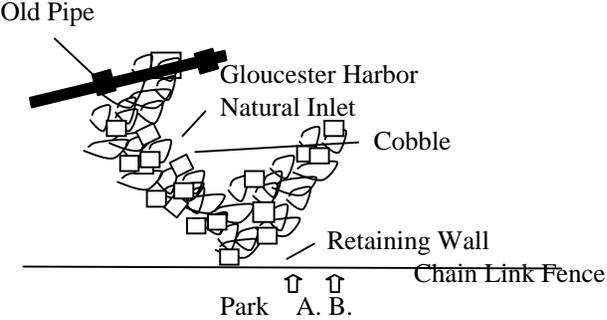
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	8	Annisquam River	Salt Marsh	IM, BE	Estuarine	Rte. 128	Unknown	143
<b>Notes</b>				<b>Photo</b>				
Gutter ditch could be excavated to retreat advance of <i>Phragmites australis</i>				<p><b>A.</b></p>  <p><b>B.</b></p> 				
Spoils left on the marsh from prior activity (vegetated with salt marsh grasses)								
Arrow in picture A shows spoil pile								
Deep panne has habitat value								
Phragmites stand approximately 300' x 300'								
Connection of two ditches would increase tidal flow to wetland and may reduce Phragmites								
<b>Sketch</b>								
 <p>Upland</p> <p>Friendly's</p>								
Restoration Priority								
General Classification: minor								
Restoration Potential Score: NA								

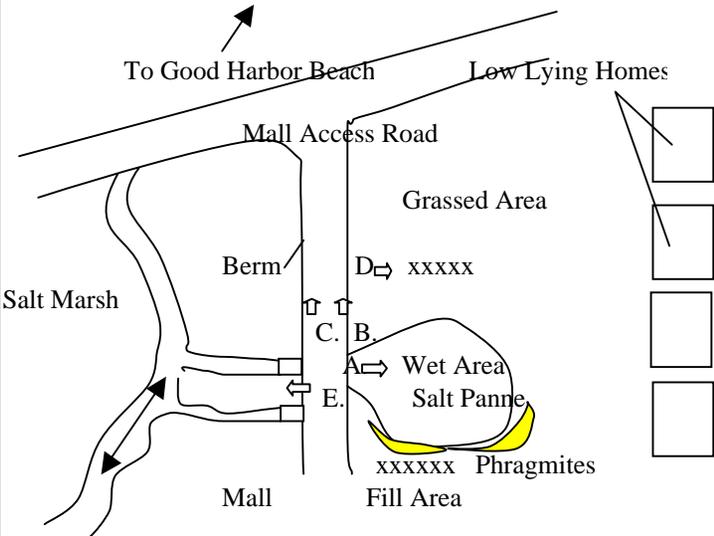
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	9	Annisquam River	Salt Marsh	BMP, DL	Anadromous/Estuarine	Rte. 128	State/Public	144
<b>Notes</b>				<b>Photo</b>				
3' Steel culvert at outlet, discharge below Friendly's Parking Lot				<b>A.</b>		<b>B.</b>		
Area below culvert is potential smelt spawning habitat (may exist)								
Heavy tide wrack build up along bank								
Area has high potential for stormwater BMP								
Rotary probably on filled tideland								
Creek at culvert outlet approx. 15' wide								
Area still a public landing								
Formally CSO discharge site								
<b>Sketch</b>				<b>C.</b>				
						<b>D.</b>		
A. B. C. D. Storm drains								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

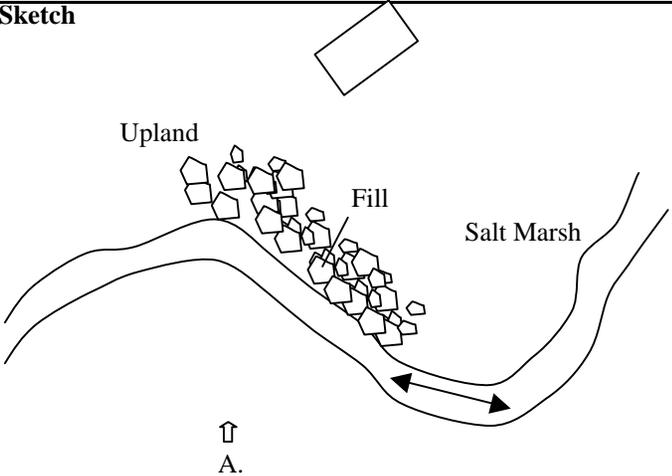
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	10	Blyman Canal	Salt Marsh	IM	Estuarine	High School	Municipal	145
<b>Notes</b>				<b>Photo</b>				
Adjacent to town landing				A.				
Area degraded - does not support vegetation								
Area not a productive viable mudflat								
Degraded zone could have soil amendments and elevation change to support vegetation								
Area subject to wave action due to high boat traffic								
Approx. 200' in length and 75' wide								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								



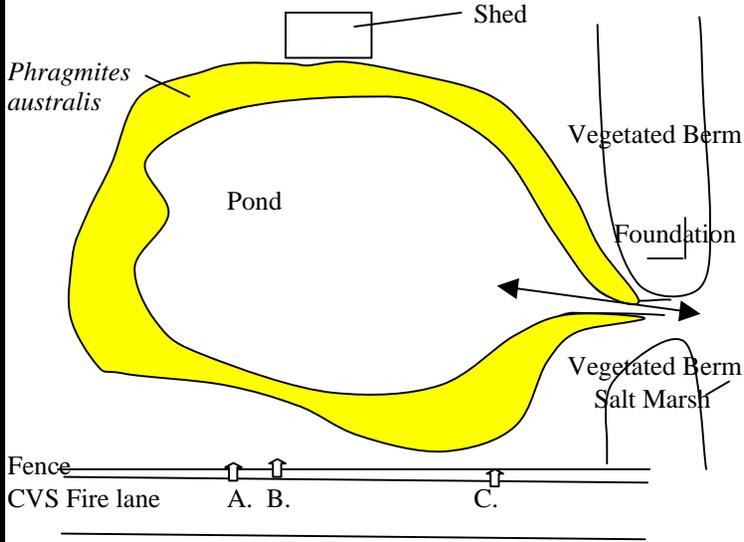
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	12	Pavillion Beach	Barrier Beach	BE	Estuarine	Fort Point	Municipal	147
<b>Notes</b>				<b>Photo</b> A.				
Coastal bank highly degraded, no vegetative buffer								
Planting plan could be developed								
Area has intensive use may be difficult to improve conditions								
No buffer between warehouses and beach								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

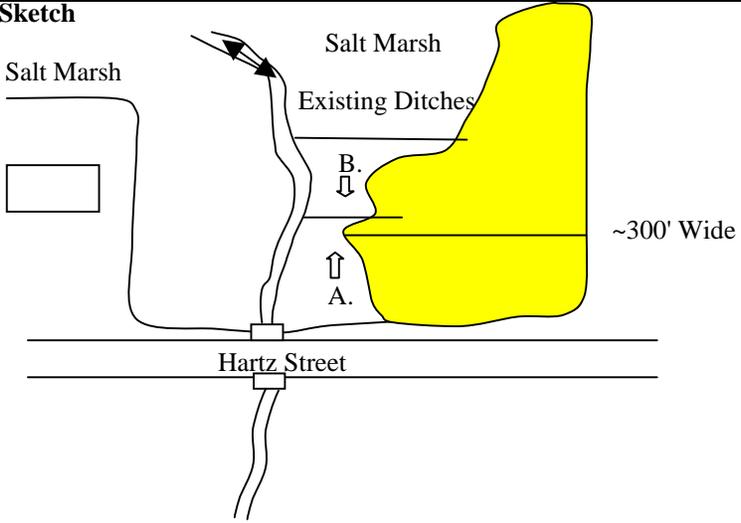
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	13	Outer Harbor	Rocky Intertidal Shore	FR, BI	Estuarine	Fort Point	Private	148
<b>Notes</b>				<b>Photo</b> A. 				
Disturbed rocky shore line								
Opportunity for a tide pool restoration/creation								
Manipulation of grades and configuration of rocks could improve habitat for juvenile fish								
Private ownership may reduce opportunity for restoration								
<b>Sketch</b>				<b>B.</b> 				
 <p>Old Pipe</p> <p>Gloucester Harbor</p> <p>Natural Inlet</p> <p>Cobble</p> <p>Retaining Wall</p> <p>Chain Link Fence</p> <p>Park A. B.</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

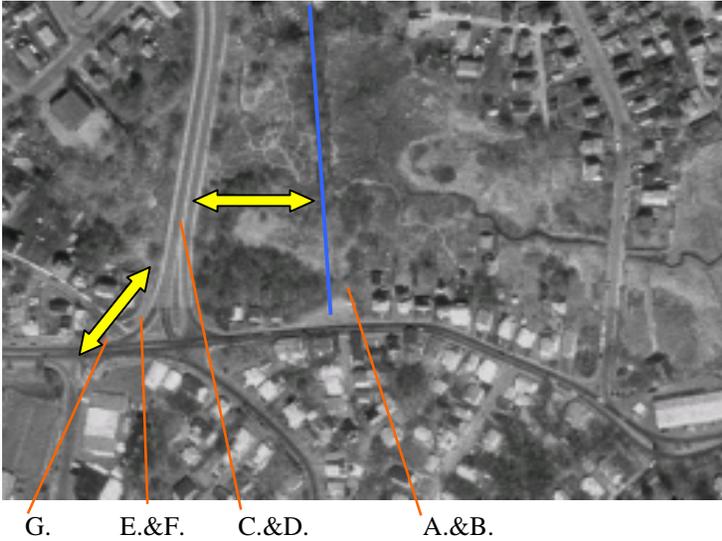
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	14	Saratoga Creek	Salt Marsh	CU, BE, FR, IM	Estuarine	Atlantic Ave.	Private	149
<b>Notes</b>								
Salt marsh blocked from regular tidal flow				A.				
Poorly functioning culvert or culverts								
High marsh vegetation found in impacted area				B.				
Two culverts found on downstream side								
Area may be a mitigation for road improvements								
Potential for the entire impact area to become salt marsh								
Approximately 300' from road to low lying development								
<b>Sketch</b>				C.				
								
				D.				
								
				E.				
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 135								

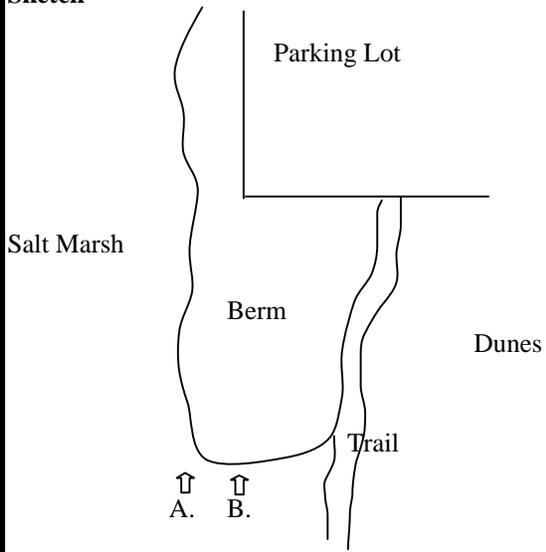
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	15	Saratoga Creek	Salt Marsh	FR	Estuarine	Rio Dr.	Unknown	150
<b>Notes</b>				<b>Photo</b>				
Old stone based pier				<p>A.</p> 				
Site could be addressed in context of Saratoga Creek watershed restoration								
Relatively minor disturbance								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

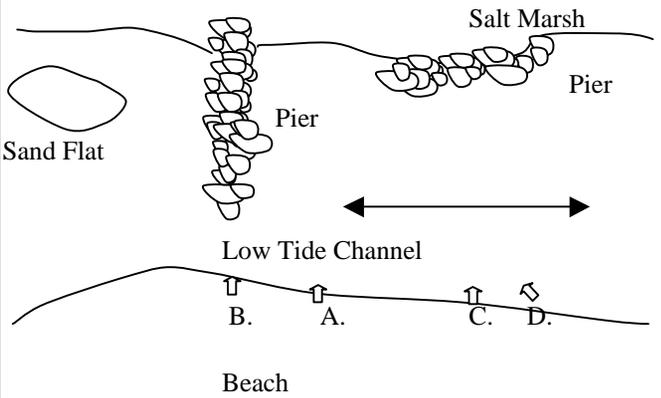
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint												
Q-3	16	Saratoga Creek	Salt Marsh	FR, BMP	Estuarine	Atlantic Ave.	Private	151												
<b>Notes</b>				<b>A.</b>		<b>B.</b>														
Site already permitted for redevelopment																				
Parking lot area could be reduced and salt marsh created																				
Need study for parking spaces should be done																				
No stormwater infrastructure																				
Could create public access point for small water craft																				
In depressions in pavement pannes are being formed																				
Site has high potential																				
<b>Sketch</b>				<b>C.</b>		<b>D.</b>														
																				
									<b>E.</b>		<b>F.</b>									
																				
														F.		E.	D.	C.	B.	A.
<b>Restoration Priority</b>																				
<i>General Classification:</i> minor																				
<i>Restoration Potential Score:</i> NA																				

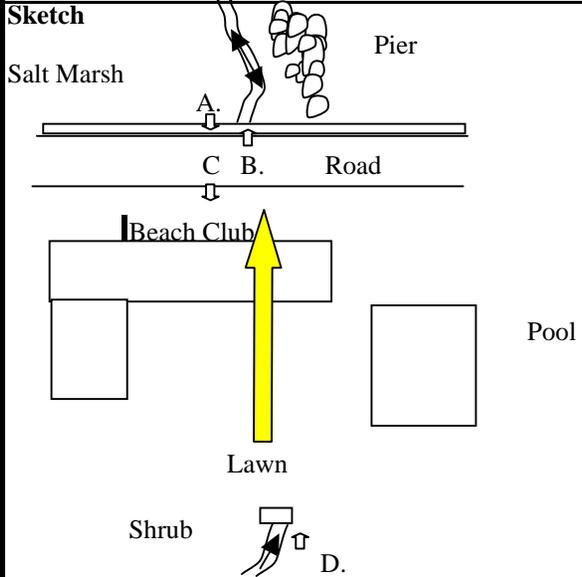
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	17	Saratoga Creek	Salt Marsh	FR, BMP	Estuarine	Atlantic Ave.	Unknown	152
<b>Notes</b>				<b>Photo</b>				
Salt/brackish pond acts like a stormwater detention area				A.				
Area surrounded by Phragmites				B.				
Minimal hydrologic connection with abutting salt marsh								
Berm acts to reduce tidal flow								
Area has habitat value for shorebirds								
Opportunities for better tidal flow might enhance habitat value								
Feeder ditch should be examined for flow potential								
Approx. 150' across pond								
<b>Sketch</b>				C.				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

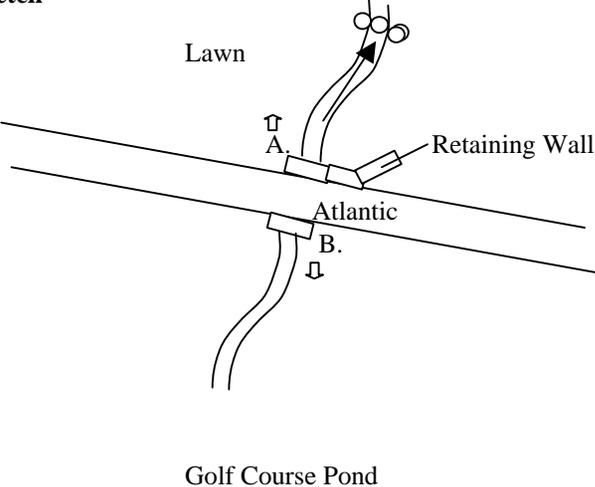
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	18	Saratoga Creek	Salt Marsh	IM	Estuarine	Hartz St.	Unknown	153
<b>Notes</b>				<b>Photo</b>				
Large area of Phragmites growth				 A.				
Ditch configuration could be changed to assist in tidal flow								
Project should be considered in context of watershed restoration								
Culvert under Hartz street does not affect site								
Anecdotal evidence suggests Phragmites is expanding								
Area of potential (or actual) smelt spawning (esp. above Hartz St.)								
<b>Sketch</b>				 B.				
 <p>Salt Marsh</p> <p>Salt Marsh</p> <p>Existing Ditches</p> <p>B.</p> <p>A.</p> <p>Hartz Street</p> <p>~300' Wide</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

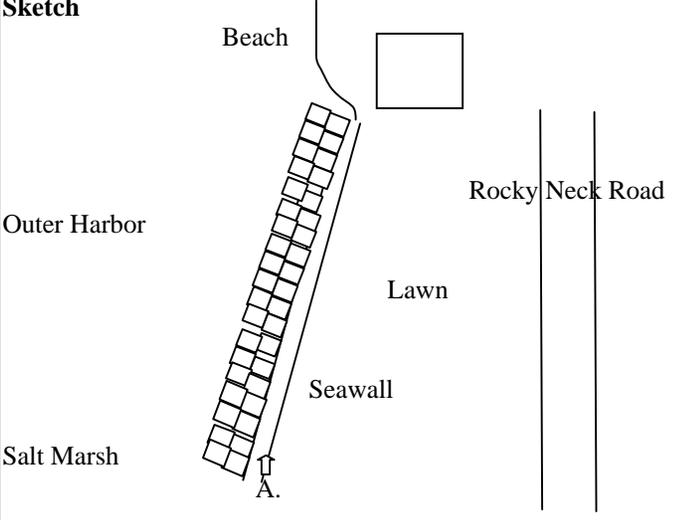
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	19	Saratoga Creek	Salt Marsh	CR, IM	Estuarine	Rte. 128 Extention	Unknown/Multiple	154
<b>Notes</b>				<b>Photo</b>				
Historic connection from Saratoga Creek to the harbor				<b>A.</b> 				
Area impacted by lack of tidal flow and invasive species				<b>B.</b> 				
Culvert found under Rte. 128 extension, in poor condition				<b>C.</b> 				
Defined creek system not found in fresh marsh				<b>D.</b> 				
Berm present across fresh water marsh (see below)				<b>E.</b> 				
Problems may result in a harbor reconnection due to concerns with water quality				<b>F.</b> 				
Further study needed to determine hydrologic conditions				<b>G.</b> 				
<b>Sketch</b>								
Old Berm (Blue Line)								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

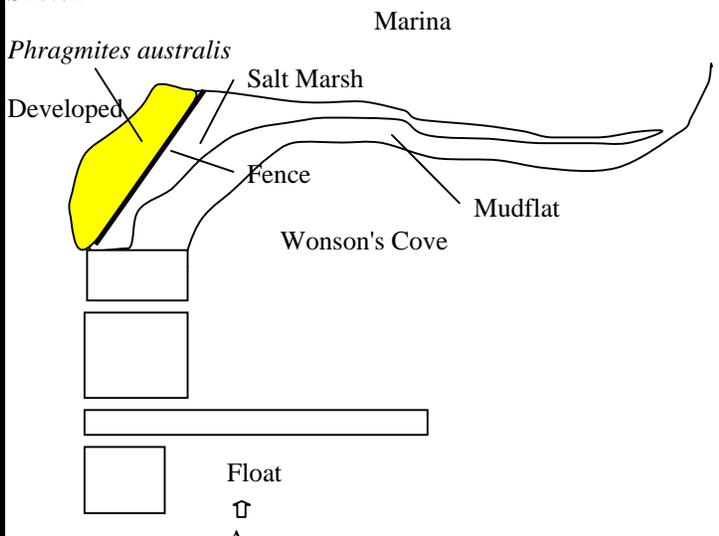
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	20	Good Harbor Beach	Salt Marsh	FR	Estuarine	Thatcher Rd.	Municipal	155
<b>Notes</b>				<b>Photo</b>				
Debris from beach cleaning (wrack, sand, etc.) and possibly from parking lot expansion				<b>A.</b>				
Berm is approx. 5 to 6' in height and approx. 200 yards in length								
Berm encroaches on high marsh								
Management issue								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 140								

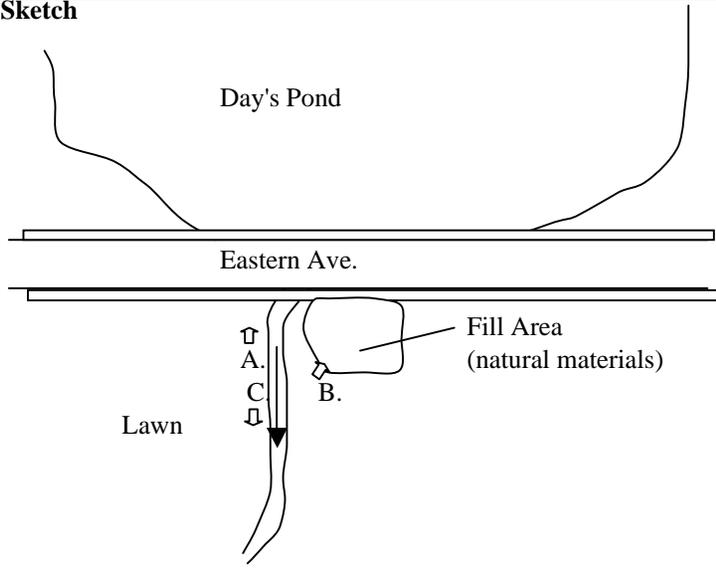
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	21	Good Harbor Beach	Salt Marsh/Tidal Flat	FR	Estuarine	Nautilus Rd.	Unknown	156
<b>Notes</b>				<b>Photo</b>				
Old stone pier extends into stream channel and restricts tidal flow				<b>A.</b>				
Second pier is parallel stream				<b>B.</b>				
Approx. 4' wide and extends approx. 50' from shore								
Stone pier could be partially breeched								
Elimination of pier may increase salinity upstream								
Site should be looked at in context with watershed and upstream indirect impacts								
More hydrologic assessment needed								
<b>Sketch</b>								
Upland								
								
				<b>C.</b>				
								
				<b>D.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

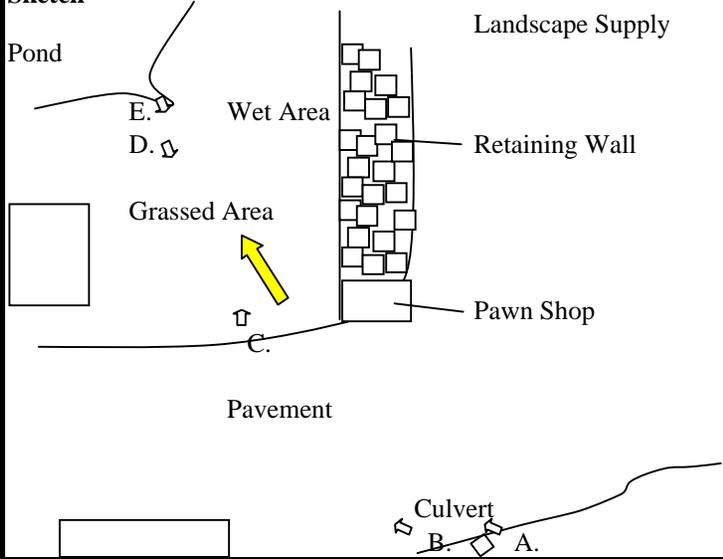
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	22	Good Harbor	Salt Marsh/Shrub Swamp	DL, FR	Anadromous/Catadromous	Nautilus Rd.	Private	157
<b>Notes</b>				<b>Photo</b>				
Low flow discharge				A. 				
Approx. 1.5' culvert up and downstream				B. 				
Upstream culvert is grated with concrete baffle to reduce/retard flow				C. 				
Stream flows under beach club				D. 				
Historic eel run								
Source of watershed - golf course ponds								
Fill area replaces native smelt spawning area								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

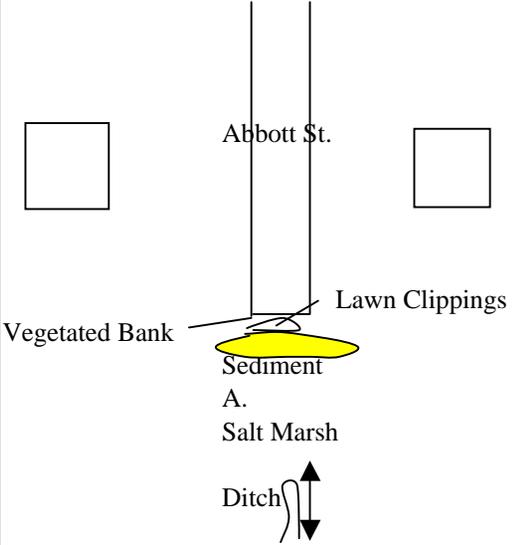
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint	
Q-3	23	Good Harbor	Shrub Swamp	FR, BE	Catadromous	Atlantic Ave.	Private	158	
<b>Notes</b>				<b>Photo</b>					
Source water - golf course pond				<b>A.</b> 					
Stone dam in stream acts as an impediment									
Downstream lawn to near stream edge-need for increased buffer									
Not much vegetative buffer along headwater pond									
Minimal disturbance									
Site should be considered in context of eel potential									
<b>Sketch</b>				<b>B.</b> 					
									
<b>Restoration Priority</b>									
<i>General Classification:</i> minor									
<i>Restoration Potential Score:</i> NA									

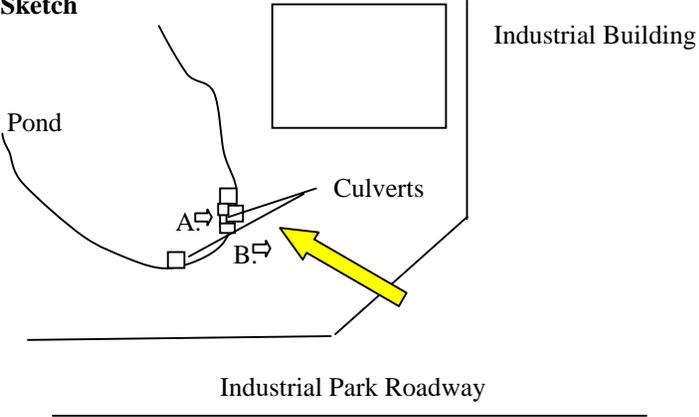
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	24	Wonson Cove	Salt Marsh	FR	Estuarine	Rocky Neck	Municipal	159
<b>Notes</b>				<b>Photo</b>				
Potential to connect to Wonson Cove on opposite side of road				<b>A.</b> 				
Limited habitat value								
Need to determine if neck was once an island								
Seawall replaces natural coastal bank								
Low priority site								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

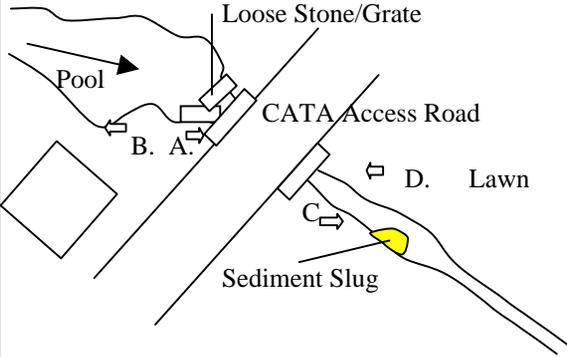
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	25	Smith Cove	Salt Marsh	FR, BE, IM	Estuarine	Rocky Neck	Unknown	160
<b>Notes</b>				<b>Photo</b>				
Small pocket marsh				<p><b>A.</b></p> 				
Phragmites advance limited by fence								
Salt marsh present below fence line								
Area heavily developed								
Vestigial marsh								
Not a high priority								
Simple removal of fence may allow tidal water to raise salinities and limit/stunt Phragmites								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

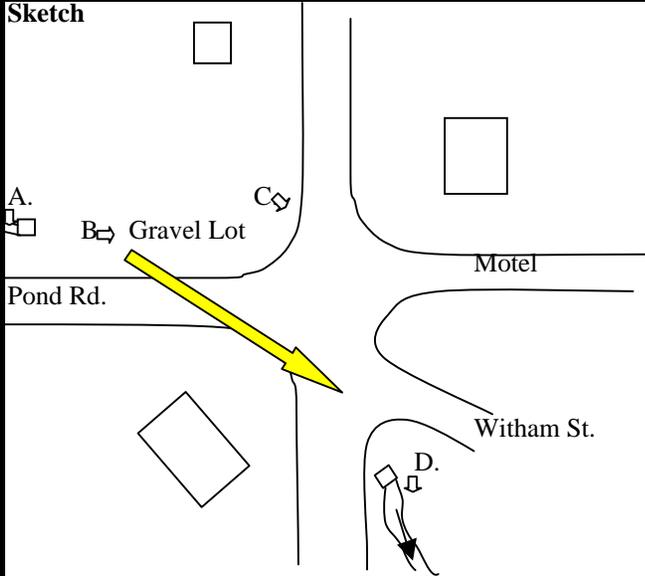
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	26	Day's Pond	Open Water	CU, FR, BE, RR, BMP	Catadromous	Eastern Ave.	Municipal	161
<b>Notes</b>				<b>Photo</b>				
Upper Day's Pond				<b>A.</b>				
High potential to enhance eel passage								
Pond probably too small for alewives				<b>B.</b>				
Culvert elliptical, approx. 2' x 3'								
Stream impacted by stormwater								
Simple roughed ramp below culvert may enhance overall efforts								
to restore Day's Pond by enhancing eel passage								
Area below pond may be restored for smelt								
Large area of fill beside stream below road								
2-3' elevation drop from culvert to stream (less in high water)								
Site should be considered in context with lower Day's Pond								
<b>Sketch</b>				<b>C.</b>				
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 155								

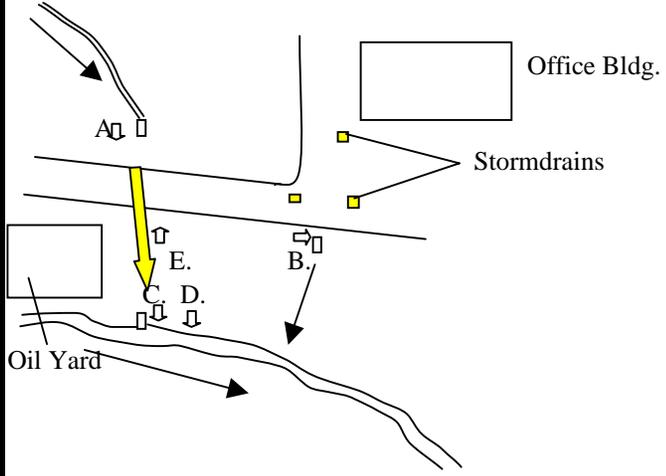
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	27	Day's Pond	Open Water	DL	Riverine	Eastern Ave.	Private	162
<b>Notes</b>				<b>Photo</b>				
Upstream 2' culvert, minimal flow				<b>A.</b> 				
Daylight section approx. 100 to 200'				<b>B.</b> 				
Stream outlet not clearly defined, culvert has disintegrated				<b>D.</b> 				
Outlet stream filters through wetlands prior to entering pond				<b>C.</b> 				
Difficult to daylight stream as it will impact access, parking and storage - partial daylighting may be possible				<b>E.</b> 				
<b>Sketch</b>								
 <p> Pond  Wet Area  Grassed Area  Pavement  Landscape Supply  Retaining Wall  Pawn Shop  Culvert </p>								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

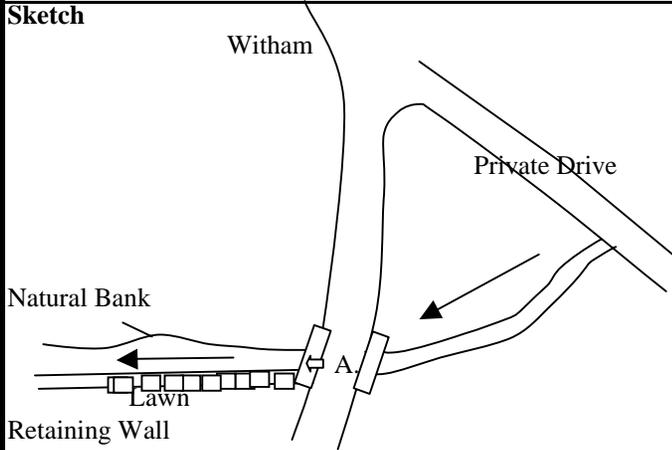
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	28	Saratoga Creek	Brackish Marsh/Salt Marsh	FR	Estuarine	Abbott Rd.	Municipal	163
<b>Notes</b>				<b>Photo</b>				
Good opportunity for the installation of a stormwater BMP				<b>A.</b> 				
Stormwater has resulted in sediment plume on marsh								
Discharge from a 1' corrugated plastic culvert								
Perhaps up to 5 yards of built up sediment								
Lawn and grass clippings have also been dumped over bank								
Canopy of trees along vegetated bank probably reduces Phragmites								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification: major</i> <i>Restoration Potential Score: 105</i>								

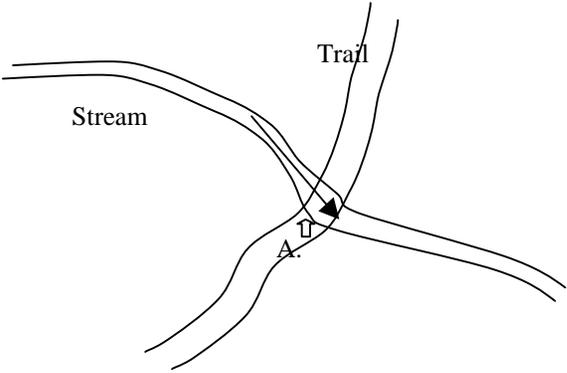
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	29	Unnamed	Shrub Swamp	DL	Riverine	Pond Rd.	Unknown	164
<b>Notes</b>				<b>Photo</b>				
Appears that a pond is cut in half by a road, road not found but shown on topographic maps				<b>A.</b>				
Stream reduced to stormwater catch basins discharging to pond								
Strong flow from culvert in dry weather indicates that a stream may have been filled								
Stream not found								
Dense development upstream (industrial park)								
Pond may be large enough to support alewife - further study needed								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

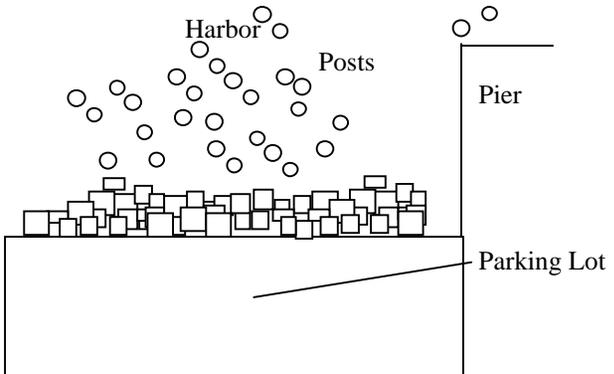
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	30	Unnamed	Shrub Swamp	CU, FL	Anadromous/Catadromous	Pond Rd.	Unknown	165
<b>Notes</b>				<b>Photo</b>				
Culvert drops significantly from upstream to downstream				<b>A.</b>				
Culvert seems undersized								
~3' Galvanized culvert at outlet, ~2.5' ceramic upstream				<b>B.</b>				
Debris upstream of road								
Site could be improved in light of alewife passage - further study needed				<b>C.</b>				
								
				<b>D.</b>				
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

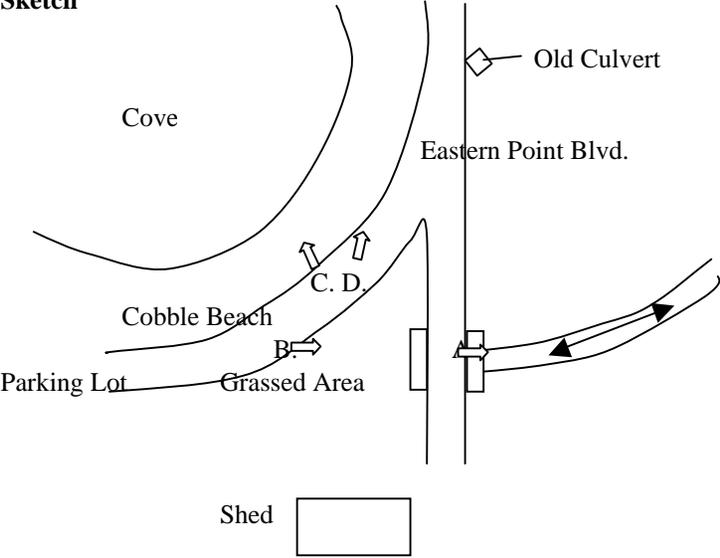
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	31	Unnamed	Shrub Swamp	DL, BE	Anadromous/Catadromous	Pond Rd.	Unknown	166
<b>Notes</b>				<b>Photo</b>				
4' Concrete culvert				<b>A.</b>				
Opportunity to daylight section of creek								
Approx. 200-300' of daylight opportunity				<b>B.</b>				
Stormwater impacts site (sediment in stream downstream side)								
Paved swale at downstream outlet				<b>C.</b>				
Site should be looked at in light of alewife passage potential								
				<b>D.</b>				
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	32	Unnamed/Cape Pond	Shrub Swamp	DL, CU	Riverine	Witham St.	Unknown	167
<b>Notes</b>								
Series of drainage culverts				A.				
30-40' of daylighting potential								
Outlet culvert at C 2'				B.				
Passage to Cape Pond of alewives not likely due to lack of significant flow								
Area seems to be altered from construction of adjacent development				C.				
								
				D.				
								
				E.				
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

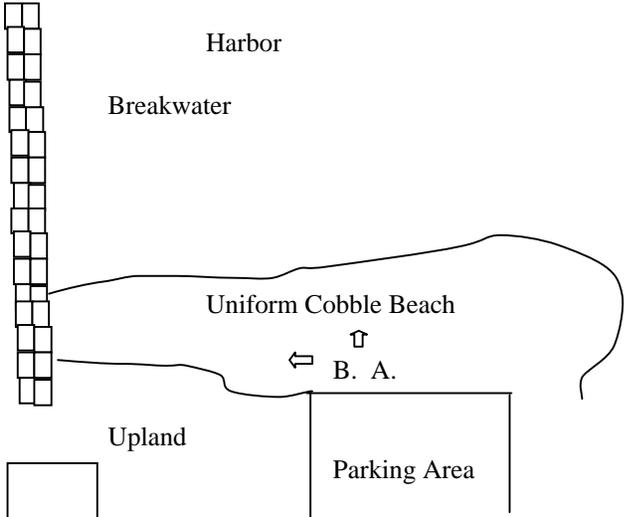
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	33	Unnamed	Shrub Swamp	BE, BI	Riverine	Witham St.	Private	168
<b>Notes</b>				<b>Photo</b>				
3' culvert properly sized				A.				
Bridge on private drive does not restrict the natural flow of water								
Opportunity to recreate natural bank and enhance smelt spawning habitat								
Low priority								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

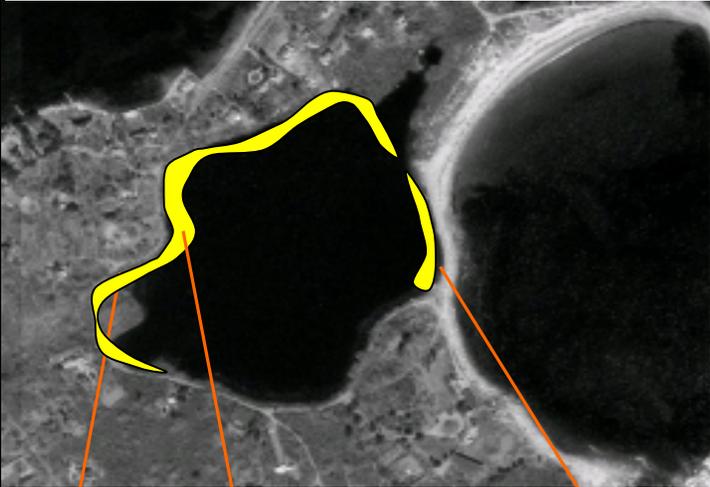
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	34	Unnamed	Wooded Swamp Deciduous	BE	Riverine	Cape Pond Cart Path	Unknown	169
<b>Notes</b>				<b>Photo</b>				
Bridge may reduce sedimentation impacts				A.				
Area impacted by motorized traffic								
Low priority site								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

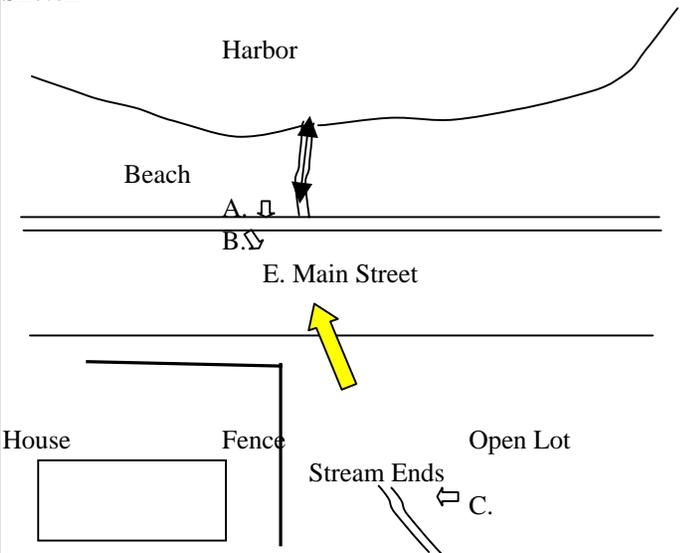
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	35	Inner Harbor	Rocky Intertidal Shore	FR	Estuarine	East Main St.	Private	170
<b>Notes</b>				<b>Photo</b>				
Removal of posts would reduce amount of wrack caught in area				A.				
Habitat enhancement may be limited by post removal								
Restoration may be more of a cleanup than a restoration								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

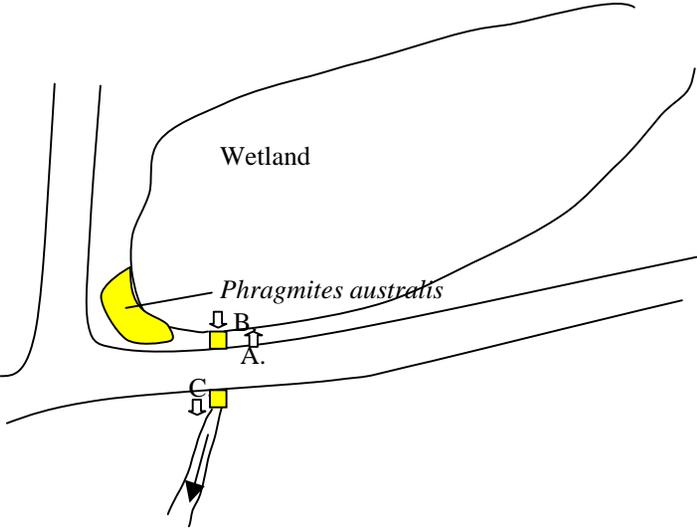
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	36	Outer Harbor	Salt Marsh	DL, FR, IM	Estuarine	Eastern Point Blvd.	Private	171
<b>Notes</b>				<b>Photo</b>				
Project soon to be restored by Mass Audubon				<b>A.</b>				
Site tidally restricted, invasive species present in restricted marsh				<b>B.</b>				
New culvert and creek are planned to be installed								
								
				<b>C.</b>				
								
				<b>D.</b>				
								
<b>Sketch</b>								
 <p>The sketch shows a plan view of the site. On the left is a 'Cove'. A 'Cobble Beach' runs along the cove. To the right of the beach is a 'Parking Lot' and a 'Grassed Area'. A road, 'Eastern Point Blvd.', runs vertically through the site. An 'Old Culvert' is marked with a diamond symbol on the road. A 'Shed' is shown as a rectangle below the road. Arrows labeled 'B.' and 'C. D.' indicate directions or features. A new culvert is shown as a rectangle on the road with arrows pointing towards the waterway.</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

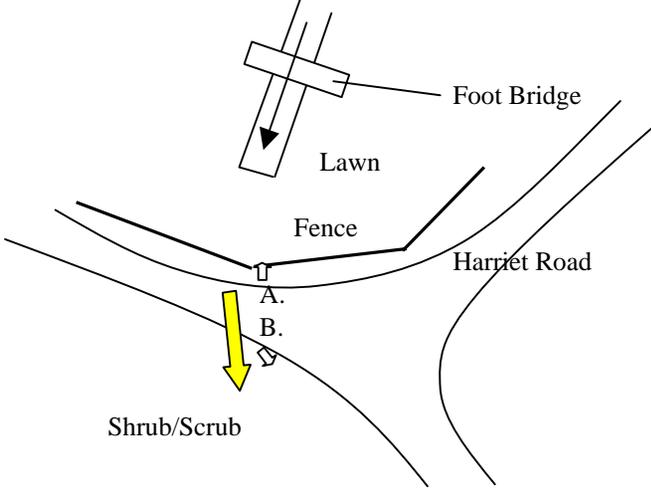
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	37	Good Harbor Marsh	Salt Marsh	IM	Estuarine	Witham St./Thatcher Rd.	Unknown	NA
<b>Notes</b>				<b>Photo</b>				
Good Harbor back marsh				A.				
Area impacted at perimeter by <i>Phragmites australis</i>								
Ditch along Nugent Farm edge halts spread of Phragmites								
Opportunities for OMWM/restoration to reduce Phragmites								
Historical connection to Saratoga Beach, Rockport via main creek (see arrow below)								
Restoration should be done in context of entire marsh system								
Main <i>Phragmites australis</i> growth areas shown below (approx. location)								
<b>Sketch</b>				B.				
				C.				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

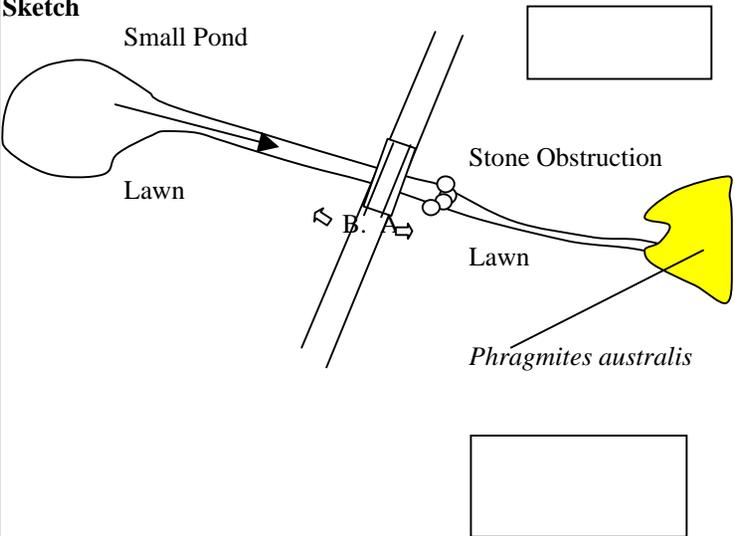
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	38	Outer Harbor	Rocky Intertidal Shore	FR, BI	Estuarine	Eastern Point Blvd.	Private	172
<b>Notes</b>				<b>Photo</b>				
Parcel part of Mass Audubon Eastern Point Wildlife Sanctuary				<p><b>A.</b></p> 				
Coast appears to have been filled, rock is uniform in shape								
Re-alignment of stones could be done to enhance retention of water for tide pool habitat								
Tide pools are juvenile fish habitat								
Area sheltered by breakwater								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

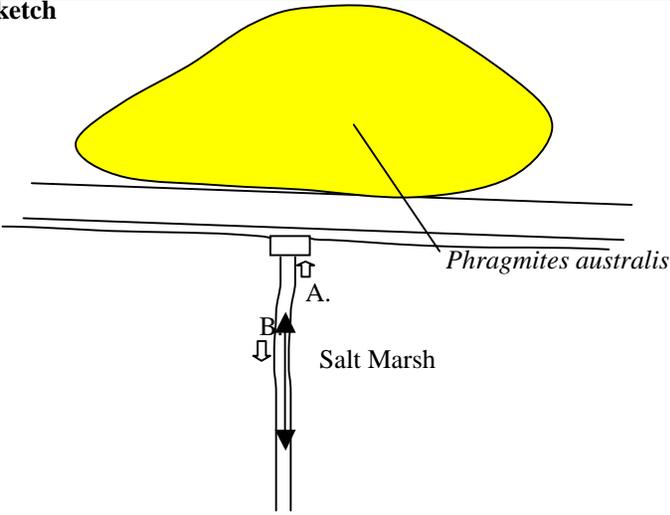
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	39	Niles Pond	Brackish Marsh	IM	Catadromous	Niles Pond Rd.	Private	173
<b>Notes</b>				<b>Photo</b>				
Proposed restoration plan to reduce <i>Phragmites australis</i> exists and in the permit phase				<b>A.</b>				
Pond may be optimum <i>Phragmites</i> habitat due to periodic coastal breaches of the bank								
Need to determine rate of <i>Phragmites</i> advance				<b>B.</b>				
Opportunities to achieve productive eel habitat should be considered without changing the hydrology and ecology of the pond								
<b>Sketch</b>								
								
D. <i>Phragmites australis</i>				<b>C.</b>				
A., B., C.								
<b>Restoration Priority</b>				<b>D.</b>				
General Classification: minor								
Restoration Potential Score: NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	40	Niles Beach	Coastal Beach	CU, DL, BMP	Riverine	E. Main St.	Public/Private	174, 175
<b>Notes</b>				<b>Photo</b>				
Small stream discharges to Niles Beach				A. 				
Slight seep noted at time of site visit				B. 				
Area drains from open parcel above								
Source of stream difficult to determine - due dense undergrowth								
Site would may benefit from a stormwater BMP due to discharge to bathing beach								
1.5' culvert inside 3' x 3' granite box culvert								
<b>Sketch</b>				C. 				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

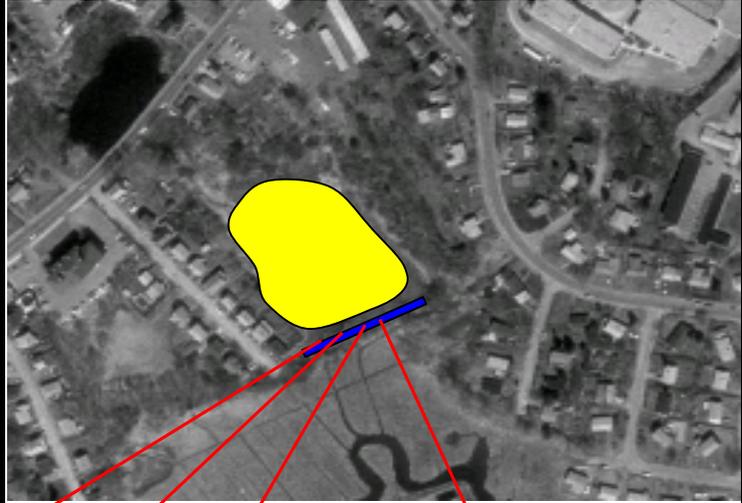
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	41	Unnamed	Shrub Swamp/Deep Marsh	CU	Riverine	Ledge Rd.	Municipal	176
<b>Notes</b>				<b>Photo</b>				
Culvert restricts flow but creates wetland complex upstream				A.				
Wetland area should not be disturbed as increased drainage would probably reduce wildlife values								
Wetland area is hummocky with open water habitat								
								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	42	Unnamed	Shrub Swamp	BE, BI	Riverine	Harriet Rd.	Public/Private	177
<b>Notes</b>				<b>Photo</b>				
Stream empties into culvert system that drains to the ocean				<b>A.</b>				
Stream channeled into 2' corrugated culvert								
Stone retaining walls replace natural stream banks								
No vegetated buffer along stream edge								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	43	Good Harbor	Open Water	BE	Riverine	Old Nugent Farm	Private	178
<b>Notes</b>				<b>Photo</b>				
No vegetated buffer				A.				
Lawn may contain fertilizers and pesticides								
Granite bridge sized correctly								
Stone obstruction 5' down form bridge								
Area may be eel habitat (small headwater pond)								
Education to homeowners/association could result in vegetated buffer along stream corridor								
Heavy stand of <i>Phragmites australis</i> below lawn area								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>								
General Classification: major								
Restoration Potential Score: 110								

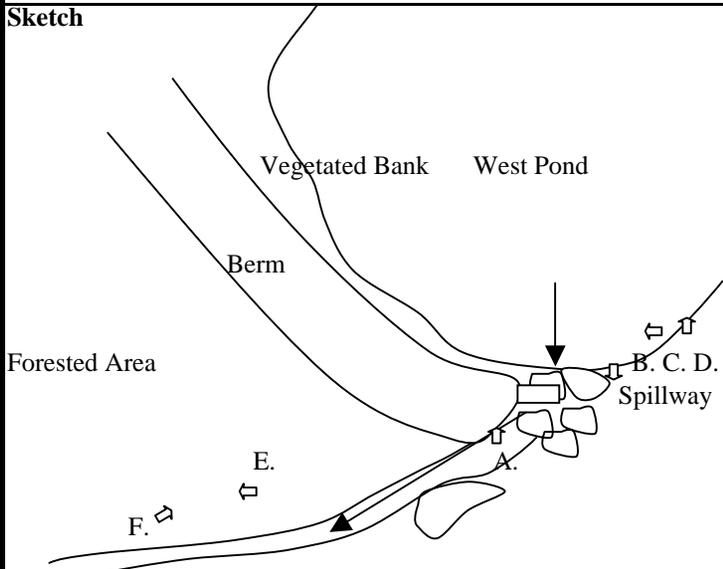
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	44	Good Harbor	Brackish Marsh	CU	Estuarine	Thatcher Rd.	Public/Private	179
<b>Notes</b>				<b>Photo</b>				
Degraded 3' x 2' granite box culvert				<b>A.</b> 				
Improvement of flow may enhance potential eel run								
Phragmites area at least 100' in length along road								
Significant elevation drop from either side of road								
Flow enhancement may mean channel improvement upstream								
				<b>B.</b> 				
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

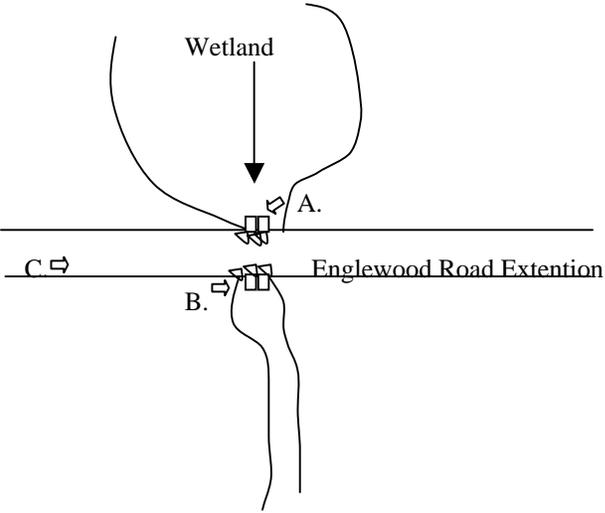
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint	
Q-3	45	Good Harbor/Long Beach	Brackish Marsh	CR	Anadromous/Estuarine	Thatcher Rd.	Private/Public	NA	
<b>Notes</b>				<b>Photo</b>					
Witham to Long Beach cut				<p>A. </p> <p>C. </p> <p>E. </p>					
Formally tidally influenced									
Brackish pools have been formed which are good shorebird feeding areas, lots of exposed mudflats									
Culvert at Witham St. is a 3.5' granite box culvert, set slightly too high									
Ponds may have alewife potential, habitat should be checked									
Further hydrologic studies should be done to determine potential for restoration									
Concrete culvert 2.5' by Rockport line at photo station E.									
<b>Sketch</b>				<p>B. </p> <p>D. </p>					
 <p>A.      B., C.      D., E.</p>									
<b>Restoration Priority</b>									
<i>General Classification:</i> minor									
<i>Restoration Potential Score:</i> NA									

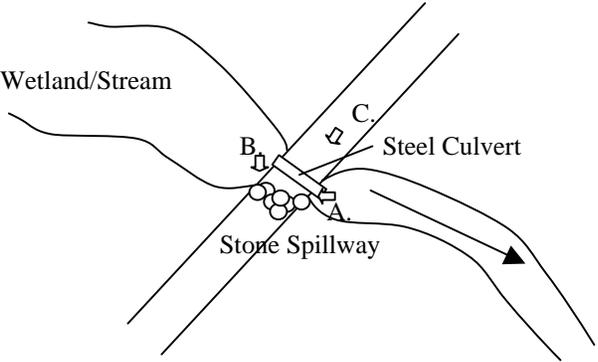
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-3	46	Day's Pond	Brackish Marsh	FR, CU, DR	Estuarine	Abott Rd.	Unknown	228
<b>Notes</b>				<b>A.</b>		<b>B.</b>		
6' high vegetated berm impounds wetland								
Wetland area heavily vegetated by <i>Phragmites australis</i>								
One 12-16" metal culvert drains wetland behind berm								
Wetland probably was formally salt marsh								
Some salt marsh still exists in the Lower Day's Pond impoundment								
Nearby development along Abbott St. and opposite side								
Partial berm/dam removal would probably result in salt marsh restoration								
<b>Sketch</b>				<b>C.</b>		<b>D.</b>		
								
A., B. C., D. E., F. Berm				<b>E.</b>		<b>F.</b>		
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: 125								

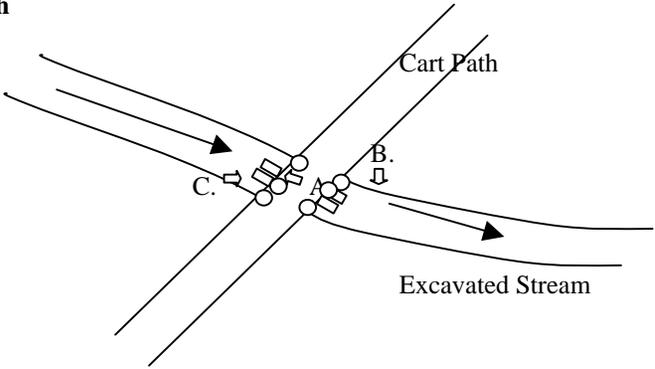
# QUADRANT 4 POTENTIAL RESTORATION SITES

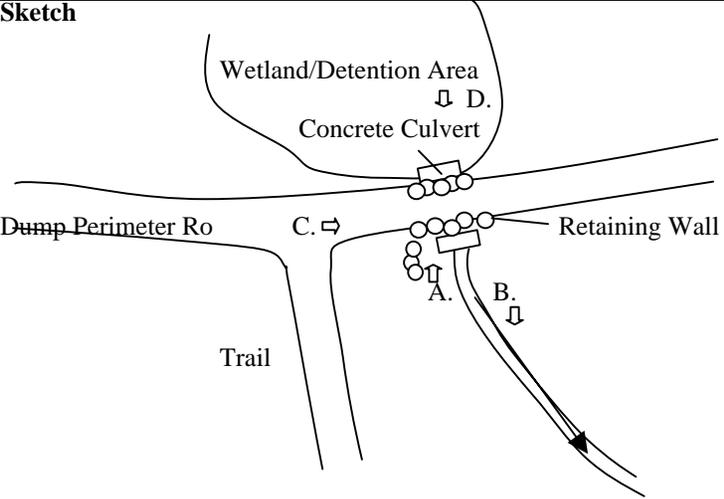


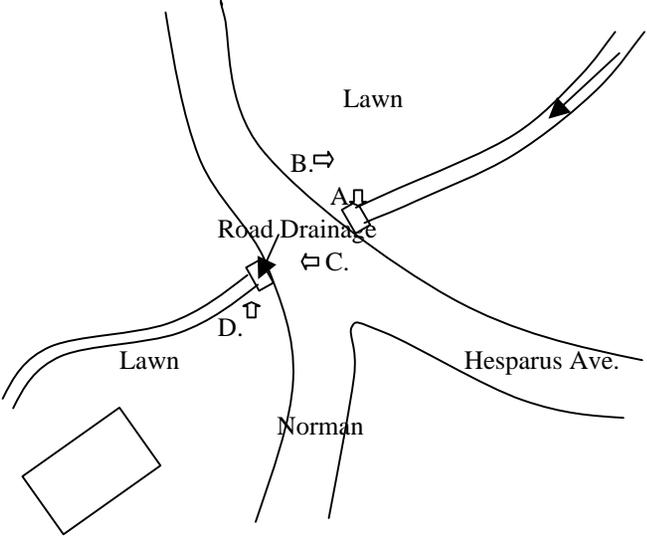
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	1	West Pond	Open Water	FL, DR	Catadromous	Lake Rd.	Private	180
<b>Notes</b>				<b>A.</b>				
Minimal flow over spillway during summer site investigation								
Limited anadromous fish potential due to configuration of stream outlet at the ocean								
Dam removal should be considered to return natural flow								
Habitat values of natural stream with associated wetlands vs. pond should be studied further								
Dam length approx. 150'								
Significant elevation drop from pond level to dam base								
Dam removal/repair should be considered in light of safety as well as a positive exchange of habitat values								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>				<b>C.</b>				
General Classification: minor								
Restoration Potential Score: NA								
				<b>D.</b>				
								
				<b>E.</b>				
								
				<b>F.</b>				
								

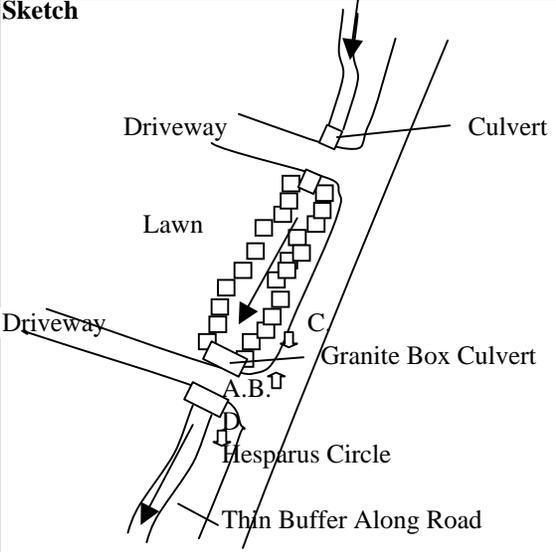
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	2	West Pond	Wooded Swamp Deciduous	CU,FR	Riverine	Cart Path (Englewood)	Municipal	181
<b>Notes</b>				<b>Photo</b>				
Two ~1.5' culverts retard water flow and create upstream wetlands				<b>A.</b>				
Culverts may be set too high				<b>B.</b>				
1-2' elevation change from upstream to downstream								
Wetland system well developed above								
Grass road, little stormwater impacts								
				<b>C.</b> 				
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

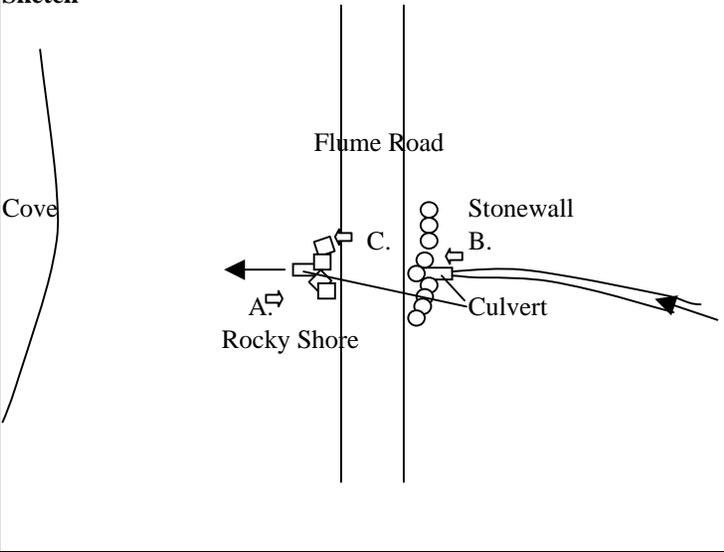
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	3	West Pond	Wooded Swamp Deciduous	CU,FR	Riverine	Cart Path (Englewood Rd.)	Municipal	182
<b>Notes</b>				<b>Photo</b>				
One 16 to 18" culvert, exposed at ground level				<b>A.</b>				
Culvert set too high, restricts flow and creates wetlands above				<b>B.</b>				
Low priority/minimal disturbance				 				
Grass road								
Low flow stream								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

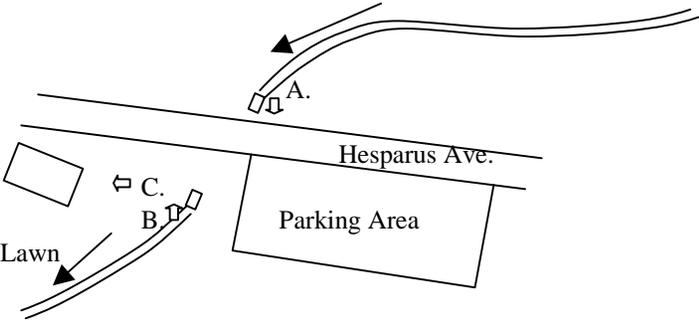
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	4	West Pond	Wooded Swamp Deciduous	CU,FR	Riverine	Cart Path (Englewood Rd.)	Municipal	183
<b>Notes</b>				<b>Photo</b>				
Stream channelized on both sides, upstream and downstream				<p>A. </p> <p>B. </p> <p>C. </p>				
Two 16-18" culverts								
Stream alteration may be a component of the dump closure drainage plan								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	5	West Pond	Wooded Swamp Deciduous	CU, DL	Riverine	Landfill Access Rd.	Municipal	184
<b>Notes</b>				<b>Photo</b>				
Area drains detention area for dump				<b>A.</b>				
Limited restoration potential, but clearly stream disturbance								
Closure requirements may not allow restoration of stream				<b>B.</b>				
Trees growing in stream indicate low or sporadic flow								
<b>Sketch</b>				<b>C.</b>				
								
				<b>D.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

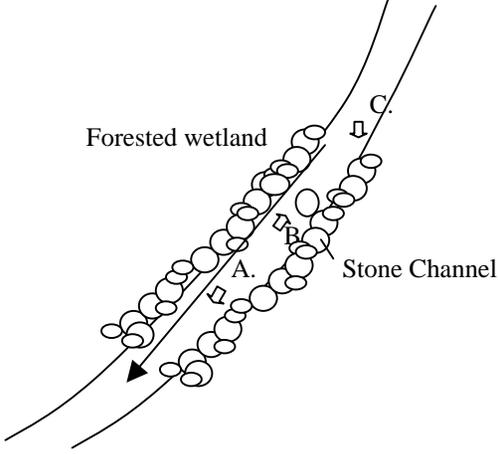
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	6	West Pond	Shrub Swamp	CU, BE	Riverine/Catadromous	Hesperus Ave.	Municipal	185
<b>Notes</b>				<b>A.</b>				
3' concrete culvert set 4-6" too high								
~70' culvert length								
Culvert may be undersized given periodic pond overflows								
Lawn extends to near stream edge upstream and downstream								
<b>Sketch</b>				<b>B.</b>				
								
				<b>C.</b>				
								
				<b>D.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

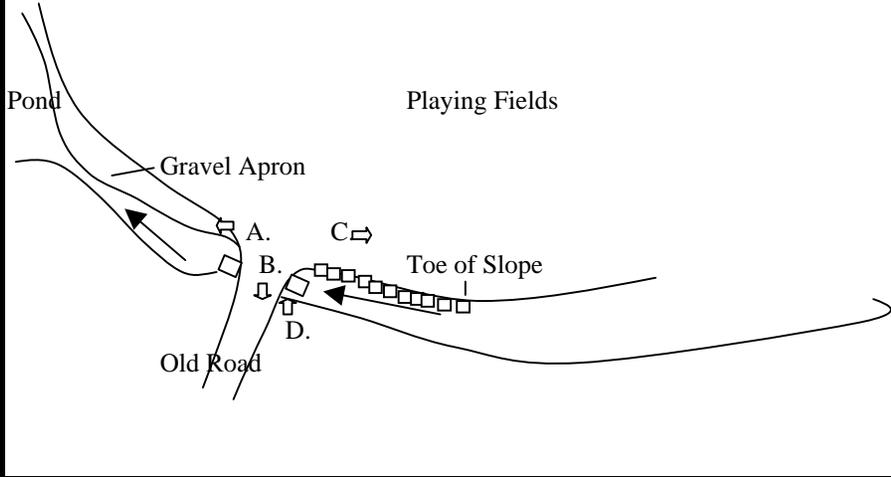
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	7	West Pond	Shrub Swamp	BE, CR	Riverine/Catadromous	Hesperus Circle	Private	186
<b>Notes</b>				<b>Photo</b>				
Stream highly altered				<b>A.</b>				
18" culvert set too high								
Stream channelized with large stone, provides little natural floodplain or a natural buffer				<b>B.</b>				
3'x2' granite box culvert falling apart								
Area has limited anadromous fish potential due to configuration of outlet at ocean				<b>C.</b>				
Lawn extends to stream edge								
				<b>D.</b>				
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

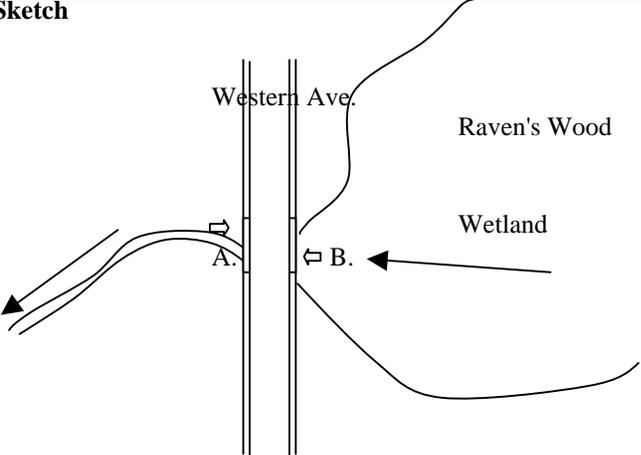
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	8	West Pond	Rocky Intertidal Shore	FL, DL	Riverine/Catadromous	Flume Rd.	Public/Private	187
<b>Notes</b>				<b>Photo</b>				
Steep drop from stream to mean tide level				A.				
Streambed not present in shifting cobble shoreline				B.				
Elevation difference reduces potential for anadromous fish enhancement								
3' aluminum culvert								
<b>Sketch</b>								
				C.				
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

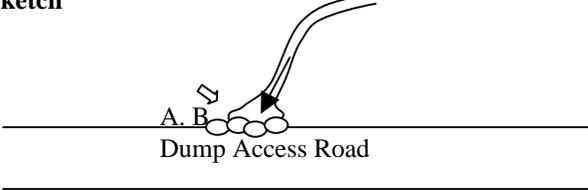
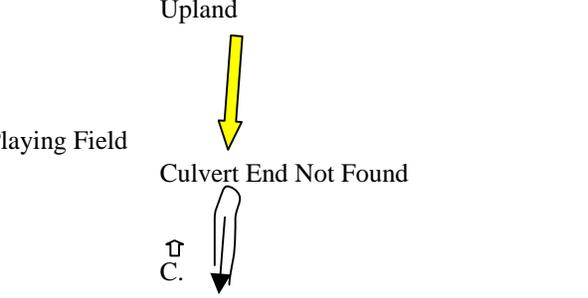
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	9	Rafes Chasm Creek	Wooded Swamp Deciduous	CU, BE	Riverine/Catadromous	Hesperus Ave.	Public/Private	188
<b>Notes</b>				<b>Photo</b>				
Small collapsed culvert, 16" steel				<b>A.</b>				
Collapsed culvert may create wetlands upstream				<b>B.</b>				
Downstream lawn to near stream edge								
Low priority/minimal disturbance								
Downstream culvert approx. 25' from road edge								
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

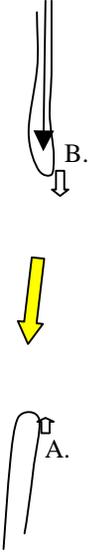
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	10	Norman's Woe Creek	Wooded Swamp Mixed Trees	CR, BE	Riverine/Catadromous	Hesperus Ave.	Private	NA
<b>Notes</b>				<b>Photo</b>				
Site not field investigated				A.				
Pond seems to have been constructed in stream or may be natural								
Outlet to ocean not investigated								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	11	Norman's Woe Creek	Wooded Swamp Mixed Trees	BI	Riverine/Catadromous	Hesperus Ave.	Municipal	189
<b>Notes</b>				<b>Photo</b>				
Channelized section of creek				A.				
Reduction of stream side wetlands by reducing natural floodplain								
More deepwater habitat seems to have been created				B.				
Berm on either side of creek may be from dredging								
Stream approx. 5' wide				C.				
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

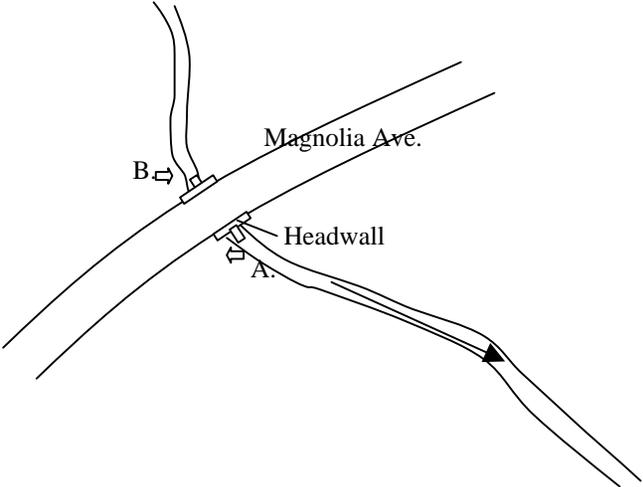
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	12	Norman's Woe Creek	Shallow Marsh Meadow/Wooded Swamp Deciduous	DL, BE	Riverine/Catadromous	Landfill Access Rd.	Municipal	191
<b>Notes</b>				<b>Photo</b>				
Area altered due to dump closure				<b>A.</b>				
Fringe of playing fields directly abut stream edge and wetlands								
3' Corrugated culvert under old road				<b>B.</b>				
Road may not be a necessary and could be removed to restore wetlands								
<b>Sketch</b>				<b>C.</b>				
								
				<b>D.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

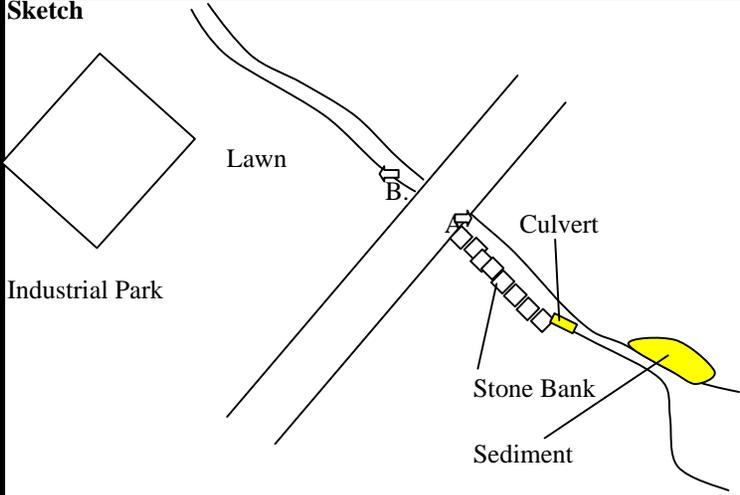
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint					
Q-4	13	Norman's Woe Creek	Wooded Swamp Mixed Trees	CU	Riverine	Western Ave.	Municipal	192					
<b>Notes</b>				<b>Photo</b>									
Culvert not found, slumped into stream bed													
Upstream no clearly defined stream channel													
New culvert set at proper inlet height may reduce wetland area upstream													
<b>Sketch</b>				<b>A.</b> 									
									<b>B.</b> 				
<b>Restoration Priority</b>													
<i>General Classification:</i> minor													
<i>Restoration Potential Score:</i> NA													

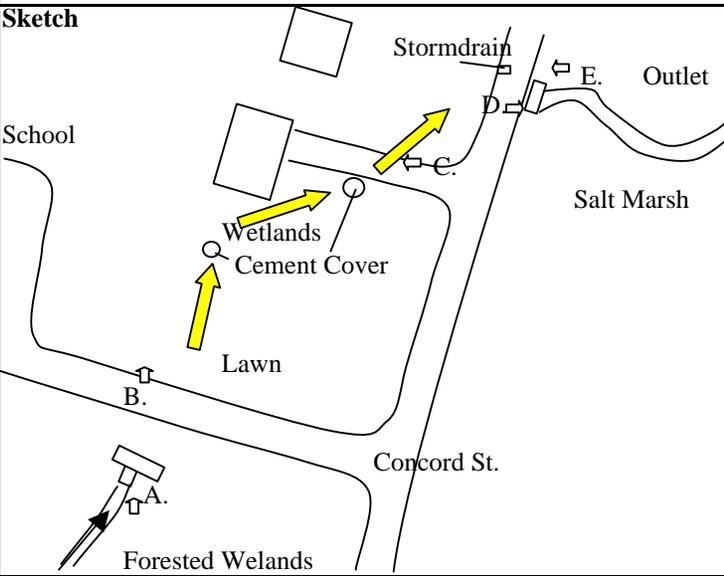
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	14	Norman's Woe Creek	Shallow Marsh Meadow/Wooded Swamp Deciduous	CU, DL	Riverine	Landfill Access Rd.	Municipal	193
<b>Notes</b>				<b>Photo</b>				
One 16" black corrugated plastic culvert				<b>A.</b>				
Outlet of culvert not found				<b>B.</b>				
Section of stream buried for about 80-100'								
Culvert under main access road to playing fields								
Straight forward daylighting project on municipal property								
<b>Sketch</b>				<b>C.</b>				
								
				<b>D.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 125								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	15	Norman's Woe Creek	Wooded Swamp Deciduous	DL	Riverine	Landfill Access Rd.	Municipal	194
<b>Notes</b>				<b>Photo</b>				
12" degraded culvert				<b>A.</b>				
Purpose of culvert installation not clear								
100-150' of culvert or culverted stream				<b>B.</b>				
Berm seen along culvert ridge								
Wetlands present in an around culvert perimeter								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 125								

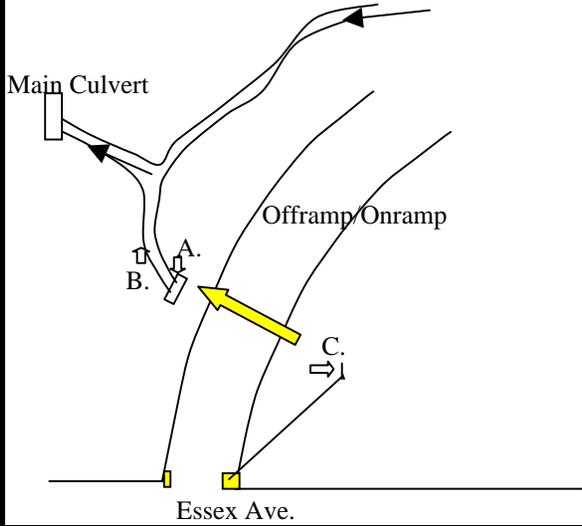
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	16	Wolf Trap Brook	Wooded Swamp Mixed Trees	BMP	Riverine	Kondelin Rd.	Unknown	195
<b>Notes</b>				<b>Photo</b>				
Sediment buildup from stormwater				A.				
Site impacted from roadway sediment								
Brook in good condition downstream								
Site impacted by trash and debris								
<b>Sketch</b>								
<p>The sketch illustrates a site layout. On the left, a curved line labeled 'Sediment' points to a 'Pooled Area' highlighted in yellow. To the right of the pool are two orange squares labeled 'Storm Drains'. Below the pool is a rectangular area labeled 'Parking Lot'. A small box labeled 'A.' is located near the bottom right of the pool area.</p>								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								
				<p>The photograph shows a stream flowing through a wooded area. A yellow arrow points to a visible sediment buildup or turbidity in the water. A tire is visible on the bank in the background.</p>				

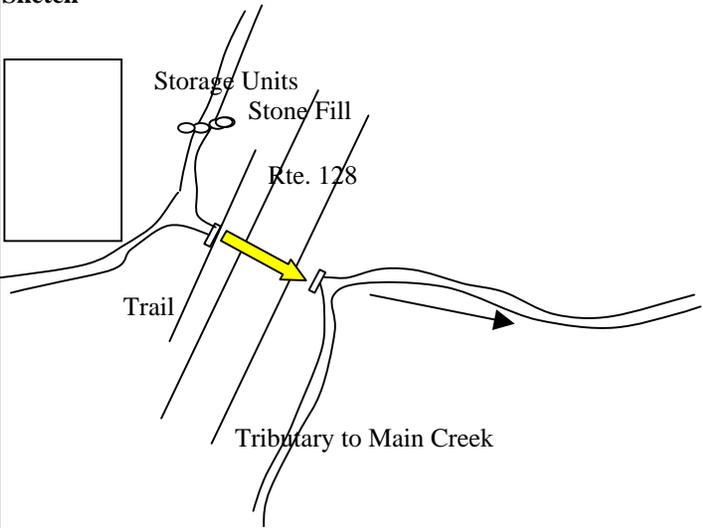
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	17	Clark Pond	Wooded Swamp Deciduous	CU	Riverine	Magnolia Ave.	Municipal	196
<b>Notes</b>				<b>Photo</b>				
Brook is dry below				<b>A.</b>				
3' corrugated culvert, set too high								
Culvert set too high may result in gain in wetlands upstream								
Sand buildup downstream potentially from stormwater								
Extensive wetlands upstream noted								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

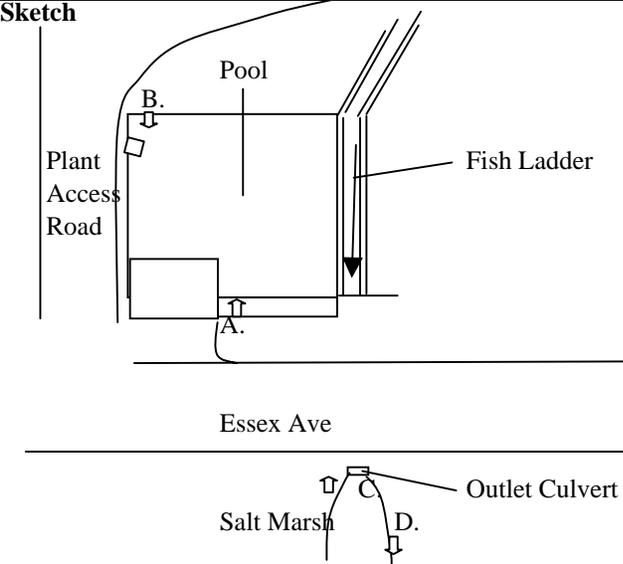
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	18	Clark Pond	Shrub Swamp	BI, BE	Riverine	Kettle Cove Industrial Park	Private	197
<b>Notes</b>				<b>Photo</b>				
Channelized, artificial bank replaces natural floodplain				<b>A.</b>				
Culvert set at right invert				<b>B.</b>				
~3.5' corrugated culvert								
Possibly an artificial pool below, acts a stream sediment trap								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

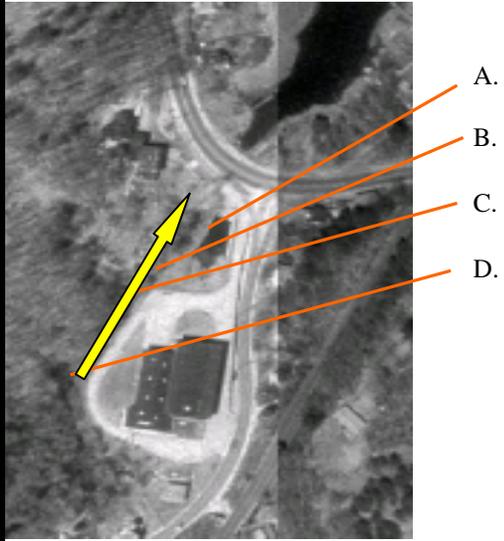
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	19	Pigery Creek	Brackish Marsh	DL, CU	Riverine/Anadromous	Concord St.	Public/Private	198
<b>Notes</b>				<b>Photo</b>				
Campus of West Parish School				<p><b>A.</b> </p> <p><b>B.</b> </p> <p><b>C.</b> </p> <p><b>D.</b> </p> <p><b>E.</b> </p>				
Upstream 4-5' culvert with perennial stream type flows								
Stream culverted for approx. 100 yards								
Culverted section of stream at natural smelt spawning area								
4 2-2.5' culverts at discharge point, for stream and stormwater								
Stream course not known as it flows under access road to school and discharges to salt marsh								
School has expansion plans that might preclude restoration								
Area is used by schoolchildren								
<b>Sketch</b>								
 <p>Stormdrain</p> <p>Outlet</p> <p>School</p> <p>Wetlands</p> <p>Cement Cover</p> <p>Lawn</p> <p>Salt Marsh</p> <p>Concord St.</p> <p>Forested Wetlands</p> <p>A.</p> <p>B.</p> <p>C.</p> <p>D.</p> <p>E.</p>								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

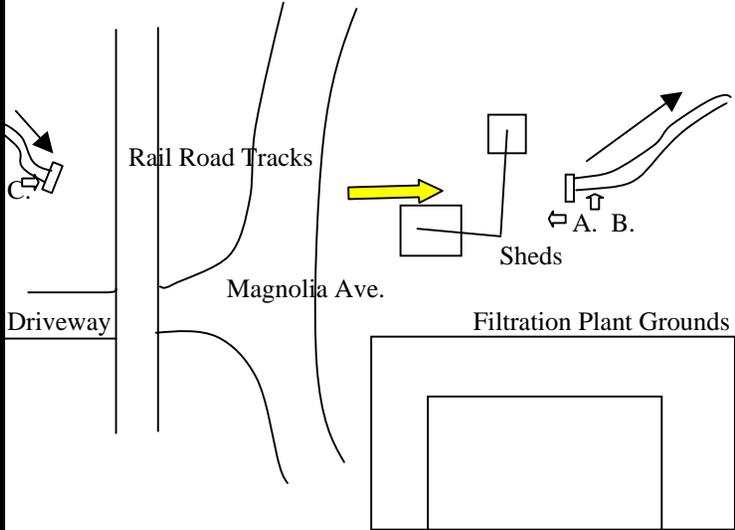
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	20	Pigery Creek	Shrub Swamp	DL, CU	Riverine	Essex Ave.	Public/Private	199
<b>Notes</b>								
~5' concrete culvert installed by Mass Highway to alleviate flooding from Rte.128				A.				
Up to 1/4 mile of culverted stream				B.				
Stream runs in back of residential neighborhood, mostly lawn and outbuildings (shown incorrectly on plan below as open stream)				C.				
Ends of culvert grated to presumably prevent trespassing				D.				
				E.				
<b>Sketch</b>								
<p>C. B. D. E. A.</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

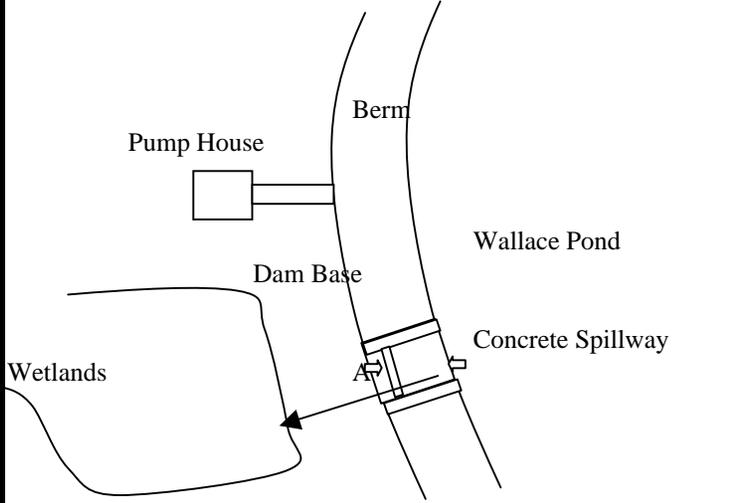
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	21	Pigery Creek	Shallow Marsh Meadow/Wooded Swamp Deciduous	BMP	Riverine	Rte. 128	Public/Private	200
<b>Notes</b>				<b>Photo</b>				
Sediment build-up in stream from stormwater from Rte.128 offramp				<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>A.</p>  </div> <div style="text-align: center;"> <p>B.</p>  </div> </div> <div style="text-align: center;"> <p>C.</p>  </div>				
Potential to install a BMP in offramp median to improve water quality								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	22	Pigery Creek	Shrub Swamp	CU, BE, FR	Riverine	Rte. 128	Public	201
<b>Notes</b>				<b>Photo</b> A. 				
Approx. 100' culvert under Rte. 128								
Upstream pavement to near stream edge, small buffer								
Stone fill to edge of wetlands upstream								
Culvert slightly undersized								
Minimal disturbance								
<b>Sketch</b>				<b>Photo</b> B. 				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

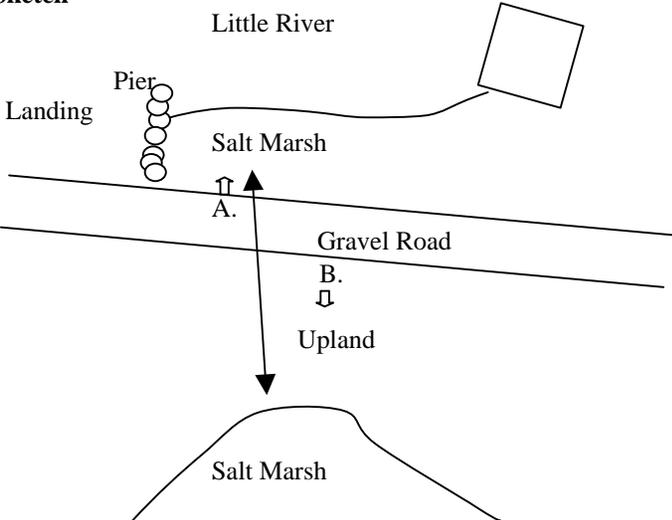
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	23	Little River	Brackish Marsh	FR, CR	Anadromous/Estuarine	Magnolia Ave./Essex Ave.	Municipal	204
<b>Notes</b>				<b>Photo</b>				
Settling pond could be integrated with stream system to form resting pool for alewife				<p>A.</p>  <p>B.</p>  <p>C.</p>  <p>D.</p> 				
Settling pond not needed as part of filtration plant operations								
Pond could be enhanced for smelt and better integrated into stream flow								
Restoration should be looked at in conjunction with site 24								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 155								

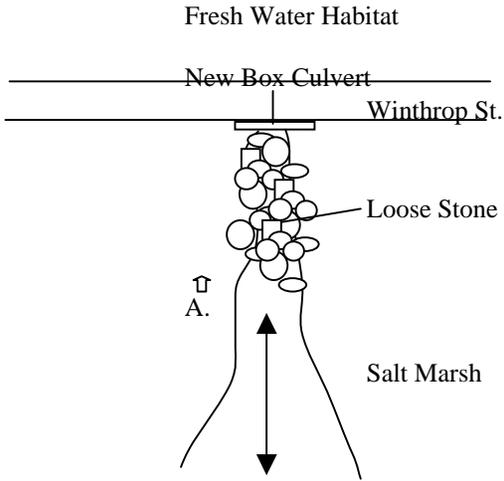
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	24	Little River	Brackish Marsh	BI, DL	Estuarine/Anadromous	Magnolia Ave./Essex Ave.	Municipal	205
<b>Notes</b>				<b>Photo</b>				
Fish ladder could be replaced with natural stream				A.				
Natural stream may pass fish better and provide flood storage								
Natural stream would limit need for long term maintenance of the fish ladder								
Natural stream could be integrated with settling pool creation				B.				
Restoration should be looked at in conjunction with site 23				C.				
								
				D.				
								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 155								

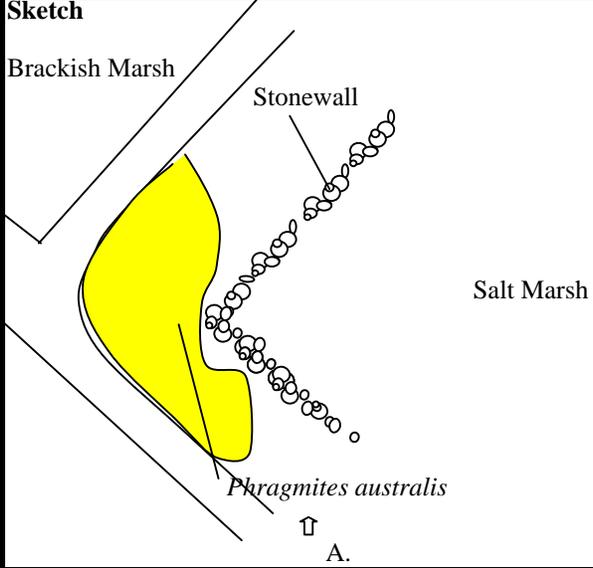
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	25	Wallace Pond	Shrub Swamp	DL, CU	Riverine/Anadromous	Magnolia Ave.	Municipal	206
<b>Notes</b>				<b>Photo</b>				
Stream culverted for approx. 200'				A.				
Approx. 3' concrete culvert at outlet, granite box culvert at inlet								
Potential to daylight stream to Magnolia Ave.								
Alewife potential limited - upstream dam/water supply reservoir				B.				
Historic alewife run according to anecdotal information								
				C.				
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

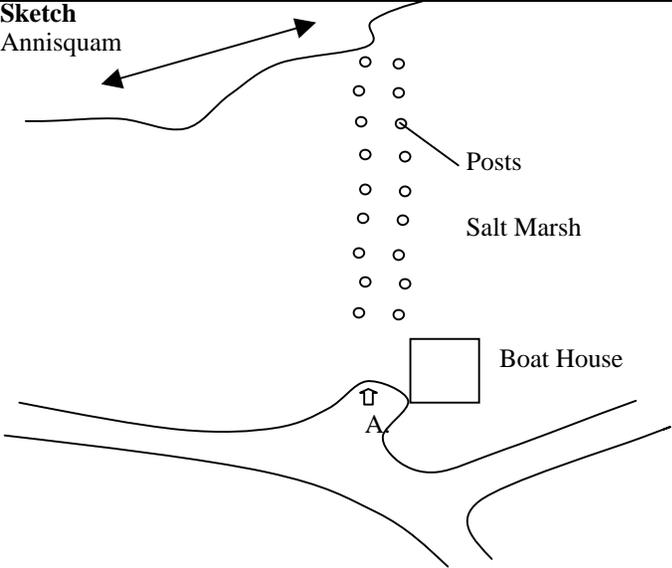
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	26	Wallace Pond	Shrub Swamp	FL	Riverine/Anadromous	Magnolia Ave.	Municipal	207
<b>Notes</b>				<b>Photo</b>				
Stream feed presumably from leakage at dam base				<b>A.</b> 				
Spillway may be too steep for fish ladder								
Political issue of water supply reservoir as alewife spawning area								
Shoreline of Wallace Pond fairly undisturbed								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

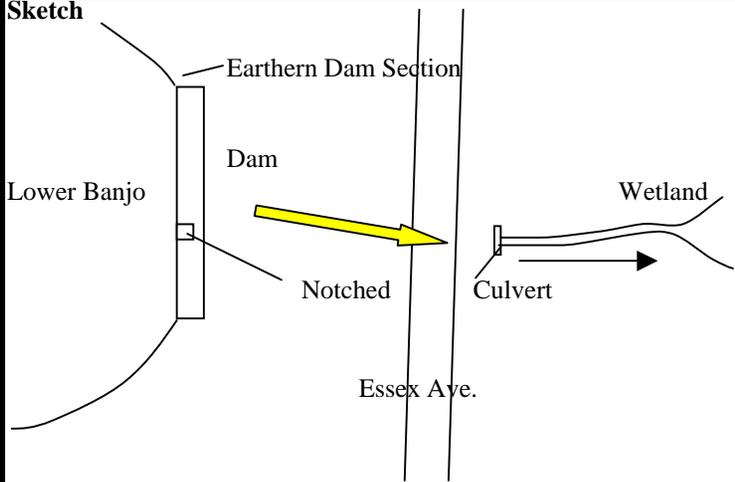


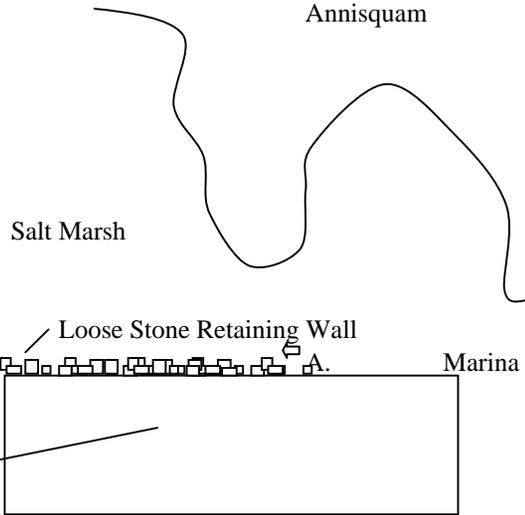
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	28	Little River	Salt Marsh	FR, CI	Estuarine	Stanwood Ave.	Unknown	209
<b>Notes</b>				<b>Photo</b>				
Potential salt marsh connection severed by Stanwood Point Road				<b>A.</b>				
No culvert found, anecdotal evidence that no connection existed								
Limited invasive species impacts to spur need for hydrologic change								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

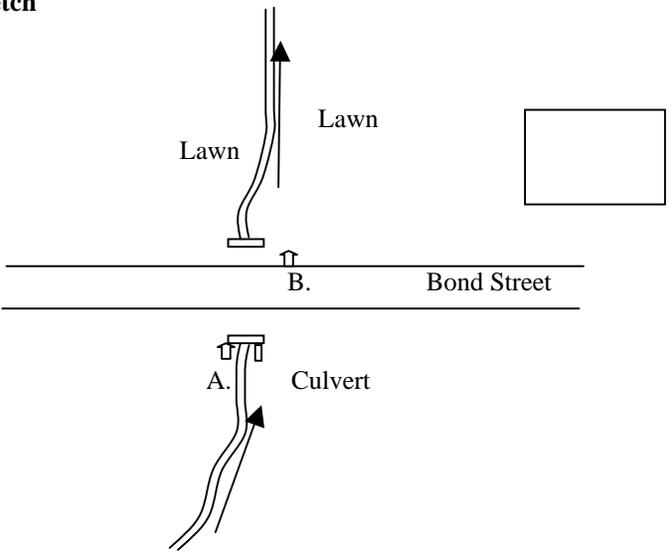
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	29	Fernwood Lake	Brackish Marsh/Wooded Swamp Deciduous	FR, CR	Anadromous/Estuarine	Winthrop Ave.	Private	210
<b>Notes</b>				<b>Photo</b>				
Re-alignment of stones could encourage smelt spawning				<b>A.</b> 				
Approx. 50' of smelt run habitat could be created								
New box culvert could help support smelt habitat improvement								
Stones seem to be artificially placed not natural configuration								
Cove is sheltered so stream bed re-alignment would not be adversely impacted by storm action like at Folly Cove								
Stones as configured do not articulate primary stream bed								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 155								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	30	Annisquam River	Salt Marsh/Brackish Marsh	FR, IM	Estuarine	Winthrop Ave.	Private	211
<b>Notes</b>				<b>Photo</b>				
Stone wall reduces salt marsh sheet flow potentially encouraging <i>Phragmites australis</i>								
Partial removal of the stone wall may reduce <i>Phragmites</i> advance								
Not a clear creek channel to brackish marsh found								
Culvert under Winthrop not found								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

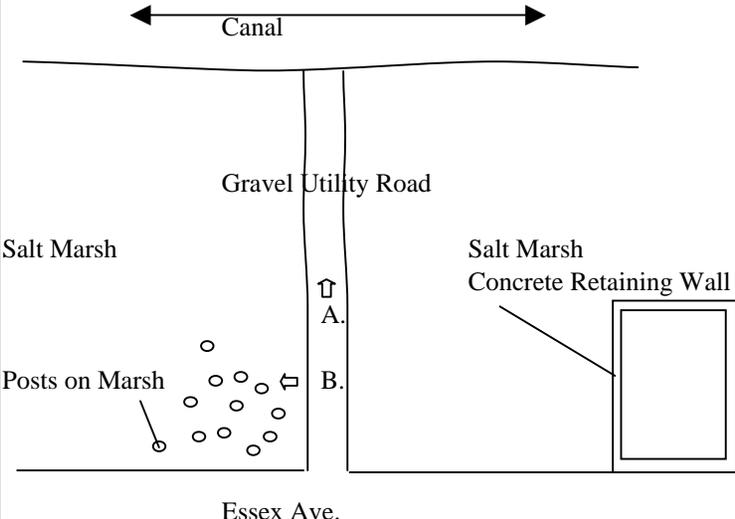
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	31	Annisquam River	Salt Marsh	FR	Estuarine	Massasoit Rd.	Private	212
<b>Notes</b>				<b>Photo</b>				
Old pier posts in salt marsh				A.				
Present impact limited								
Post removal may limit future pier construction which would have a greater resource impact								
<b>Sketch</b>								
Annisquam								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	32	Upper Banjo Pond	Open Water	FL	Catadromous	Essex Ave.	Public/Private	213
<b>Notes</b>				<b>Photo</b>				
Dam from lower Banjo Pond to LePage's				<p><b>A.</b></p>  <p><b>B.</b></p>  <p><b>C.</b></p> 				
Alewife ladder construction not likely given engineering constraints and lack of continuous water flow								
Increased base flow may encourage eel passage								
Dam is approx. 15' high from base to top of concrete structure								
Box culvert at outlet is approx. 3' x 2'								
Little base stream flow at time of investigation								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

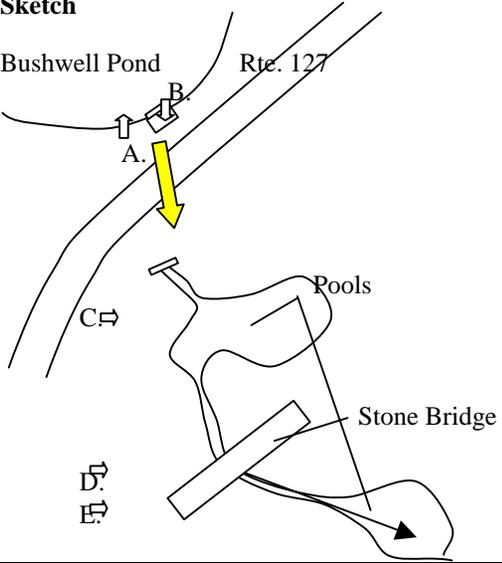
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	33	Blynman Canal	Salt Marsh	FR	Estuarine	Essex Ave.	Private	214
<b>Notes</b>				<b>Photo</b>				
Section of fill area on presumably historic salt marsh				A.				
Elevation change in fill area would probably result in re-growth of native salt marsh species								
Large area of potential restoration								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

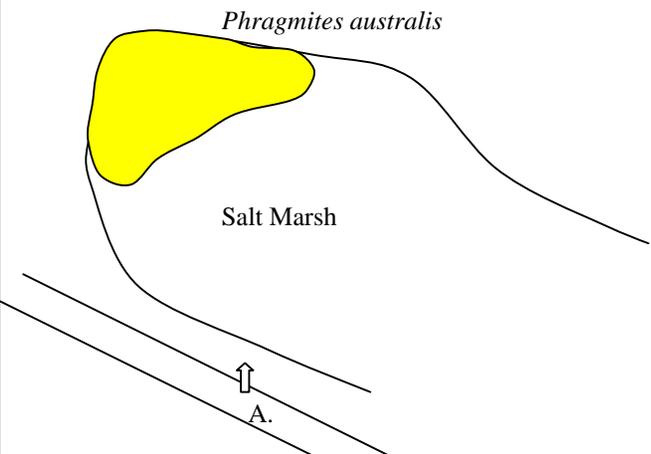
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	34	Unnamed	Wooded Swamp Deciduous	CU, BE	Riverine	Bond St.	Private	215
<b>Notes</b>				<b>Photo</b>				
Downstream lawn to near stream edge								
Culvert may be slightly undersized								
Stream has low flow								
Stream appears to be straightened out through ditching								
Minor disturbance								
<b>Sketch</b>				<b>A.</b>  <b>B.</b> 				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

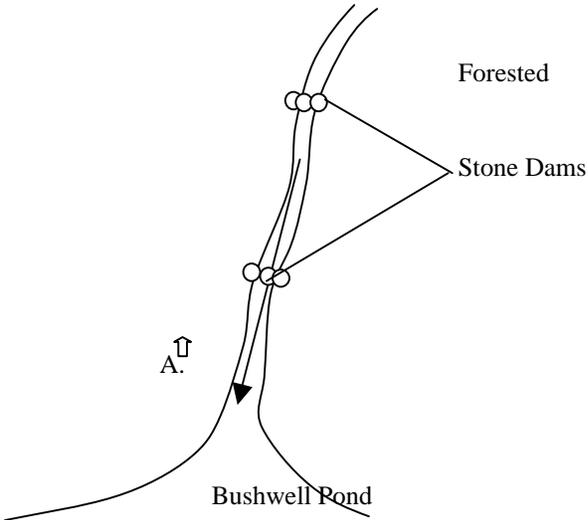
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	35	Blynman Canal	Salt Marsh	CU, DL, FR, IM	Anadromous/Estuarine	Essex Ave.	Private/Public	216
<b>Notes</b>								
Stream diverted through treatment plant								
Salt marsh upstream of culverted section								
<i>Phragmites australis</i> present throughout impacted salt marsh								
Tidal flow could be improved by increasing culvert size or by allowing for another culvert connection to canal								
Reduction in parking lot perimeter at movie theater would enhance flood storage and increase salt marsh								
Creation of salt pannes in impacted areas may reduce <i>Phragmites</i>								
Project could be done in conjunction with mosquito control								
May be potential to enhance smelt habitat with upgraded culvert								
<b>Sketch</b>								
<p><i>Phragmites australis</i> (approx. location)</p>								
				<p>F. E. D. C. B. A.</p>				
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								
				<p><b>A.</b></p>				
				<p><b>B.</b></p>				
				<p><b>C.</b></p>				
				<p><b>D.</b></p>				
				<p><b>E.</b></p>				
				<p><b>F.</b></p>				

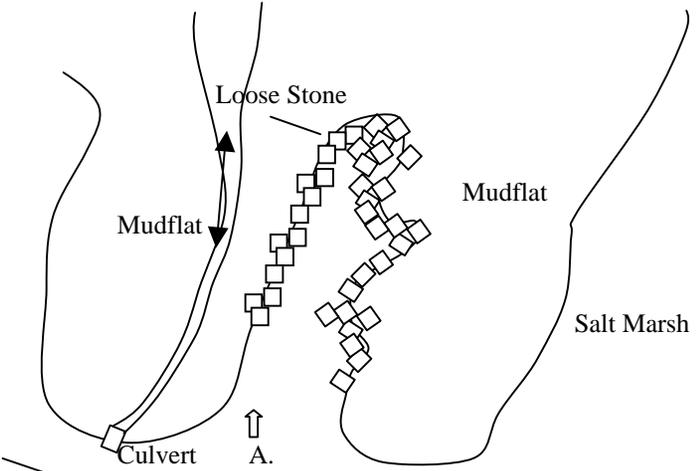
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	36	Blynman Canal	Salt Marsh	FR	Estuarine	Essex Ave.	Unknown	217
<b>Notes</b>				<b>Photo</b>				
Location of the main sewer discharge pipe				A. 				
Access needed for utility maintenance								
Road removal would result in increased salt marsh								
Limited potential due to tangible need for road								
Road's low profile reduces habitat impacts and allows for sheet flow								
Area of old posts on marsh presents a fill removal opportunity								
<b>Sketch</b>				B. 				
 <p style="text-align: center;">← Canal →</p> <p style="text-align: center;">Gravel Utility Road</p> <p>Salt Marsh</p> <p>Posts on Marsh</p> <p style="text-align: right;">Salt Marsh Concrete Retaining Wall</p> <p style="text-align: center;">Essex Ave.</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

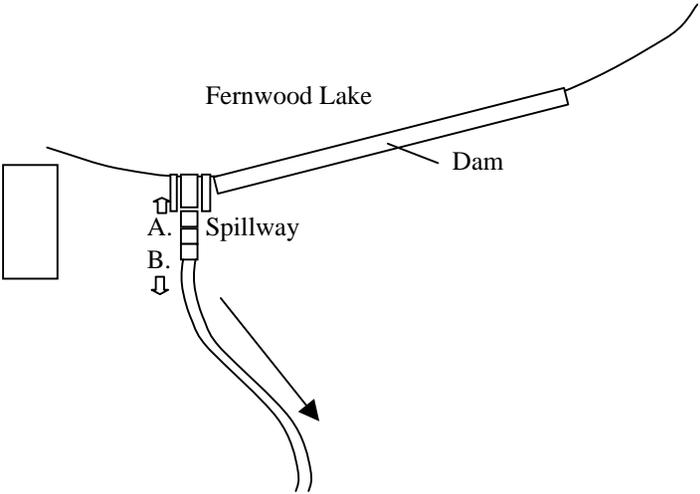
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	37	Blynman Canal	Salt Marsh	CU, DL	Estuarine	Essex Ave.	Unknown	218
<b>Notes</b>				<b>Photo</b>				
Impounded salt marsh could have increased tidal flushing				<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>A.</p>  </div> <div style="text-align: center;"> <p>B.</p>  </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>C.</p>  </div>				
Approx. 10-15 acre marsh area								
Marsh perimeter ringed with <i>Phragmites australis</i>								
Feeder pipe approx. 3.5' concrete culvert								
Main feeder culvert diverted through treatment plant property								
Culverted section of creek could be daylighted for 200' feet to Essex Ave.								
Need to explore additional culverts to drain and flush salt marsh								
Culvert outlet comes from same culvert that feeds movie theater marsh								
theater marsh								
<b>Sketch</b>								
								
<p style="text-align: center;">Treatment Plant    Blynman Canal</p> <p style="text-align: center;">Outlet Culvert    C.    B.    A.</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> major								
<i>Restoration Potential Score:</i> 155								

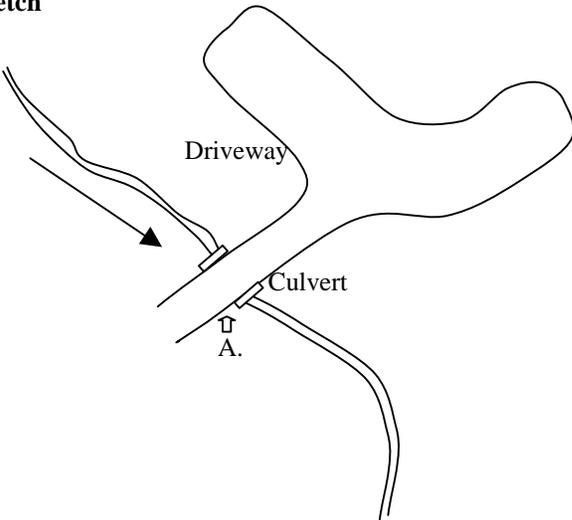
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	38	Buswell Pond	Open Water	FL	Anadromous/Catadromous	Western Ave.	Public/Private	219
<b>Notes</b>				<b>A.</b>				
Approx. 10' drop from pond level to stream base (Photo B)								
Pond may be too small for alewife								
Large elevation drop from pond to sea level in relatively short span								
Stream is channelized in masonry stream bed near bridge								
Approx. 50' of buried culvert under Western Ave.								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>				<b>C.</b>				
General Classification: minor								
Restoration Potential Score: NA								
				<b>D.</b>				
								
				<b>E.</b>				
								

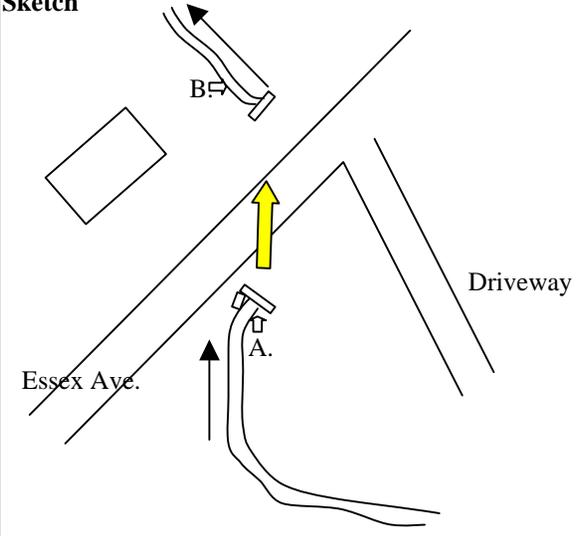
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	39	Freshwater Cove	Salt Marsh	IM	Estuarine	Dollivers Neck	Private	220
<b>Notes</b>				<b>Photo</b>				
End of Freshwater Cove				A.				
Typical transition zone <i>Phragmites australis</i> growth								
No clear channel definition in salt marsh								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	40	Buswell Pond	Wooded Swamp Deciduous	FR	Riverine	Western Ave.	Private	221
<b>Notes</b>				<b>Photo</b>				
2 small stone dams in stream course				A.				
Minimal impact								
Dams create deep water habitat but retard natural flow								
Stream not an anadromous fish run nor potential run								
Stream drops considerably in elevation prior to entry into pond								
<b>Sketch</b>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

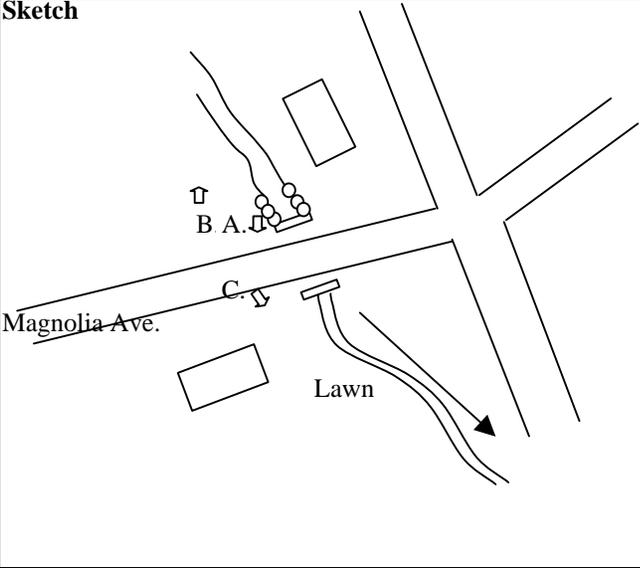
Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	41	Annisquam River	Salt Marsh	FR	Estuarine	Rte. 128	Private	222
<b>Notes</b>				<b>Photo</b>				
Historic pier structure extends into cove				A.				
Popular recreation access point								
Minimal disturbance								
Pier replaces mudflat								
Pier could be partially removed to allow for more wetland resource creation								
Pier owned by Essex County Greenbelt Assoc.								
<b>Sketch</b>								
								
Rte. 128								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	42	Fernwood Lake	Open Water	FL	Anadromous/Catadromous	Fernwood Ave.	Private	229
<b>Notes</b>				<b>Photo</b>				
Main spillway from Fernwood Lake				<b>A.</b> 				
16" weir boards control flow								
Dam extends along edge of lake								
Elevation drop from dam to stream below Essex Ave. is significant								
Spring flows are quite rapid, fish ladder would need to dissipate actual flow								
Landowner supportive of fish passage improvements								
<b>Sketch</b>				<b>B.</b>				
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor <i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	43	Fernwood Lake	Wooded Swamp Deciduous	CU, FL	Anadromous/Catadromous	Fernwood Ave.	Private	230
<b>Notes</b>				<b>Photo</b>				
Culverts below dam spillway				A.				
Culverts need to be removed to facilitate fish passage								
Culvert set to high								
2 Culverts near road surface presumably handle high flows								
2 - ~12" culverts								
1 - ~16" culvert								
Site linked to sites 42, 44 and 29								
<b>Sketch</b>								
								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	44	Fernwood Lake	Shrub Swamp	CU, FL, DL	Anadromous/Catadromous	Essex Ave.	Municipal	231
<b>Notes</b>				<b>Photo</b>				
Approx. 3' culvert under Essex Ave.				A.				
An effort to provide alewife fish passage to Fernwood Lake would probably require culvert improvements								
Section of 50' of buried stream along Essex Ave.								
<b>Sketch</b>				B.				
								
<b>Restoration Priority</b>								
General Classification: minor								
Restoration Potential Score: NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	45	Fernwood Lake	Shrub Swamp/Open Water	FR	Anadromous/Catadromous	Essex Ave.	Unknown	NA
<b>Notes</b>				<b>Photo</b>				
Berm placed across lake to segment water bodies				<p>A.</p> 				
Area of potential fill removal								
Area behind berm more vegetated, less deep water habitat								
Disturbance not site investigated								
Removal of berm may increase spawning habitat for alewives if passage improvements are possible								
Berm is vegetated								
<b>Sketch</b>								
 <p>A.</p>								
<b>Restoration Priority</b>								
<i>General Classification:</i> minor								
<i>Restoration Potential Score:</i> NA								

Quad	Site #	Watershed	Wetland Type	Restoration Code	Target Species	Access/Road	Ownership	Waypoint
Q-4	46	Clark Pond	Wooded Swamp Deciduo	BE, BI	Anadromous/Catadromous	Magnolia Ave.	Private	232
<b>Notes</b>				<b>Photo</b>				
Minor disturbance				A.				
Stream downstream could benefit with greater vegetated buffer				B.				
Stream artificially channelized upstream for approx. 20' either side								
Culvert slightly undersized								
								
								
<b>Sketch</b>				C.				
								
<b>Restoration Priority</b>								
<i>General Classification: minor</i>								
<i>Restoration Potential Score: NA</i>								

## Appendix B

### Restoration Code Key

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<b>Restoration Technique</b>	<b>Code</b>
Buffer Enhancement	BE
Bank Improvement	BI
Channel Re-alignment	CR
Culvert Upgrade	CU
Daylighting	DL
Dam Removal	DR
Fill Removal	FR
Fish/Eel Ladder	FL
Invasive Plant Species Management	IM
Open Marsh Water Management	OWMM
Roughened Ramp	RR
Stocking	S
Stormwater Best Management Practice	BMP
Trash Removal	TR

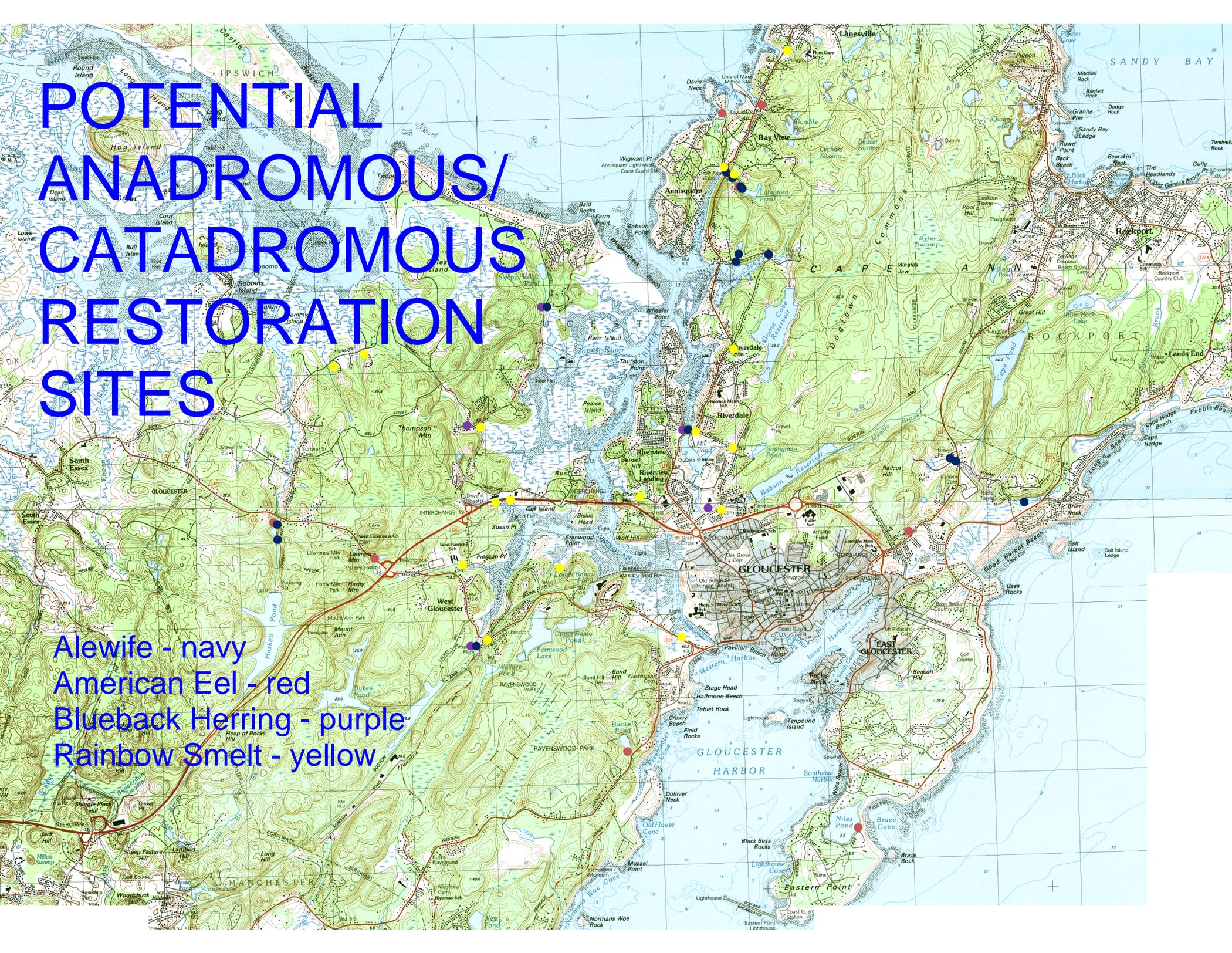
## **Appendix C**

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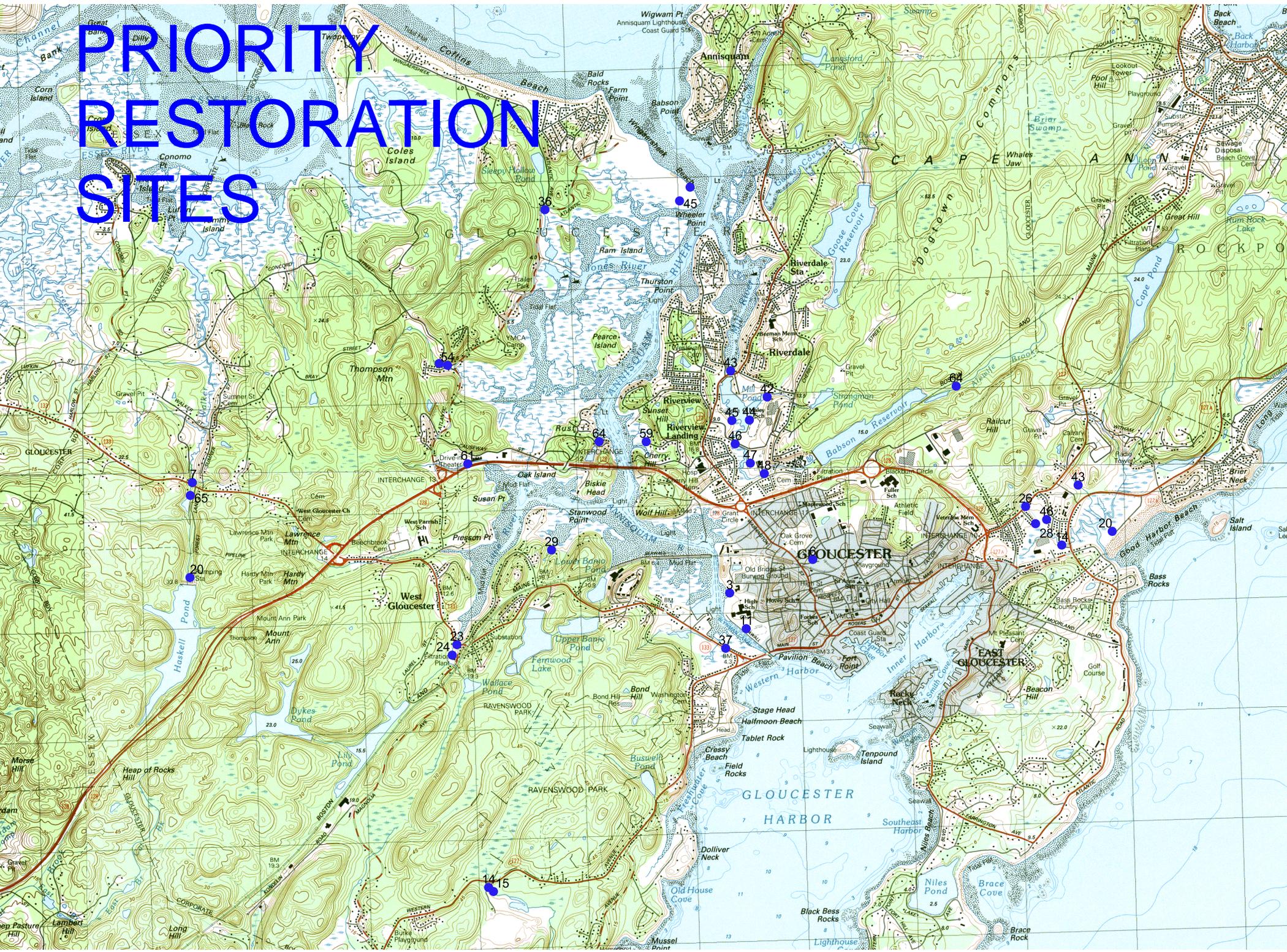
### **Potential Anadromous and Catadromous Restoration Sites and Priority Restoration Site Maps**

# POTENTIAL ANADROMOUS/ CATADROMOUS RESTORATION SITES

Alewife - navy  
American Eel - red  
Blueback Herring - purple  
Rainbow Smelt - yellow



# PRIORITY RESTORATION SITES



## Appendix D

### Criteria for Determining Restoration Potential

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<i>1. Direct impact area of restoration</i>	Points
Less than .5 acre	10
.6-1 acre	20
1.1-5 acres	30
Greater than 5.1 acres	40

<i>2. Indirect impact area of restoration</i>	Points
Less than .5 acre	5
.6-1 acre	10
1.1-5 acres	15
Greater than 5.1 acres	20

<i>3. Biological Value</i>	Points
Project may reduce biological values and productivity	-10
Project will have limited improvement to biological values or productivity	20
Project has the potential to improve biological productivity and values	30
Project will greatly enhance biological productivity and values	40

<i>4. Community Support</i>	Points
Project has no community support	-10
Project has limited community support	20
Project is likely to have community support	30
Project has high community support	40

<i>5. Stewardship</i>	Points
Project has no stewardship potential	-5
Project has limited stewardship potential	5
Project has stewardship potential	10
Project has multiple stewardship potential	15

<i>6. Landowner support</i>	Points
Land owner unresponsive or multiple landowners (more than 5)	-5
Land owner(s) unknown	0
Land owner(s) potentially supportive	10
Land owner supportive	15

<i>7. Cost</i>	Points
Under \$250,000	0

Under \$50,000	5
Under \$25,000	10
Under \$5,000	15

<i>8. Fundability</i>	Points
Project does not involve anadromous/catadromous fish or marine resource enhancement	0
Project involves indirect anadromous/catadromous fish or marine resource enhancement	5
Project involves anadromous/catadromous fish or marine resource enhancement	10
Project involves multiple anadromous/catadromous fish or marine resources enhancement	15

<i>9. Engineering</i>	Points
Project involves expensive, complex and novel engineering	-5
Project involves expensive engineering	5
Project involves limited engineering	10
Project involves little to no engineering	15

<i>10. Education Value</i>	Points
Project is not highly visible and/or is difficult to interpret	-5
Project has limited visibility and/or limited interpretive value	0
Project is visible and/or has interpretive value	5
Project is highly visible and/or is easy to interpret	10

<i>11. Liability</i>	Points
Project will result in loss of property value or loss of property use	-10
Project may result in loss of property value or loss of property use	-5
Project may enhance property value and property use	0
Project may enhance property value and/or improve property use	5

## **Appendix E**

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### **Example of a Recent Restoration Project, West Ox Pasture Brook**

# DAYLIGHTING

new life for buried streams



Written by  
Richard Pinkham  
Rocky Mountain Institute,  
Old Snowmass, Colorado

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# **DAYLIGHTING: NEW LIFE FOR BURIED STREAMS**

by Richard Pinkham  
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Background: Embarrass Creek restoration, courtesy of Urbana, Illinois Park District

Insets: Shoal Creek tributary restoration, courtesy of DeKalb County, Georgia Parks Dept.

## West Ox Pasture Brook

Small private properties no doubt present myriad daylighting opportunities across the country. In Rowley, Massachusetts, multiple organizations cooperated with homeowners to daylight 85 feet of West Ox Pasture Brook in a backyard.

Watershed:	0.35 square miles; low-density suburban
Flow rates:	Unavailable; small perennial stream
Length daylighted:	85 feet of culvert removed
Year daylighted:	1999
Project costs:	\$1,200, plus donated materials and time
Primary objectives:	Stream restoration and riparian habitat creation
Notable features:	Backyard daylighting; cost savings on a home septic system replacement

### Background

West Ox Pasture Brook drains a small, low-density suburban watershed in Rowley, a small community located about one hour's drive north of Boston. The brook is a small, barely perennial tributary of the Mill River, which flows to the Parker River and then to the Atlantic Ocean at Plum Island Sound. It is culverted and grassed over in some of the residential backyards it crosses.

Rowley Conservation Commission administrator Tim Purinton noticed this section of culverted brook when he walked the lot after its owners approached the commission for a permit to replace a failing septic system. Purinton suggested the homeowners daylight the brook, and offered them assistance to help the project happen.

A number of agencies and organizations took interest. A U.S. Fish and Wildlife service employee helped "sell" the homeowners on the habitat-creation benefits of the project and enrolled them in the Partners for Wildlife program, which protects and creates habitat on private property. The U.S. Natural Resources Conservation Service provided the surveying and engineering necessary to obtain a state wetlands permit. Purinton says of the NRCS, "We couldn't have done the project without them. They put it on paper. And they don't usually take on something this small." The Parker River Clean Water Association worked with the homeowners to develop a planting plan for the restoration.

### Actions

A contractor removed the 85-foot, 24-inch corrugated-metal culvert and graded the stream banks in the fall of 1999. As planned, the contractor used the excavation spoils to cover over the new septic system. Volunteers from the Parker River Clean Water Association, supervised by a professional landscaper, mulched the banks with hay and planted various native

species. They plan to add some wetland emergent plants at the toe of the banks in the spring of 2000.

### Results

Water once again flows at the surface along this section of West Ox Pasture Brook. The homeowners are reportedly pleased to have running water in their backyard. They plan to place a small bridge over the brook, and look forward to the vegetation establishing itself and to an increase in visiting birds and butterflies.

### Economics/Funding

The cash costs for this project, primarily for excavation, came to only \$1,200.

The U.S. Fish and Wildlife Service Partners for Wildlife Program put up \$800 and the Rowley Conservation Commission \$400. Material and time donations were important to the project. The Parker River Clean Water Association provided plants as part of its waterfront buffer planting program, which is supported by grants from the Essex County Ecology Center, the Massachusetts Riverways Program, and the Massachusetts Environmental Trust (funded by Massachusetts vanity license plate fees). The Fish and Wildlife Service, Natural Resources Conservation Service, and Rowley Conservation Commission all donated staff time on the project.

The homeowners did not contribute toward the daylighting costs. In fact, the project somewhat reduced their costs for the needed septic system—the soils excavated to create the new stream channel were used to help cover the system.

### Challenges and Lessons

Purinton reports that the homeowners needed some coaxing and "hand-holding" to agree to the project. Betty Lambright, a professional landscape designer, worked with the Parker River Clean Water Association on the project. Her skills as a native-plants landscaper were critical in convincing the homeowners to consider daylighting the stream. Typical homeowners want to have neatly groomed yards, which is not what most small streams look like when surrounded by natural buffers. Lambright's landscape drawings, and her marketing skills in showing the homeowners photos of the native plants in various seasons, convinced the homeowners that their stream restoration would still look attractive.

The new septic system presented a design challenge. To meet the required 50-foot setback, the new stream curves away from its expected course a bit. The septic system's location could not be adjusted because of the lot's configuration.

Opportunities for projects like this abound. As Becka Roof

of the Parker River Clean Water Association says, “This is perhaps a little different than a typical daylighting of a larger river system in an urban area. Yet I believe many miles of these little tiny creeks pop in and out of culverts all across suburban America—and we need to show homeowners what can be done even on a small, individual scale.”

However, Purinton notes that even this small project took a lot of coordination and effort, especially for permitting. As the administrator of the local conservation commission—which under Massachusetts law has jurisdiction over all work done within 200 feet of perennial streams—he is essentially a “professional permitter,” and brought to the project skills and experience that homeowners and many other local officials might lack.

*Sources: Mehaffey 1999; Purinton 1999; Roolf 1999.*



*A backhoe halfway through removing a culvert and grading the banks of West Ox Pasture Brook in a Rowley, Massachusetts backyard. Courtesy of Rowley Conservation Commission.*