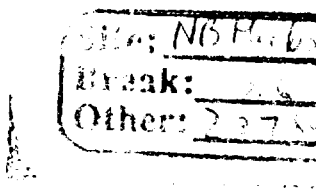
USACE CONTRACT NO. DACW33-94-D-0002
TASK ORDER NO. 017
TOTAL ENVIRONMENTAL RESTORATION CONTRACT



RESTORATION PLAN
FOR
EARLY ACTION SEDIMENT REMOVAL
NEW BEDFORD HARBOR SUPERFUND SITE

New Bedford Harbor, Massachusetts

December 2000

-DDA/Liner
- truck decon at Sawyer St.

Prepared for
U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

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Prepared by
Foster Wheeler Environmental Corporation
133 Federal Street
Boston, MA 02110

Revision	Date	Prepared By	Approved By	Pages Affected
0	12/29/00	J. Scott		All

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1.0 INTRODUCTION

This Restoration Plan describes the restoration efforts to be undertaken following the completion of Early Action remedial activities along the east bank of the Acushnet River, south of Main Street, Acushnet, Massachusetts. Early Action remedial activities are to include the removal of contaminated soils and sediments from within and adjacent to two wetlands along theriver bank. Approximately 0.41 acre of wetlands and 1.23 acres of adjacent uplands will be affected by the soil and sediment removal activities. This Restoration Plan describes the in-place and in-kind restoration of the impacted wetlands, and restoration of the impacted upland areas.

2.0 PURPOSE AND OBJECTIVES OF THE RESTORATION PLAN

The purpose of the Restoration Plan is to provide for compensatory wetlands mitigation to offset and compensate unavoidable wetlands impacts resulting from the Early Action soil and sediment removal. Compensatory wetlands mitigation through restoration is necessary to comply with the state and federal Applicable or Relevant and Appropriate Requirements (ARARs) for CERCLA Remedial Actions, and must be consistent with the mitigation and replication requirements set forth in Section 404 of the Clean Water Act. The Restoration Plan also provides for restoration of upland areas adjacent to the impacted wetlands for the purpose of soil stabilization, visual and aesthetic restoration, and replacement of trees and shrubs ~~as requested by the affected landowner~~.

A total of 0.41 acre of intertidal wetlands at two locations will be restored to compensate for the disturbances and impact to the same area of intertidal wetlands at the same two locations (Sheet C-2). In addition, approximately 0.09 acre of new intertidal wetland adjacent to existing wetland will be created as a result of lowering the elevation of one wetland (see Section 4.2.1). The primary goal of the wetlands restoration is to develop wetlands that will become successfully established with the restored hydrologic regimes. The objectives of the Restoration Plan are listed below.

- Restore 0.41 acre of estuarine intertidal wetlands disturbed during removal of contaminated soils and sediments;
- Establish a self sustaining, functional emergent wetland system;
- Establish a plant community in the wetlands that have a competitive advantage over *Phragmites australis*;
- Restore and enhance pre-remediation wetland functions; and
- Stabilize and restore 1.23 acres of uplands disturbed during removal of contaminated soils.

3.0 EXISTING ENVIRONMENT

A general description of the area that will be affected by the Early Action sediment removal, including detailed descriptions of flora, soils, and hydrology for the two wetland areas, is included in the Wetlands Delineation and Functions and Values Assessment Report (Appendix A). A summary of the existing conditions of the areas to be affected is included below.

3.1 Hydrology

The shoreline area included in the Early Action soil and sediment removal is within the upper New Bedford Harbor/Acushnet River estuary, and is tidally influenced. Elevations, in mean lower low water (MLLW), of the area of shoreline, are as follows:

Mean Higher High Water (MHHW)	=	4.1 feet
Mean High Water (MHW)	=	3.8 feet
Mean Tide Level (MTL)	=	1.9 feet
Mean Low Water (MLW)	=	0.1 feet

3.2 Upper Wetland

The 0.33-acre Upper Wetland is located on the east bank of the Acushnet River approximately 300 feet south of Main Street. The wetland is dominated by *Phragmites*, and is bordered by the Acushnet River to the south, and commercial and residential areas and upland hardwoods to the west, north, and east. Soils in the Upper Wetland are mapped as Scarboro series, and are very poorly drained. Elevation of the wetland ranges from 0 to 5 feet (MLLW).

3.3 Lower Wetland

The 0.08-acre Lower Wetland is approximately 100 feet south of the Upper Wetland along the east shoreline of the Achusnet River. Approximately 0.06 acre of the Lower Wetland is vegetated with an emergent community dominated by smooth cordgrass (*Spartina alterniflora*). The remainder is unvegetated intertidal shoreline. Soils consist of a very thin layer of muck and silt over rocks and cobbles in a sand matrix. Elevation of the wetland ranges from 0 to 3 feet.

3.4 Uplands

Upland areas that will be disturbed by the Early Action soil and sediment removal include areas immediately adjacent to the west and east sides of the Upper Wetland and the east side of the Lower Wetland. In addition, upland areas will be temporarily disturbed by the use of an existing trail on the Braley property for construction access and staging. The upland area to the west of the Upper Wetland consists of fill vegetated with Japanese knotweed (*Polyganum cuspidatum*) and ash leaf maple (*Acer negundo*). The upland area to the east of the Upper Wetland consists of mowed grasses and about 12 small (2- to 6-inch dbh) ailanthus (tree-of-heaven) trees (*Ailanthus altissima*). The upland to the east of the Lower Wetland consists of small to medium ailanthus overstory, and shrub and vine understory of honeysuckle (*Lonicera* sp.), bittersweet (*Celastrus scandens*), and Virginia rose (*Rosa virginiana*). The shoreline in this area includes Norway maple (*Acer platanoides*), black cherry (*Prunus serotina*), and apple (*Pyrus malus*). The area that will be disturbed by use of the existing trail on the Braley property includes primarily shrub and vine undergrowth of honeysuckle, bittersweet, multiflora rose, arrowwood (*Viburnum* sp.), Japanese barberry (*Berberis thunbergii*), and Virginia creeper (*Parthenocissus quinquefolia*). Approximately two ailanthus trees (6- to 10-inch dbh) are also in the area that would be affected by use of the trail.

4.0 RESTORATION PLAN

4.1 Excavation

The approximate areas to be excavated for the removal of contaminated soil and sediment are shown on Sheet C-1. The areas to be excavated generally correspond to the delineated wetland boundaries of the Upper and Lower Wetlands, however some adjacent upland areas will also be excavated. Approximately 0.33 acre within the Upper Wetland, 0.08 acre within the Lower Wetland, and 0.13 acre of adjacent uplands will be disturbed by excavation. Approximately 1.1

additional acres of upland will be disturbed by construction of a temporary haul road and staging area.

Depth of excavation will be as required to meet remedial action goals, and is estimated to range from 1 to 3 feet. Estimated depths of excavation are shown on Sheet C-1.

4.2 Backfill and Grading

4.2.1 Upper Wetland

No backfilling is planned following excavation of the Upper Wetland. Following excavation, elevation of the Upper Wetland will range from 0 feet MLLW along its southern (lower) edge to 3 feet MLLW along its northern and eastern (upper) edge (see Sheet C-2), which will expose the wetland to inundation by daily tides. The wetland will be maintained at this elevation to prevent or greatly minimize reestablishment of *Phragmites*, and to allow for the establishment of smooth cordgrass. Based on deep soil sampling, the soils that will be exposed at the planned final elevation consist of silty sand with 10-30 percent organic matter and 10-20 percent gravel and small rock fragments.

Grading within the Upper Wetland will be limited to the edges of the excavated wetland as necessary to establish stable slopes in the transition area from wetland to upland. Grading and disturbance (beyond that necessary to excavate contaminated soils and sediments) will be minimized to the extent possible to minimize the area of potential reestablishment and/or spread of *Phragmites*. Wetland edges will be graded to an approximate 2:1 slope. Topsoil will be placed on the upper 12 inches of the upland portion of the slope, and the slope stabilized with a biodegradable erosion control fabric.

Because some adjacent upland areas will be excavated and not backfilled, the final wetland area within the Upper Wetland will be greater than the pre-disturbance area. The wetland area will be increased by approximately 0.09 acre over the existing wetland area.

4.2.2 Lower Wetland

The Lower Wetland is currently inundated by daily tides, and vegetation within the wetland is dominated by smooth cordgrass. The restoration goal is to restore this wetland to existing conditions. Following excavation and removal of contaminated soils and sediments, the pre-disturbance elevation of the wetland will be restored with a combination of common fill, and a gravely, sandy "topsoil". Excavated areas will be backfilled with common fill up to the final one foot of grade. The upper most one foot of backfill will consist of a mix of sand, gravel, and organic matter to match the characteristics of the corresponding excavated material.

4.2.3 Uplands

Following excavation and removal of contaminated soils from the upland areas, the pre-disturbance elevations of the areas will be restored with a combination of common fill and topsoil. Excavated areas will be backfilled with common fill up to the final one foot of grade. The upper-most one foot of backfill will consist of commercially available topsoil or loam. Temporary fill used for the haul road will be removed, and the preexisting grade restored.

4.3 Wetlands Hydrology

The Upper and Lower Wetlands are currently tidally influenced, with the Upper Wetland being inundated by occasional (monthly) high tides, and the Lower Wetland being inundated by daily tides. Based on salinity measurements at daily high tide on December 19, 2000 (a lunar mid-tide), surface water salinity within the Lower Wetland and the Acushnet River adjacent to the Upper Wetland reaches 20 parts per thousand (ppt). As described above, the final elevation of the Upper Wetland will be approximately 2 feet lower than the existing elevation, which will expose the wetland to inundation by daily tides, and prevent or greatly minimize reestablishment of *Phragmites* and allow for establishment of smooth cordgrass. The pre-existing elevations and soil types within the Lower Wetland will be restored, which will allow for the hydrology of the Lower Wetland to remain unchanged.

4.4 Vegetation

Vegetation reestablishment within the areas to be disturbed by the Early Action soil and sediment removal, and specifications for planting, are shown on Sheet C-2, and summarized below.

4.4.1 Upper Wetland

The area of the Upper Wetland that will be exposed to inundation by daily brackish or salt water tides (between MTL and MHW, or approximately 1.9 feet to 3.8 feet MLLW) will be planted with smooth cordgrass. Any portion of the wetland between MHW and MHHW, which is expected to be limited to the banks, will be planted with a commercially available wetland seed mix containing a diversity of Northeast wetland species suited to occasional inundation by brackish water.

4.4.2 Lower Wetland

Approximately 0.06 acre of the Lower Wetland that currently contains smooth cordgrass will be replanted with smooth cordgrass following backfilling.

4.4.3 Uplands

Disturbed upland areas will be reseeded with commercially available mix of native plants and grasses suited to the Northeast. Ash leaf maple saplings will be planted at several locations along the restored haul road and restored uplands on the Braley property to compensate for ailanthus trees that are cut as a result of excavation and use of the access trail. An effort will be made to avoid clearing trees along the shoreline of the Lower Wetland, including a large apple tree overhanging the bank.

5.0 MONITORING PLAN

Monitoring will be conducted to determine if the objectives of the Restoration Plan are met. Monitoring will be conducted for a three to five year period. After three years of monitoring, the monitoring plan will be reevaluated and reduced if appropriate based on the status of restoration.

Permanent monitoring locations will be established within each wetland area. The vegetation, sediments/soils, and hydrology will be monitored at each of these locations during the growing season. Qualitative vegetation monitoring of wetlands and uplands will be conducted every other week during the first growing season following planting/seeding to allow early detection and

correction of critical problems (*e.g.* high plant mortality, low seed germination, erosion, significant encroachment by *Phragmites*). Quantitative monitoring of the two wetland areas will be conducted twice annually, once at the beginning of the growing season, and once at the end. Table 5-1 outlines elements of the monitoring plan.

An annual report will be prepared and submitted to the USACE by December 30 of each monitoring year. The annual report will include as-built drawings and the status of restoration of each wetland and the uplands. The annual report will include evaluation of the success of restoration within each wetland, and include recommendations for corrective actions. The annual report will also include photographic documentation of permanent monitoring plots.

The annual report completed following the third monitoring year will include a recommendation of whether or not it is appropriate to reduce the monitoring effort for the remaining two years, and an evaluation of the need for supplemental planting and seeding based on success of revegetation. At the end of the monitoring period (three or five years) a post-restoration wetland delineation and function and values assessment will be conducted. Total wetland acreage and vegetation cover class will be evaluated to determine overall success of restoration. Results of the post-restoration evaluations will be included in the final year monitoring report.

Table 5-1
Restoration Monitoring Plan Components

Type	Frequency	Sample Methods	Corrective Actions
Qualitative Monitoring of Upper Wetland and Lower Wetland			
Vegetation	BiWeekly throughout first growing season	Evaluate one square meter quadrates in designated locations (staked in field).	Reseed or replant as necessary.
		Map encroachment of *Phragmites australis* or other invasive species. Record percent germination of seeded areas and plantings.	Evaluate need for *Phragmites* or other invasive species control.
Hydrology	During lunar high and low tides immediately following excavation/backfill, then BiWeekly throughout first growing season	Observe tide levels relative to final grade of Upper and Lower Wetlands prior to planting to confirm MTL and MHW range. locations within wetlands to be planted with smooth cordgrass. Monitor MTL and MHW range during biweekly vegetation monitoring.	Define prior to planting area within Upper Wetland that is between MTL and MHW, modify area to be planted as necessary.
Benthic Community	Baseline, 6 months following restoration of habitats	Grab sample collected from 0-10 cm depth interval with a petite ponar. Macroinvertebrates will be identified to lowest practicable taxon and enumerated.	
Qualitative Monitoring of Uplands			
Vegetation	BiWeekly throughout first growing season	Wandering transects, recording percent germination of seeded areas and plantings.	Reseed or replant as necessary.
Quantitative Monitoring of Upper Wetland and Lower Wetland			
Sediment	Biannual, spring and fall	Surface sediment ponar grab samples (upper one foot). Analyze for total organic carbon, grain size, pH, redox potential.	
Soil	Biannual, spring and fall	Soil profile of upper 18 inches including description of texture, soil matrix color, and mottling/gleying.	
Hydrology	Biannual, spring and fall	Record MHW and MTL. Measure surface water salinity.	
Vegetation	Biannual, spring and fall	Evaluate one square meter plots in designated locations (staked in field). Record total percent cover and species composition.	Reseed or replant as necessary
Benthic Community	Biannual, spring and fall	Grab sample collected from 0-10 cm depth interval with a petite ponar. Macroinvertebrates will be identified to lowest practicable taxon and enumerated.	
Wetland Delineation, Functions and Values Assessment	End of monitoring period	Conduct ACOE 1987 Delineation, and ACOE Highway Methodology Wetlands Functions and Values Assessment	
Quantitative Monitoring of Uplands			
Vegetation	Biannual, spring and fall	Evaluate percent cover of seeded area and success of planted trees.	Reseed or replant as necessary

APPENDIX A

WETLAND DELINEATION AND FUNCTIONS AND VALUES REPORT

USACE CONTRACT NO. DACW33-94-D-002
TASK ORDER NO. 017
TOTAL ENVIROMENTAL RESTORATION CONTRACT

WETLAND DELINEATION AND FUNCTIONS AND VALUES REPORT FOR EARLY ACTION SEDIMENT REMOVAL EAST BANK OF THE ACUSHNET RIVER BETWEEN NORTH MAIN STREET AND GUILOTTE STREET IN ACUSHNET, MASSACHUSETTS

NEW BEDFORD HARBOR SUPERFUND SITE
NEW BEDFORD HARBOR, MASSACHUSETTS

MAY 2000

Prepared for

U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

ND00-007

USACE CONTRACT NO. DACW33-94-D-002
TASK ORDER NO. 017
TOTAL ENVIRONMENTAL RESTORATION CONTRACT

WETLAND DELINEATION AND FUNCTIONS AND VALUES REPORT FOR EARLY ACTION SEDIMENT REMOVAL EAST BANK OF THE ACUSHNET RIVER BETWEEN NORTH MAIN STREET AND GUILOTTE STREET IN ACUSHNET, MASSACHUSETTS

NEW BEDFORD HARBOR SUPERFUND SITE
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MAY 2000

Prepared for

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New England District
Concord, Massachusetts

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1.0 INTRODUCTION

1.1 Purpose and Scope of Report

This report describes the results of a wetland delineation and functions and values assessment conducted on May 18, 2000 along a section of the east bank of the Acushnet River in Acushnet, Massachusetts (Figure 1-1). The purpose of the evaluation was to determine the extent and functions and values of wetlands within the proposed early action areas that will be remediated by the excavation of contaminated soil and/or sediment.

1.2 Site Description

Approximately 600 feet of the east bank of the Acushnet River, located in the town of Acushnet, was investigated. The area of investigation included three properties between North Main Street, to the north, and a drainage easement that extends from and parallel with Guilotte Street, to the south (Figure 1 – 2). Using the Coastline (1:25,000) datalayer from MassGIS, the upstream limit of the Massachusetts coast within the Acushnet River was determined to be approximately 900 feet upstream of North Main Street (MassGIS, www.state.ma.us/mgis/cs.htm) (Figure 1 - 2). During the field investigation tidal activity was observed in the Acushnet River along the area of investigation.

The bank of the river is subject to tidal fluctuations and in most parts had been reinforced with large rocks (photo 1.1). With the exception of an approximate 0.24-acre floodplain and a stream channel, the transition from river bank to upland parallels the river course.

Two wetland communities and a stream were delineated during the investigation. The stream is located approximately 200 feet north of the Guilotte Street drainage easement, and has well defined banks (photo 1.2). Blue flags, numbered 51 through 54, were placed by the survey team and delineate the center of the stream within the area of investigation.

A floodplain wetland (Upper Wetland) began approximately 300 feet south of North Main Street and continued for approximately 110 feet (photo 1.3). The wetland was dominated by common reed (*Phragmites australis*). Approximately 1 to 3 inches of water was standing in the wetland. Pink flags, numbered 12 through 24, were placed by the survey team to delineate the border of wetland.

The other wetland (Lower Wetland) was a cordgrass (*Spartina alternifolia*) community located within the tidal zone, between the stream and a dock, and was approximately 125 feet long (photo 1.4). The community was characterized by cordgrass growing out of a very thin layer of muck on top of rocks and boulders. The width of the wetland ranged from approximately two feet to 25 feet, with the widest point just south of the dock (approximately 0.06 acre). Pink flags, numbered 4 through 8, were placed by the survey team to delineate the landward border of wetland.

1.3 Site History

The Natural Resource Conservation Service (NRCS) Soil Survey of Bristol County Massachusetts, Southern Part, (NRCS, 1981), shows the site as a combination of developed urban land and a very poorly drained hydric soil (Figure 1 – 3). Fill material was observed in the northern end of the site. It appeared that the fill was placed much more than five years ago.

2.0 SAMPLING APPROACH

Vegetative characteristics, hydrology, and soil conditions were evaluated on-site by Kevin Prestage and Benjamin Sholl, Wetland Scientists for Foster Wheeler Environmental Corporation (Foster Wheeler). Prior to our field investigation, background information, site plans, topographic maps, NRCS soil maps, and other available information was reviewed. The small size of the site allowed for an initial walkover of the entire area to survey the vegetative communities. The Upper Wetland was a homogenous natural community and subsequently it was determined one sample plot would be recorded. The Lower Wetland was limited to a long, thin stretch of bank and it was determined one sample plot would be recorded. The approximate locations of the sampling plots are shown on Figure 1-2.

The survey for vegetated wetlands used protocols from the Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987) and New England District supplemental guidance on wetland delineation. Sample plots were located near the transition between upland and wetland. Tree, vine, sapling, shrub, and herb data were recorded within each sample plot (see Appendix B). Visual estimates of areal cover were made separately for all stratums. Soil was sampled using an auger and the soil profile was recorded. Observations of hydrology and/or evidence of hydrology were recorded. Appendix B contains the data sheets for each sample plot.

3.0 DELINEATION RESULTS

3.1 Upper Wetland

Hydrology and Topography

This wetland was located along approximately 110 feet of the bank of the Acushnet River where the riverbank was lower and less abrupt (photo 1.5). Drift lines and standing water were observed in the wetland. An overgrown reinforced rock wall (see photos 1.6 and 1.7) borders the wetland to the east and north. There is a gradual transition from the wetland to filled upland, to the west (photo 1.3).

Soils

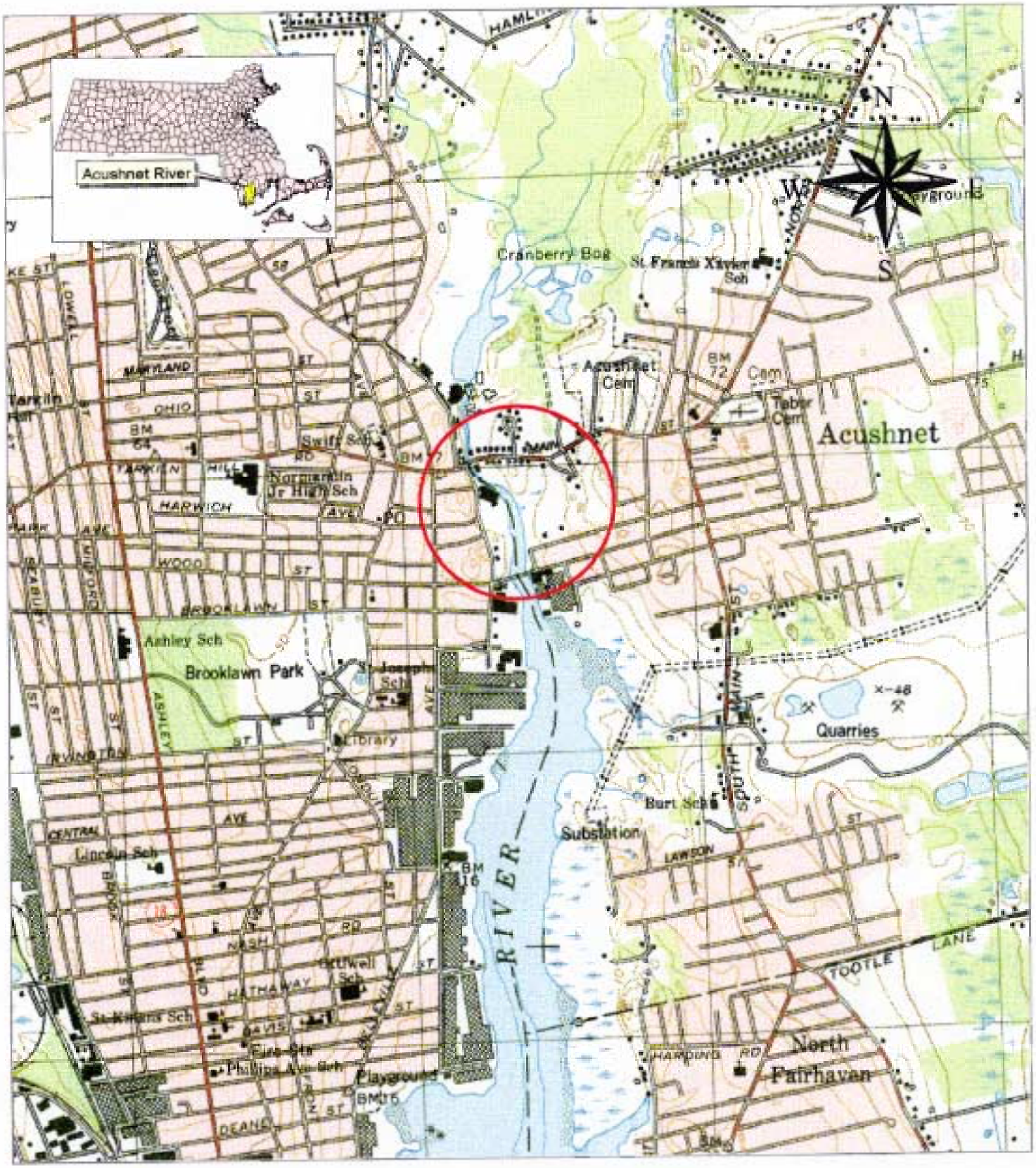
The NRCS Soil Survey of Bristol County Massachusetts, Southern Part Soil (NRCS, 1981) maps this site as Scarboro series. This is a very poorly drained series. The soil sample had an Oi horizon from 9 to 0 inches that consisted of root masses with very little muck. The Ag horizon had a matrix color of 2.5Y 4/4 and had a strong sulfur smell.

Vegetation

The wetland was a homogenous community of common reed. There were no other species observed in the wetland. Common reed is a facultative wetland (FACW) plant.

Surrounding Communities

The wetland was bordered by the Acushnet River to the south and southwest. To the east the wetland transitioned abruptly into a residential lawn with an overgrown rock wall (see photo 1.7). To the north and west the border is defined by fill material. The size of the wetland in the past may have been larger, as interpreted from the Soil Survey, but investigation of the soil revealed fill consisting of crushed rock, crushed cement, and crushed brick. This fill material was dominated by Japanese knotweed (*Polyganum cuspidatum*) (photo 1.8).

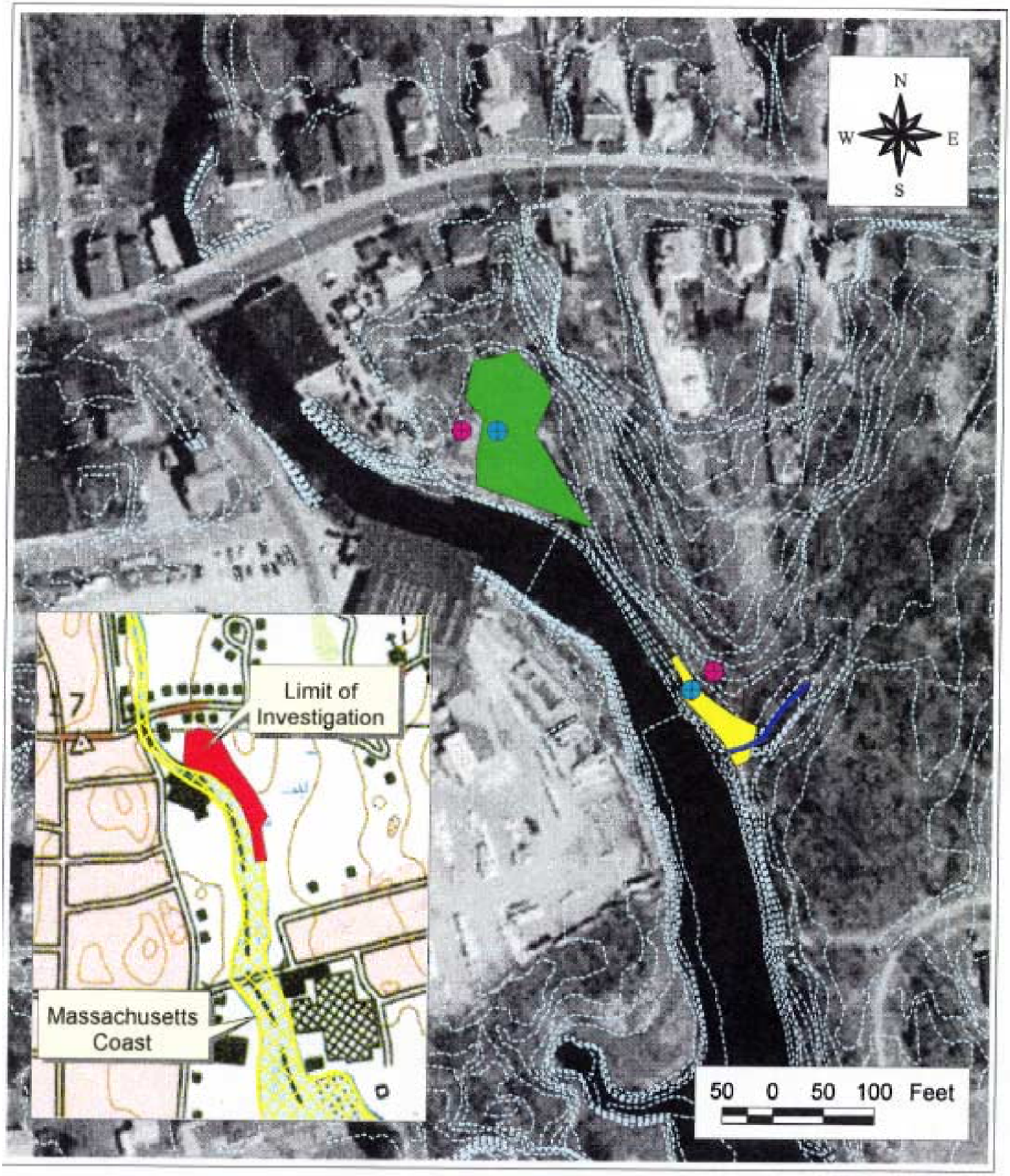


General Site Location

1000 0 1000 Feet

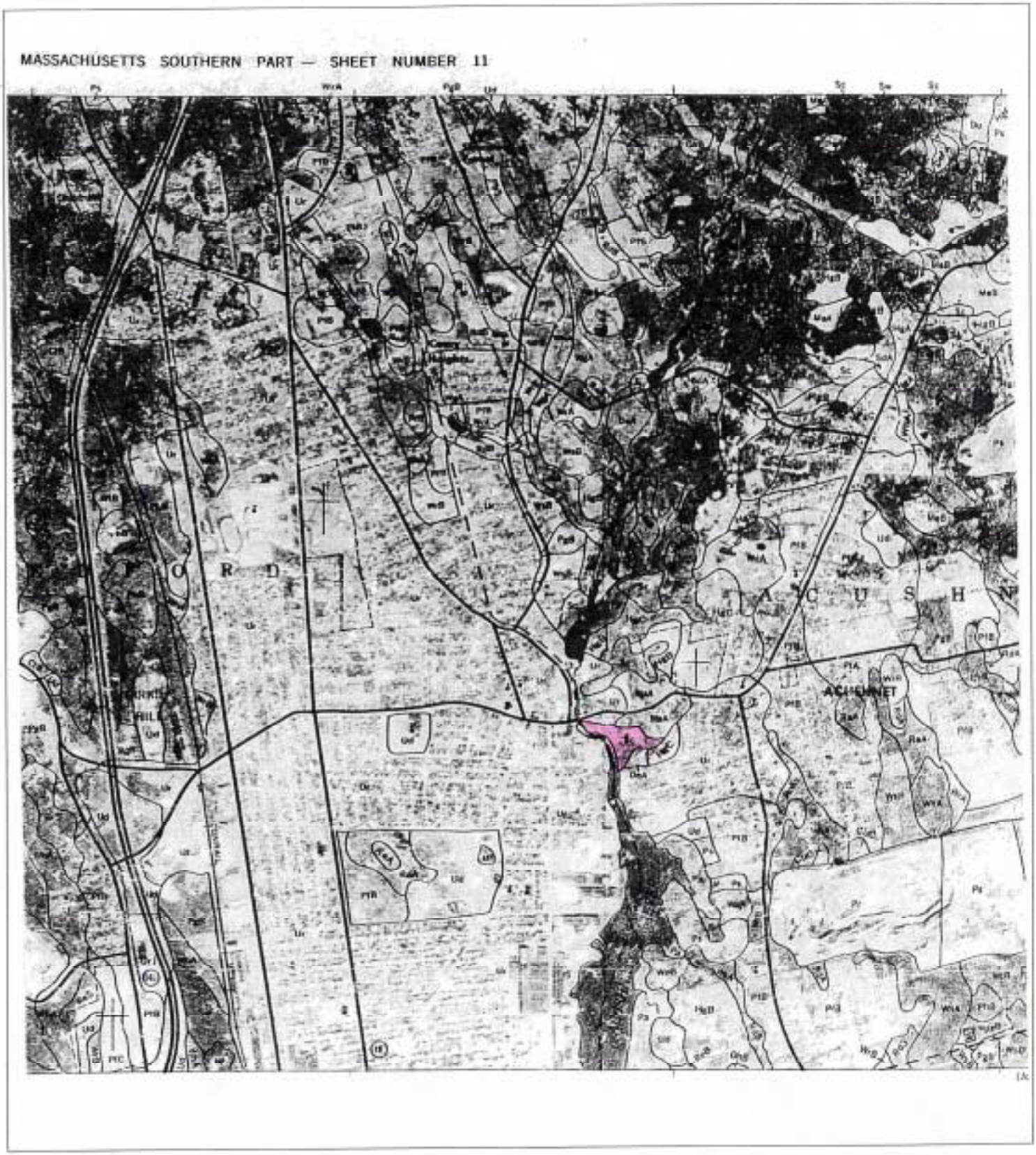
Figure 1.1
Site Vicinity Map

Sources: MassGIS. Foster Wheeler Environmental Corporation.



Sources: MassGIS. Foster Wheeler Environmental Corporation.

Figure 1.2
Delineation Results



Hydric Soils

Not to Scale

Figure 1.3
Soil Survey Map

Sources: NRCS, Soil Survey of Bristol County Mass., Southern Part.
Foster Wheeler Environmental Corporation.

3.2 Lower Wetland

Hydrology and Topography

The Lower Wetland was located within the riverbed and the riverbank for approximately 125 feet (photo 1.9). The smooth cordgrass is located below the mean high water mark and is flooded daily by tides.

Soils

Approximately 1 inch of muck was present on top of and in between rocks and boulders. In areas where the vegetation was denser, the muck had accumulated within dense root masses and vegetative debris.

Vegetation

Two species occurred within the sampling plot. Smooth cordgrass and iris (*Iris* sp.) were emerging from the riverbed and bank from the muck and rocks. Smooth cordgrass and most iris species are obligate wetland (OBL) species.

Surrounding Community

The Lower Wetland was bordered by the abrupt banks of the Acushnet River. On top of the banks was an upland community characterized by ailanthus (*Ailanthus altissima*), Virginia rose (*Rosa virginiana*), Japanese barberry (*Berberis thunbergii*), and meadow rue (*Thalictrum polygamum*).

3.3 Stream

The stream had well defined banks, ranging from approximately 6 to 18 inches high, and held flowing water approximately 2 feet wide and 1 inch deep (photo 1.2). The tidal influence appeared to flow up stream approximately 100 feet. There were no wetlands that bordered the stream within the area of tidal influence.

4.0 WETLANDS FUNCTIONS AND VALUES

4.1 Functions and Values Assessment Methodology

The wetland functional assessment was performed on May 18, 2000 using the Army Corps of Engineers Highway Methodology Workbook Supplement (USACE, 1995). The Highway Methodology is a qualitative approach to wetland evaluation which can be used following minimum field work but with a thorough understanding of the wetland and surrounding landscape. Functions and values for each wetland are based upon thirteen criteria. A data form is prepared for each wetland to record the occurrence of a particular function or value as well as rationale for determining its occurrence. This report includes a discussion of principal functions and values.

4.2 Site Overview

The surrounding landscape encompassing the site includes the developed land to the north associated with North Maine Street, and the undeveloped land to the east consisting of mixed second growth forest (Figure 1-1). The town of Acushnet is not known to experience problems with flooding except for minor events in areas with a high density of impervious surfaces (New Bedford Department of Emergency Management, 2000).

The bank of the river is subject to tidal influence and in most parts had been reinforced with large rocks. With the exception of a small floodplain wetland and a stream channel, the Acushnet River/upland interface is a well defined bank.

Two wetland communities and a stream were identified within the site (Table 4-1). The stream is located approximately 200 feet north of the Guilotte Street drainage easement, and has well defined banks. Approximately 50 feet of the stream above its confluence with the Acushnet River was included in the evaluation. There are no vegetated wetlands along the area of the stream included in the study area.

A floodplain wetland (Upper Wetland) began approximately 375 feet south of North Main and continued for approximately 100 feet. The wetland is dominated almost entirely (90-100% cover) by a monotypic stand of *Phragmites* (photos 1.1 and 1.2). Approximately 1 to 3 inches of standing water was present over most of the area within scattered micro-depressions, observed both at high and low tide.

The other wetland (Lower Wetland) is a smooth cordgrass (*Spartina alternifolia*) wetland located within the tidal zone of the Acushnet River. The wetland consisted of smooth cordgrass and *Iris* sp. growing out of a very thin layer of muck on top of rocks and boulders. The width of the wetland ranged from approximately 2 feet to 15 feet wide.

4.3 Upper Wetland

Wetland System: Tidal fringe (Estuarine)
National Wetland Inventory classification: Estuarine, Intertidal, Emergent Wetland (EIEW)

The wetland is bordered by the Acushnet River to the southwest (photo 1.1). The eastern edge of the wetland transitions abruptly into a residential lawn with scattered Norway maples and an overgrown rock wall (photo 1.2). The northern border is defined by fill material. The wetland is distinguished by very low topographic gradients and poorly drained and very poorly drained hydric soils resulting in anearobic conditions. The soil survey shows hydric soils extending further to the north, however, soils surveyed in this area contained crushed rock, crushed cement, and crushed brick. This fill material was dominated by Japanese knotweed.

The primary water source includes both overbank flow from tidal influence and riverine flow. Dominant hydrodynamics for the site include bidirectional and horizontal flow. Additional water sources may be groundwater discharge and precipitation. Frequent flooding and water tables dictated essentially by sea surface rise are reasons why the wetland rarely experiences periods of dryness for long durations. Surface ponding within the wetland is limited to micro-depressions within the flat area. Ponded water was not observed to be running off in a lateral fashion. In the upper portions of the marsh the primary direction of water movement is vertical, whereas in the lower portions, which are more susceptible to tidal influence, water fluctuates in a more horizontal fashion.

Nutrient uptake by the wetland vegetation and sediments may also play an important role in the uptake of certain pollutants. *Phragmites* has the capacity for significant nutrient retention and is recognized for it's ability to stabilize sediments.

Some wildlife habitat exists for species which use *Phragmites*, such as aquatic furbearers, terrestrial furbearers, red-winged blackbirds, etc. Two red-winged blackbirds were observed in the wetland and a killdeer was heard from somewhere within the wetland. Fish habitat is not present within the wetland and shellfish habitat is limited, although native shellfish such as snails are probably present but were not surveyed in this investigation.

The principal functions associated with the floodplain wetland include Sediment/Shoreline Stabilization and Floodflow Alteration with limited wildlife value.

Hydrological Function 1 – Sediment/Shoreline Stabilization

The Upper Wetland has the ability to dissipate energy from both tidal rise and riverine flow. Dense stands of *Phragmites* reduce energy of moving water at the land/water interface (Photo 1.1). An observable transition between the emergent marsh system and the Acushnet River is evident in the form of a sharp bank. During potentially erosive events the resilient herbaceous layer functions to stabilize sediments and approximately 50 feet of shoreline.

Hydrological Function 2 – Sediment/Toxicant Retention

The Upper Wetland has the capacity sediment/toxicant retention. The dense vegetation helps secure the substrate beneath the sediment-water interface and therefore promotes the accumulation of clayey, cohesive sediments which were observed in the wetland. Overland flow from urbanized neighboring communities reaches the marsh where larger particles are filtered out. Evidence of siltation was observed along the base of standing herbaceous material throughout the wetland.

Habitat Functions – Wildlife Habitat

The capacity of this wetland to support animal populations and guilds by providing characteristic habitats is somewhat limited. Some wildlife habitat value is present, especially for the red-winged blackbird which was observed within the *Phragmites* stands on several occasions. The *Phragmites* stand has some potential to support nesting birds, as well as providing cover for both terrestrial and aquatic furbearers which have been observed in the area on a consistent basis by the current landowner.

4.4 Lower Wetland

Wetland System: Tidal fringe/Estuarine
National Wetland Inventory classification: Estuarine, Intertidal, Unconsolidated Shore

This wetland consists of approximately 100 feet of shoreline within the tidal zone dominated by smooth cordgrass (photo 1.4). Emergent vegetation and shoreline bank vegetation are generally successful in buffering the erosive forces associated with fluctuating tides and riverine flow (photo 1.3). However, some signs of erosion were observed along the shoreline including exposed roots and bank undercutting. The principal function of the cordgrass wetland is Sediment/Shoreline Stabilization.

Hydrological Functions – Sediment/Shoreline Stabilization

The Lower Wetland has the ability to physically dissipate erosive energy caused by waves, currents, tides, or ice through the presence of persistent emergent vegetation and dense bank vegetation (photo 1.3). The impact of erosion on the adjacent upland area is greatly reduced as a result.

Habitat Functions – Fish and Shellfish Habitat

The Lower Wetland provides fish habitat during periods of inundation by daily tides. The dense cordgrass vegetation provides potential shelter or nursery habitat for a number of species potentially occurring within the upper reaches of the Acushnet River estuary.

4.5 Stream

Wetland System: Riverine
National Wetland Inventory classification: Riverine, Intermittent, Streambed (R4SB)

The stream community was surveyed roughly 40-50 feet from its confluence with the Acushnet River (photo 1.6). Water depth in May averaged 2 inches from bank to bank. The substrate was consistent throughout, consisting primarily of cobble/gravel mixture. The stream is approximately 60% shaded by second-growth mixed forest. Bank stability was considered good, consisting of tree root/brush/cobble and roughly 3-6 inches of overhang in some places. It appeared the banks are effective in supporting high flows with little erosion taking place. Instream cover was abundant for macroinvertebrate habitat, consisting of fallen woody debris, cobble, boulder, and vegetation.

There were no vegetated wetlands along the length of stream included in the study area. However, the stream was included in the functional assessment.

The principal functions associated with this stream are Production Export, Wildlife Habitat, and limited Floodflow Alteration.

Hydrologic Function – Sediment/Shoreline Stabilization

Dense riparian vegetation along the stream banks provides shoreline stabilization for this stream.

Habitat Functions – Wildlife Habitat

The stream community exhibits three distinct cover types: (1) open stream community; (2) bordering herbaceous/shrub layer; and (3) a mixed second growth forest. This structural complexity contributes a degree of diversity favoring wildlife use. More than 40% of the stream banks are bordered by upland wildlife habitat at least 500 feet in width consisting of multiple layers of vegetation.

Table 4-1
Flora and Fauna of East Bank Acushnet River Wetlands
Observed May 18, 2000

EMERGENT AND TERRESTRIAL PLANTS

SCIENTIFIC NAME	COMMON NAME
Ulmus rubra	Slippery elm
Acer platanoides	Norway maple
Ailanthus altissima	Ailanthus
Polygonum cuspidatum	Japanese knotweed
Rhus radicans	Poison ivy
Convolvulus sepium	Hedge bindweed
Berberis thunbergii	Japanese barberry
Thalictrum polygamum	Tall meadow rue
Rosa virginiana	Virginia rose
Smilax rotundifolia	Common greenbrier
Phragmites australis	Common reed
Iris sp.	Yellow iris or Blue flag
Spartina alternifolia	Smooth Cordgrass
Juncus sp.	Rush

WETLAND ANIMAL SPECIES LIST

SCIENTIFIC NAME	COMMON NAME
Agelaius phoeniceus	Red-winged blackbird
Branta canadensis	Canada geese
Cygnus olor	Mute swan
Charadrius wilsonia	Killdeer
Corvus brachyrhynchos	American crow
Chrysemys picta picta	Eastern painted turtle
Chelydra serpentina	Snapping turtle
Morone saxatilis	Striped bass (dead)

kingfisher's seen also

5.0 CONCLUSIONS

Three resource areas were identified adjacent to the Acushnet River below the mean high water mark. The Upper Wetland was identified in a small floodplain that was dominated by common reed, inundated with about 1 to 3 inches of water, and had soils that smelled like sulfur. The Upper Wetland is a disturbed area with very little species richness but exhibits positive functions and values for Sediment/Shoreline Stabilization and Sediment/Toxicant Retention.

The Lower Wetland was identified in the riverbed and riverbank of the Acushnet River below the mean high water mark. Smooth cordgrass grew out of a thin layer of muck between rocks and boulders. The Lower Wetland is effective in buffering wave action and riverine flow, and has positive functions and values for Sediment/Shoreline Stabilization and Fish and Shellfish Habitat.

A stream was identified that flowed into the Acushnet River. The stream had abrupt banks and flowing water. There were no vegetated wetlands along the border of the stream below the mean high water mark. The stream, within 50 feet upstream of its confluence with Acushnet River, traverses a mixed second growth forest with dense understory. Principal functions include Sediment/Shoreline Stabilization and Wildlife Habitat.

6.0 REFERENCES

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New Bedford Emergency Management Department. 2000. Flood and Storm Surge, Local Vulnerability. (www) http://www.ci.new-bedford.ma.us/Nav3.htm.

US Army Corps of Engineers. 1995. The Highway Methodology Workbook Supplement. USACE, New England Division.

APPENDIX A

Photographs:

Photo 1.1	**Tidal Influence (North)**
Photo 1.2	**Stream (East)**
Photo 1.3	**Upper Wetland (North)**
Photo 1.4	**Lower Wetland (East)**
Photo 1.5	**Upper Wetland (East)**
Photo 1.6	**Upper Wetland (North)**
Photo 1.7	**Upper Wetland (Northeast)**
Photo 1.8	**Upper Wetland (East)**
Photo 1.9	**Lower Wetland (North)**

Photo 1.1
The Acushnet River facing south (downstream).
Note: tidal influence is evident along the banks
(this photo was taken about midway between low and high tide).

Photo 1.2
A tributary to the Acushnet River facing east (upstream).
Note: defined banks and flowing water.

Photo 1.3
A floodplain wetland facing north.
Note: dominance of common reed.

Photo 1.4
A cordgrass wetland emerging from the riverbed facing east.
Note: transition from wetland to upland.

Photo 1.5
Floodplain wetland viewed from the Acushnet River (facing east).
Note: change in bank elevation.

Photo 1.6
The southern boundary of the floodplain wetland, facing north.
Note: abrupt transition from wetland to upland residential land.

Photo 1.7
Rock wall bordering the floodplain wetland, facing northeast.

Photo 1.8
Transition from upland to floodplain wetland, facing east.
Note: dominance of Japanese knotweed in upland.

Photo 1.9
Cordgrass wetland along the riverbed of the Acushnet River, facing north.
Note: vegetation emerges from the tidal zone of the river.

APPENDIX B

Data Sheets - Routine Wetland Determination

PROJECT TITLE: Early Action Sediment Removal TRANSECT: PLOT: 1

DELINEATOR(S): Kevin Restage, Ben Shaw DATE: 5/18/00 (shore @ dock)

VEGETATION	Stratum and Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI STATUS
"Herb"	Iris species *	60/80	25	OBL
	Spartina species	20/80	25	OBL

* this species was growing within the tidal zone

NOTE 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology. Plants recorded with asterisks should be considered as "other hydrophytes" in the tally below.

NOTE 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL	FACW	FAC	*OTHER HYDROPHYTES	FAC-	FACU	UPL
1			1			

Hydrophytes SUBTOTAL: 2 NON-hydrophytes SUBTOTAL: 0

100 x Subtotal Hydrophytes / Subtotal Hydrophytes + Subtotal Non-hydrophytes = PERCENT HYDROPHYTES = 100

HYDROLOGY

1. Hydrology is often the most difficult feature to observe.
2. Interpretation must consider the validity of the observation in light of the season, recent weather conditions, watershed alterations, etc.
3. Interpretation of hydrology may require repeated observations over more than one season.

☐ RECORDED DATA
- Stream, lake or tidal gage Identification:
- Aerial Photograph Identification:
- Other Identification:

☐ NO RECORDED DATA

☒ OBSERVATIONS:

Depth to Free Water: surface
Depth to Saturation (including capillary fringe): surface
Describe Altered Hydrology: No

Tidal Flooding

☐ Inundated ☑ Saturated in upper 12 inches ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☒ OTHER (explain): Tidal Flooding

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES Color, Abundance, Size & Contrast	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
1-0 inch	O	Muck		much on top of rocky shoreline
>0 inches	Rocky Shore			large rocks with muck and sand – not possible to dig a useful pit

HYDRIC SOIL INDICATOR(S): Muck

REFERENCE:

OPTIONAL SOIL DATA:

REFERENCES:

TAXONOMIC SUBGROUP : Not Applicable

SOIL DRAINAGE CLASS:

DEPTH TO ACTIVE WATER TABLE:

NTCHS HYDRIC SOIL CRITERION:

CONCLUSIONS

	Yes	No
Greater than 50% Hydrophytes?	☒	☐
Hydric Soils Criterion Met?	☒	☐
Wetland Hydrology Met?	☒	☐

IS THIS DATAPOINT IN A WETLAND? Yes ☒ No ☐

REMARKS:

CE-ED-CO-Forms Version 04/06 Page 2

PROJECT TITLE: Early Action Sediment Removal TRANSECT: PLOT: 1

PROJECT TITLE: Early Action Sed. Removal TRANSECT: PLOT: 2

DELINEATOR(S): Kevin Prestage, Ben Stoll DATE: 5/18/00 (dock)

VEGETATION	Stratum and Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI STATUS
"Tree"	Acer platanoides	15/40	38	Not Liste
	Pyrus americana	25/40	63	FacU
"Sapling"	none			
"Shrub"	Virgin Rose – Rosa Virginiana	30/80	38	Fac
	Green Briar – Smilax rotundifolia	20/80	25	Fac
	Berberis thunbergii	30/80	38	FacU
"Herb"	Meadow Rue – Thalictrum polygamum	20/20	100	FacW*

"NL" = not listed

NOTE 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology. Plants recorded with asterisks should be considered as "other hydrophytes" in the tally below.

NOTE 2: Species with NA or NI status are reported, but are not calculated in the tally below.

9/20 rule

OBL	FACW	FAC	*OTHER HYDROPHYTES	FAC-	FACU	UPL	
	1	2				2	1 Not Li

Hydrophytes SUBTOTAL: 3 NON-hydrophytes SUBTOTAL: 3

100 x Subtotal Hydrophytes / Subtotal Hydrophytes + Subtotal Non-hydrophytes = PERCENT HYDROPHYTES = 50%

HYDROLOGY

1. Hydrology is often the most difficult feature to observe.
2. Interpretation must consider the validity of the observation in light of the season, recent weather conditions, watershed alterations, etc.
3. Interpretation of hydrology may require repeated observations over more than one season.

☐ RECORDED DATA
- Stream, lake or tidal gage — Identification: _____
- Aerial Photograph — Identification: _____
- Other — Identification: _____

☐ NO RECORDED DATA

☒ OBSERVATIONS:

Depth to Free Water: not observed in soil pit

Depth to Saturation (including capillary fringe): not observed in soil pit

Describe Altered Hydrology:

No hydrologic indicators observed

☐ Inundated ☐ Saturated in upper 12 inches ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☐ OTHER (explain):

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES Color, Abundance, Size & Contrast	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0"-4"	A	10YR 4/3	None	loamy sand
4"-15"	B	10YR 4/4	None	sandy loam

HYDRIC SOIL INDICATOR(S): None observed

REFERENCE:

OPTIONAL SOIL DATA:

REFERENCES:

TAXONOMIC SUBGROUP: Deerfield series

SOIL DRAINAGE CLASS: moderately well drained

DEPTH TO ACTIVE WATER TABLE:

NTCHS HYDRIC SOIL CRITERION:

CONCLUSIONS

	Yes	No
Greater than 50% Hydrophytes?	☒	☐
Hydric Soils Criterion Met?	☐	☒
Wetland Hydrology Met?	☐	☒

IS THIS DATAPOINT IN A WETLAND? Yes ☐ No ☒

REMARKS:

PROJECT TITLE: Early Action Sed. Removal TRANSECT: PLOT: 2

PROJECT TITLE: Early Action Sed. Removal TRANSECT: PLOT: 3

DELINEATOR(S): Kevin Prestage, Ben Shott DATE: 5/10/00 (Outside Phragmites)

VEGETATION — Stratum and Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI STATUS
"Herb" Polygonum cuspidatum - Knotweed	60/85	71	FacU
Convolvulus sepium - hedge bindweed	15/85	18	Fac
Eleocharis acicularis	10/85	12	OBL

NOTE 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology. Plants recorded with asterisks should be considered as "other hydrophytes" in the tally below.

NOTE 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL	FACW	FAC	*OTHER HYDROPHYTES	FAC-	FACU	UPL
					1	

Hydrophytes SUBTOTAL: 0 NON-hydrophytes SUBTOTAL: 1

100 x Subtotal Hydrophytes / Subtotal Hydrophytes + Subtotal Non-hydrophytes = PERCENT HYDROPHYTES = 0%

HYDROLOGY

1. Hydrology is often the most difficult feature to observe.
2. Interpretation must consider the validity of the observation in light of the season, recent weather conditions, watershed alterations, etc.
3. Interpretation of hydrology may require repeated observations over more than one season.

☐ RECORDED DATA
- Stream, lake or tidal gage — Identification: _____
- Aerial Photograph — Identification: _____
- Other — Identification: _____

☐ NO RECORDED DATA

☐ OBSERVATIONS:

Depth to Free Water: _____
Depth to Saturation (including capillary fringe): _____
Describe Altered Hydrology: _____

☐ Inundated ☐ Saturated in upper 12 inches ☐ Water Marks ☒ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☒ OTHER (explain): storms may flood area

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES Color, Abundance, Size & Contrast	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
0"-5"	A	10YR 3/2	None	sandy loam (mixed with fill materials; crushed cement, crushed brick, spoil) are the most identifiable)
5"-12"	B	10YR 4/3	None	very sandy loam (mixed with fill materials; see the above list)

HYDRIC SOIL INDICATOR(S)

None

REFERENCE:

OPTIONAL SOIL DATA:

REFERENCES:

TAXONOMIC SUBGROUP :

SOIL DRAINAGE CLASS: Not Applicable

DEPTH TO ACTIVE WATER TABLE:

NTCHS HYDRIC SOIL CRITERION:

CONCLUSIONS

	Yes	No
Greater than 50% Hydrophytes?	☐	☒
Hydric Soils Criterion Met?	☐	☒
Wetland Hydrology Met?	☒	☐

IS THIS DATAPOINT IN A WETLAND? Yes ☐ No ☒

REMARKS:

PROJECT TITLE: Early Action Sod. Removal TRANSECT: PLOT: 3

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES Color, Abundance, Size & Contrast	USDA Texture; and nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.
9–0"	O			Root masses with very little muck
>0"	Ag	2.5y 4/4		Sandy loam (sulfur smell)

HYDRIC SOIL INDICATOR(S)

REFERENCE:

OPTIONAL SOIL DATA:

REFERENCES:

TAXONOMIC SUBGROUP: Scarboro series

SOIL DRAINAGE CLASS: very poorly drained

DEPTH TO ACTIVE WATER TABLE: surface

NTCHS HYDRIC SOIL CRITERION:

CONCLUSIONS

	Yes	No
Greater than 50% Hydrophytes?	☒	☐
Hydric Soils Criterion Met?	☒	☐
Wetland Hydrology Met?	☒	☐

IS THIS DATAPOINT IN A WETLAND? Yes ☒ No ☐

REMARKS:

PROJECT TITLE: Early Action Sed. Removal TRANSECT: PLOT: 4

PROJECT TITLE: Early Action Seed Removal TRANSECT: PLOT: 4

DELINEATOR(S): Kevin Pestage, Ben Stek DATE: 5/18/00

VEGETATION	Stratum and Species (Dominants Only)	Dominance Ratio	Percent Dominance	NWI STATUS
"Herb"	Phragmites australis	100/100	100	OBL

NOTE 1: Use asterisk * to indicate plants with observed adaptations to wetland hydrology.
Plants recorded with asterisks should be considered as "other hydrophytes" in the tally below.

NOTE 2: Species with NA or NI status are reported, but are not calculated in the tally below.

OBL	FACW	FAC	*OTHER HYDROPHYTES	FAC-	FACU	UPL
1						

Hydrophytes SUBTOTAL: 1 NON-hydrophytes SUBTOTAL: 0

100 x Subtotal Hydrophytes / Subtotal Hydrophytes + Subtotal Non-hydrophytes = PERCENT HYDROPHYTES = 100 %

HYDROLOGY
1. Hydrology is often the most difficult feature to observe.
2. Interpretation must consider the validity of the observation in light of the season, recent weather conditions, watershed alterations, etc.
3. Interpretation of hydrology may require repeated observations over more than one season.

☐ RECORDED DATA
Stream, lake or tidal gage Identification: _____
Aerial Photograph Identification: _____
Other Identification: _____

☐ NO RECORDED DATA

☐ OBSERVATIONS:

Depth to Free Water: ponded (1" deep)
Depth to Saturation (including capillary fringe): _____
Describe Altered Hydrology: _____

☒ Inundated ☐ Saturated in upper 12 inches ☐ Water Marks ☒ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☒ OTHER (explain): flooding during storm events, sulfur smell from soil

APPENDIX C

Data Sheets - Wetland Functions & Values Evaluation Forms

WETLAND FUNCTIONS & VALUES EVALUATION FORM

Wetland I.D. Upper Wetland

Total area of wetland .34 acre Human made? _____ Is wetland part of a wildlife corridor or a "habitat island"?_____

Latitude_____Longitude_____

Adjacent land use Residential/Forest Distance to nearest roadway or other development <50'

Prepared by B. Sholl Date 5/18/00

Dominant wetland systems present EIEW Contiguous undeveloped buffer zone present No

Wetland Impact:
Type_____Area_____

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Bottom

Evaluation based on:
Office X Field X

How many tributaries contribute to the wetland? 1 Wildlife and vegetation diversity/abundance (see attached list).

Corps manual delineation completed? Y X N

Function/Value	Occurrence		Rational (Reference #)*	Principal Function(s)/ Value(s)	Comments
	Y	N			
Groundwater Recharge/Discharge		.X	7		No public or private wells downstream, no signs of groundwater recharge present.
Floodflow Alteration	X		4, 5, 7, 8, 13, 18		High density vegetation, hydric soils, impervious surfaces.
Fish and Shellfish Habitat	X		4, 12, 14, 16, 17, 10		
Sediment/Toxicant Retention	X		1, 10, 16	X	*Phragmites* retains pollutants and stabilize sediment.
Nutrient Removal	X		3, 5, 8, 9, 15		Potential for sediment and nutrient removal exists.
Production Export		X	4, 5, 7		No visible signs of export, limited community structure and special diversity.
Sediment/Shoreline Stabilization	X		1, 3, 5, 6, 8, 12, 15	X	Dense vegetation borders watercourse.
Wildlife Habitat	X		8, 11, 13, 17		Provides potential nesting bird and furbearer cover.
Recreation		X	None		
Educational Scientific Value		X	None		
Uniqueness/Heritage		X	1, 5, 14, 22, 23		
Visual Quality/Aesthetics		X	2, 6		Presence of trash, debris, and signs of disturbance.
Endangered Species Habitat		X	None		
Other					

Note: * Refer to back up list of numbered considerations

WETLAND FUNCTIONS & VALUES EVALUATION FORM

Total area of wetland .017 acre Human made? _____ Is wetland part of a wildlife corridor or a "habitat island"?_____

Adjacent land use Forest Distance to nearest roadway or other development 750'

Dominant wetland systems present EIUS Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Bottom

How many tributaries contribute to the wetland? 1 Wildlife and vegetation diversity/abundance (see attached list).

Wetland I.D. Lower Wetland

Latitude _____ Longitude_____

Prepared by B. Sholl Date 5/18/00

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office X Field X

Corps manual delineation completed? Y X N

Function/Value	Occurrence		Rational (Reference #)*	Principal Function(s)/ Value(s)	Comments
	Y	N			
Groundwater Recharge/Discharge		X	7		
Floodflow Alteration	X		4, 9, 13, 16, 18		
Fish and Shellfish Habitat	X		2, 4, 8, 9, 10, 14, 16, 17	X	Instream and overhanging cover abundant.
Sediment/Toxicant Retention		X	1, 4, 10		
Nutrient Removal		X	4, 5, 7, 9		
Production Export	X		1, 4, 7		
Sediment/Shoreline Stabilization	X		3, 12, 13, 15	X	High percentage energy absorbing emergents.
Wildlife Habitat	X		5, 6, 8, 13, 17		
Recreation		X	None		
Educational Scientific Value		X	None		
Uniqueness/Heritage		X	7, 22		
Visual Quality/Aesthetics		X	11		
Endangered Species Habitat		X	None		
Other					

Note: * Refer to back up list of numbered considerations

WETLAND FUNCTIONS & VALUES EVALUATION FORM

Total area of wetland _____ Human made? ___No___ Is wetland part of a wildlife corridor or a "habitat island"?_____

Adjacent land use ___Forested/Residential___ Distance to nearest roadway or other development ___>100'___

Dominant wetland systems present ___RISB___ Contiguous undeveloped buffer zone present ___Yes___

Is the wetland a separate hydraulic system? ___No___ If not, where does the wetland lie in the drainage basin? ___Mid___

How many tributaries contribute to the wetland? ___--___ Wildlife and vegetation diversity/abundance (see attached list).

Wetland I.D. ___Stream___

Latitude _____ Longitude_____

Prepared by ___B. Sholl___ Date _5/18/00__

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ___X___ Field ___X___

Corps manual delineation completed? Y_X__N___

Function/Value	Occurrence		Rational (Reference #)*	Principal Function(s)/ Value(s)	Comments
	Y	N			
Groundwater Recharge/Discharge		X	7		No visible signs of discharge observed.
Floodflow Alteration		X	4, 9, 13		Watercourse with limited ability to retain water.
Fish and Shellfish Habitat		X	None		
Sediment/Toxicant Retention		X	1, 10		
Nutrient Removal		X	4, 5		
Production Export	X		1, 2, 4, 5, 7, 10, 13		
Sediment/Shoreline Stabilization	X		1, 2, 3, 5, 12, 13, 14, 15	X	Dense persistent vegetation along banks.
Wildlife Habitat	X		5, 6, 7, 8, 15, 17, 19, 20	X	Diversity in plant community structure.
Recreation		X	None		
Educational Scientific Value		X	None		
Uniqueness/Heritage		X	7, 22		
Visual Quality/Aesthetics	X		10, 11, 7, 5		
Endangered Species Habitat		X	None		
Other					

Note: * Refer to back up list of numbered considerations

APPENDIX B
PLANTING SPECIFICATIONS

GENERAL

1. Disturbed wetland and upland areas shall be revegetated according to the planting/seeding specifications provided for each area.
2. All disturbed areas above Mean Tide Level (1.9 feet) will be protected with biodegradable blankets prior to planting or seeding.

MATERIALS

3. All plants and trees shall be nursery and/or container grown stock.
4. Collected material shall not be used.
5. Smooth cordgrass plants shall be sound, healthy vigorous plugs or plants (pots) from a New England seed source, and obtained from a vendor specializing in cultivating coastal wetland plant species. The cultivar shall be in pint-sized plant plugs or biodegradable peat pots with 2 to 4 healthy culms (stems) per plug/pot.
6. Wetland seed mix shall be northeast/New England wetland mix, or approved equivalent.
7. Upland seed mix shall be northeast upland conservation or wildlife seed mix, or approved equivalent.
8. Tree saplings are to equal or exceed measurements specified, and will be sound, healthy, and vigorous and free from insects, plant disease, and injuries.

TIMING

9. Preferred planting period for smooth cordgrass is between April 15 and June 15.
10. Planting of smooth cordgrass plugs/pots shall be conducted during low tide.
11. Preferred planting seeding period for wetland and upland seed mixes is between March 15 and May 15. Dormant seeding prior to March 15 may be done if approved.
12. Preferred planting period for tree saplings is between March 15 and May 15

EXECUTION

13. Driving of trucks and other vehicles will be limited to the haul road and upland staging areas. All materials, tools, and plants for wetland areas will be hand carried from the haul road/staging areas.
14. Plant material is to be delivered to the site in quantities as specified herein in order that a minimum of a full day's work can be achieved. If plants are delivered to the site in numbers greater than required for a single day's planting, they shall be properly protected against the drying action of the sun and wind. Proper care shall be taken of any plants stored on the site for more than 12 hours.
15. Smooth cordgrass plugs/pots shall be planted by hand in staggered rows spaced 24 inches on center, even with the ground surface. Plugs/pots are to be planted in holes dug using a hand trowel. Pots, if used, will be scored prior to planting. Two 10-gram agriform 20-10-5 fertilizer tablets, or equivelent, shall be added to each hole. The substrate around each hole will be pressed firmly over the roots and around the stem and compacted to eliminate air pockets.
16. Seeding of wetland areas (generally above Mean High Water) will only be applied by broadcast seeding methods. Seed will be worked into the soil with light raking.
17. Seeding of upland areas may be by broadcast methods or by hydroseeding. If broadcast seeding is used, seed will be worked into the soil with light raking.
18. Trees will be planted in a dug pit with a diameter at least two feet greater than the diameter of the plant container.
19. Prior to placement of the tree, three 10-gram agriform 20-10-5 fertilizer tablets, or equivelent, will be placed in the pit. The pit shall be thoroughly watered during and after backfill. Enough topsoil will be used to bring the surface, when settled, to the required grade. A ring or dike of packed soil will be formed around each backfilled root hole to retain surface water.

APPENDIX C

RESTORATION PLAN DRAWINGS

Document not Available

These appendices can be viewed at the US EPA New England Superfund Records and Information Center,
1 Congress Street, Boston, MA 02114-2023.

For questions or an appointment call (617) 918-1440