

Contract No. DACW33-96-D-0005
Delivery Order No. 39

January 6, 2003

FINAL REPORT

Blackstone River Feasibility Study Task A Volume I



Submitted to:

**Department of the Army,
U.S. Army Corps of Engineers
North Atlantic Division,
New England District**

Prepared by:

EPSILON ASSOCIATES, INC.

Prepared for:

BATTELLE DUXBURY OPERATIONS

**BLACKSTONE RIVER FEASIBILITY STUDY
TASK A
FINAL REPORT

VOLUME I**

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VOLUME I

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BLACKSTONE RIVER FEASIBILITY STUDY

TASK A FINAL REPORT

1.0 Introduction and Purpose

The US Army Corps of Engineers, New England District (USACE/NAE) is conducting a multi-year feasibility study to identify watershed restoration opportunities in the Blackstone River Basin in Massachusetts. The goals of this study are to identify environmental restoration needs and opportunities in the basin, develop plans and cost estimates for restoration projects, assess benefits and costs of alternative restoration plans, select a recommended watershed restoration plan, and prepare appropriate NEPA documentation.

Epsilon Associates, Inc. has been subcontracted by Battelle to perform Task A as identified in the Scope of Work (SOW) for the Blackstone River Feasibility Study (USACE/NAE July 20, 1999). As defined by USACE/NAE, Task A includes a comprehensive inventory of wetlands, riparian areas, streams, and ponds to identify and assess restoration opportunities within the Blackstone River Basin. Ponds were included as part of Task A, however, the field component for ponds was completed separately and the results are provided in the Task A Addendum.

2.0 Study Area

The Task A study area includes 18 municipalities that make up the central and southern portion of the Blackstone River Basin located in Massachusetts. For the purpose of this evaluation, the Task A study area is assumed to include all or a portion of the following municipalities: Attleboro, Bellingham, Blackstone, Douglas, Franklin, Hopedale, Hopkinton, Mendon, Milford, Millville, North Attleboro, Northbridge, Oxford, Plainville, Upton, Uxbridge, Webster, and Wrentham.

The northern portion of the Blackstone River basin was excluded from Task A because the MA Department of Environmental Protection is conducting an investigation in this area to identify similar wetland restoration opportunities. As a result the following 12 municipalities have been excluded from Task A: Auburn, Boylston, Grafton, Holden, Leicester, Millbury, Paxton, Shrewsbury, Sutton, Westborough, West Boylston, and Worcester.

3.0 Site Selection Criteria

The SOW for Task A identifies five resource types that have been targeted for potential restoration opportunities in the Blackstone River Basin. The SOW has identified specific site selection criteria for each of these resources which are described below.

1. Wetlands: The identification of potential restoration opportunities will be focused on previously disturbed wetlands such as filled wetlands, wetlands with altered hydrology, and wetlands that have been invaded by invasive species such as phragmites (*Phragmites australis*), European buckthorn (*Rhamnus frangula*), Japanese knotweed (*Polygonum cuspidatum*), and purple loosestrife (*Lythrum salicaria*). In addition, the possibility of constructing new wetlands will be evaluated in highly disturbed areas (e.g., gravel pits). Only restoration sites greater than 0.5 acres will be identified and field visits will only be conducted at sites greater than 1 acre in size.
2. Riparian Buffers: Opportunities will be identified to restore wooded buffers greater than 50 feet wide along the Blackstone River, its perennial tributaries, and impoundments greater than 5 acres in size. Potential restoration sites will be defined as lengths of riparian area where a 50-foot wide buffer is lacking for a linear distance of more than 250 feet. Disturbed land in undeveloped to moderately developed areas of the watershed will be targeted for analysis (as discussed with USACE/NAE). Site visits will be conducted at all riparian areas where the potential exists to restore a vegetated buffer along an area greater than 1,000 feet in length.
3. Riparian Habitat: Opportunities will be identified to restore large (greater than 2 acres) continuous tracts of riparian habitat along the Blackstone River, its perennial tributaries, and impoundments greater than 5 acres in size (as discussed with USACE/NAE). Disturbed land in undeveloped or lightly developed areas of the watershed will be targeted for analysis. Likely restoration sites include agricultural land, junkyards, borrow pits, and unnecessary parking lots. Field visits will be conducted for all sites greater than 5 acres in size.
4. Streams: Perennial streams where the potential exists for instream habitat restoration and streambank stabilization/erosion control projects will be identified and documented. Restoration opportunities will typically include streams that have been

channelized, have eroded banks, or exhibit excessive sedimentation of the substrate. Stream restoration opportunities associated with removal of dams on tributary streams will also be documented in conjunction with Task B of the SOW.

5. Ponds: Ponds greater than 1 acre in size (as discussed with USACE/NAE) within the study area that would benefit from habitat enhancement, invasive species control, and eutrophication reduction through the use of dredging will be identified and documented.

4.0 Methodology

In identifying potential restoration sites in the Blackstone River Basin, a three phased approach has been used. The first phase involved the procurement of existing information from a variety of sources. The second phase involved analyzing this information to identify potential restoration sites as defined by the criteria outlined in Section 3.0. Aerial photography played an important role in this phase of the project. The third phase involved field visits to each site for the purpose of collecting additional information and evaluating sites as potential restoration opportunities. The activities included in these three work phases are described below.

4.1 Information Procurement

In this initial phase of the study, existing information on the Blackstone River Basin that is applicable to this project was collected and catalogued. Government agencies, academic institutions and non-profit organizations were contacted to identify information sources for the project, such as resource maps, watershed studies, aerial photography and other ongoing studies and projects. Some of the information sources used on the project include the following:

- ◆ Massachusetts Executive Office of Environmental Affairs, Blackstone Basin Team
- ◆ Blackstone River Watershed Association
- ◆ Massachusetts GIS Program
- ◆ Massachusetts Department of Environmental Protection (DEP) Bureau of Waste Site Cleanup
- ◆ Massachusetts DEP Wetlands and Waterways Program
- ◆ Massachusetts Division of Fisheries and Wildlife (MDFW) Riverways Program

- ◆ Massachusetts Natural Heritage and Endangered Species Program (MNHESP)
- ◆ Massachusetts Wetlands Restoration and Banking Program
- ◆ National Park Service (NPS) Blackstone National Heritage Corridor
- ◆ U.S. Army Corps of Engineers (USACE/NAE)
- ◆ U.S. Environmental Protection Agency (USEPA)
- ◆ U.S. Fish and Wildlife Service (USFWS)
- ◆ University of Massachusetts Earth Science Information Office
- ◆ USDA Natural Resource Conservation Service (NRCS)
- ◆ U.S. Geological Survey (USGS)

Refer to Attachment A for a primary list of reference information used in identifying potential restoration sites for this project.

In addition to the sources described, a variety of aerial photographs and maps have been obtained and analyzed. The most recent aerial photographs that were evaluated included color infrared aerial photographs (1:40,000) taken in the spring of 1992. These photographs provided stereoscope coverage of the entire Blackstone River Basin and were used in conjunction with NRCS county soil surveys, U.S. Fish & Wildlife Service National Wetland Inventory (NWI) maps, and other resource maps and reports. The use of a stereoscope provided important information on the topography and other physiographic features of the river basin. Acetate covers were overlaid on each photograph to facilitate the labeling of information directly onto the photo. The proposed labeling scheme included an abbreviation of the site type (e.g., W, wetlands; RB, riparian buffer; RH, riparian habitat; S, streams; P, ponds), and will follow a simple numbering sequence (e.g., W-1, W-2, etc.).

NRCS soil survey maps provided detailed information on the locations of disturbed and hydric (wetland) soils. The presence of hydric soils was determined by looking at the soil drainage class and/or consulting the National List of Hydric Soils. The study area encompasses portions of the Worcester South, Middlesex, Norfolk, and Bristol North county soil surveys.

National wetland inventory maps provided useful wetland information on a small scale basis. These maps assisted in the identification of wetlands and wetland types in the river basin and also assisted in providing information on wetland cover types.

4.2 Information Interpretation and Analysis

The second phase of the project involved the interpretation of the data collected in the first phase (Section 4.1). Once potential sites were identified, their locations were placed on a base map consisting of USGS topographic quadrangles. This base map presented all potential restoration sites identified, including those to be visited in the field.

The final stage of data interpretation was preparing the field packets for the site evaluation phase. Each field packet contained useful information that helped the field staff confirm wetland restoration sites. Each packet included enough information to allow the field staff to visit and evaluate sites over a 3 to 5-day time period. The field packet included: a USGS map with potential restoration sites plotted; the aerial photograph with sites identified, blank field form; a copy of a road map locating all sites to be visited; and an assortment of natural resource information on the region including fisheries information and soil surveys. The purpose of the field packet was to provide the field team with the information it needed to locate the site quickly and efficiently, review known information gathered during earlier phases, and conduct the field evaluation and site ranking.

Potential restoration sites in the Blackstone River Basin have been identified through a synthesis of existing information. Restoration opportunities were identified using a USGS quadrangle-based evaluation.

The methodology took advantage of the manner in which the aerial photography is sequenced. The flight lines of the aerial photography corresponded to the north-south axis of each USGS topographical quadrangle. There are 10 photos positioned on each topographic quadrangle. This photo layout facilitated a logical progression from quadrangle to quadrangle. The northernmost quadrangle in the study area acted as the starting point. After evaluating all aerial photographs within this quadrangle, the adjacent quadrangle to the east will be evaluated. This west-east progression continued until the eastern edge of the basin was reached, at which point the evaluation moved south to the next row of topographic maps, and continued in the same west-east direction. In this way the entire river basin was covered in an efficient and organized manner, while moving in an overall north-south direction.

4.3 Site Evaluation

Site evaluations have been conducted at each identified potential restoration site that met the selection criteria listed in Section 3.0. A field data form created for each resource restoration type was completed at each site. The completion of a field data form required the compilation of data associated with each restoration goal, general site characteristics, and site location information.

The site evaluation phase (Phase III) coincided with the information interpretation phase (Phase II) of the project. That is, as information interpretation was completed for each USGS Quadrangle study unit, the site evaluation for that unit commenced.

The site evaluation entailed visiting sites identified during the information interpretation phase and was conducted by a two-person field team. The field team was equipped with a field packet (maps, field forms, directions, etc.) prepared for the specific area to be visited in a given day. The field team also carried copies of a letter signed by the USACE/NAE describing the purpose of the project. A copy of the letter was provided to anyone who inquired about the field program.

Additional equipment used in the field included a differential global positioning system (dGPS) receiver, field manuals, and a digital camera. The GPS equipment used on this project included a Garmin GPS 12XL unit and a Differential Corrections Inc. (DCI), RDS 3000 differential GPS receiver. Differential GPS service to 10-meter accuracy was provided by DCI. Once on site, the field data forms were completed and a GPS point was recorded. The GPS information was used to produce geographic information system (GIS) maps showing each restoration site in the Blackstone River Basin.

When it was not possible for the field team to directly access a site to collect information, field data was recorded from a distance to the extent possible. The field team spent approximately 45 minutes to 1 hour at each site. Approximately 4 to 6 sites were visited per day. While conducting site evaluations of the previously identified restoration sites, other potential restoration sites meeting selection criteria not previously identified were discovered. These sites have been included in the inventory. Additional potential sites that did not meet size criteria were not evaluated in detail but were simply listed as a potential opportunity.

4.4 Site Ranking Methodology

A scoring and ranking methodology was developed using other wetland, wildlife, and water habitat assessment methodologies (see reference list in Attachment A). Rankings have been developed for four separate attributes of each identified restoration opportunity. These attributes included impairments, benefits, negative impacts, and costs. Following development, the scoring and ranking system was included in the Site Analysis section of the field form. This allowed field staff to gather site information and score and rank various characteristics of the potential restoration opportunity while at the site.

Impairment scores were recorded on the field form for a variety of impairment factors observed at each potential restoration site. Possible impairment factors varied among resource types, however, examples that were common among all resource types included percentage of adjacent area developed, erosion and sedimentation, illegal dumping, and coverage of exotic species. Each observed factor was ranked on a scale of 1 to 3 with 1 indicating a low impairment and 3 indicating a high degree of impairment. The impairment scores were then tallied and the total impairment score was used to rank impairments as low, medium or high based on the range of scores that might be recorded.

Potential benefits of the restoration project were evaluated and scores recorded on the field form for a variety of benefits that could be expected as a result of actual site restoration. Examples of potential benefit indicators included improvements to water quality, fisheries/wildlife habitat, flood control recreation, and groundwater recharge/discharge. The total number of indicators of potential benefits observed on the site were tallied and then ranked as low, medium or high based on the range of scores that might be recorded.

Indicators of potential negative impacts were evaluated and scores recorded on the field form for a variety of impacts that could be expected as a result of restoration. Examples of potential negative impact indicators included impact to fisheries or rare species habitat, loss of agricultural land, and negative impacts to commercial uses. The total number of possible negative impacts potentially resulting from restoration were ranked as low, medium or high based on the range of scores that might be recorded.

Potential indicators of cost to restore a potential restoration site were evaluated and scores recorded on the field form. Examples of

potential indicators of cost included ownership, re-grading, fill removal, and revegetation. Because the cost of a restoration project is a factor of its size, the total number of indicators of cost was weighted by a size factor. The size factors used range from 1 to 3 and were based on the anticipated range of site sizes that could be encountered. Scores were tallied and then ranked as low, medium or high based on the range of scores that might be recorded.

A final score quantifying the quality of the restoration opportunity was tallied based on the calculated ranks for potential benefits, potential negative impacts, potential costs, and size of the restoration site. The calculated ranks were scored based on a scale of 1 to 3. The scores were then added together to produce a total score for the quality of the restoration opportunity. The total score was used to rank the site as low, medium or high based on the range of possible scores that might be recorded.

5.0 Discussion and Results

Field work for Task A was initiated during October of 1999 and completed during January of 2000. Because of the late starting date, identification of potential pond restoration opportunities was postponed until June 2000. As part of the completed field work, a total of 97 restoration opportunities have been identified and visited. Of this total, 15 were riparian buffer, 40 riparian habitat, 15 stream, and 27 wetland restoration opportunities. Information collected for the 97 sites is summarized in the final site list provided in Attachment B. Locations of these sites are identified on the orthophoto base GIS maps provided in Attachment C. Photographs of each site are included in Attachment D. Other potential restoration sites that have been identified, but either did not meet the size criteria or could not be accessed, are identified on a list provided in Attachment E. These sites are located on a USGS base provided in Attachment F.

Upon completion of all field work and site ranking, it was necessary to modify the ranking system. Because the ranking methodology was originally based on potentially observed scores and not on observed scores, a disproportionate number of sites ranked as medium on a low, medium and high scale. The primary reason for this is that the actual observed scores do not exhibit the range of potential scores and are more central to that range. To correct this problem, two modifications to the scoring/ranking system have been made. First, sites were ranked using a system based on actual scores rather than potential or

hypothetical scores. Second, the scoring/ranking system was modified to provided for a better separation of sites by using a scoring scale of 1-5 rather than 1-3. The new ranking scale employed five levels of rank -- low, low+, medium, medium+, and high -- rather than a scale of low, medium and high. Details of the modified scoring/ranking system used for each resource type are provided in Attachment G. Blank field forms are provided as Attachment H. The completed field forms are included as Attachment I.

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Attleboro
Franklin
Marlboro
Milford
Uxbridge
Webster
Worcester South
Worcester North

U.S. Fish and Wildlife Service. National Wetland Inventory Maps:

Attleboro
Blackstone
Franklin
Grafton
Leicester
Milford
Oxford
Paxton
Shrewesbury
Uxbridge
Wrentham
Worcester South
Worcester North
Webster

Table A-1
Blackstone Feasibility Study
Task A - Final Site List

Site #	Town	Subbasin Name & GIS #	Name of Adjacent Resource	Size - Length in Feet (Rank)	Owner Type	Impact Type	Existing Habitat (NWI)	Fix Type	Restored Habitat (NWI)	Rare Species Habitat	Invasive Species	100-Year Flood-plain	Adjacent Land Uses	Degree of Disturbance	Benefits	Connect to Other Habitats	Difficulty of Restoration	Existing Conditions	Proposed Conditions			Final Rank of Restoration Opportunity (score)	Comments
																		Impairment Rank (score)	Benefits Rank (score)	Impacts Rank (score)	Cost Rank (score)		
RB-1	Northbridge	Mumford Purgatory / 071	Unnamed Stream	1,200 (L+)	PRIV	Field	Crops	vegetate	woody buffer	No	No	No	Agriculture, Forest	High	Water Quality, Wildlife	Both	Moderate Difficulty	L (17)	L+ (13)	M (1)	L (4)	L+ (12)	active farm stand
RB-2	Northbridge	Mumford Purgatory / 071	Mumford River	1,500 (M)	PRIV	Golf Course	Lawn	vegetate	woody buffer	No	Yes	No	Golf Course Light Residential, Forest	High	Wildlife, Water Quality, Water Quality, Wildlife	Both	Moderate Difficulty	L+ (20)	L+ (13)	M (1)	L+ (6)	L+ (12)	
RB-3	Mendon	Rock Meadow / 117	Rock Meadow Brook	1,000 (L)	PRIV	Field	Pasture	vegetate, treat runoff	woody buffer	Yes	No	No	Forest	Medium	Wildlife	Upstream	Moderate Difficulty	L (16)	M (15)	H (2)	L (3)	L (10)	stormwater treatment
RB-4	Uxbridge	Mumford Purgatory / 071	Mumford River	1,100 (L)	PRIV	Fill, Invasives	Disturbed Buffer, some vegetation	remove fill vegetate reroute stream, vegetate	woody buffer	No	Yes	Yes	Industrial	High	Wildlife, Water Quality, Flood Control, Water Quality, Wildlife	Both	More Difficult	H (33)	L+ (12)	M (1)	L+ (5)	L (10)	
RB-5	Hopedale	Mill Hopedale / 116	Mill River	1,200 (L+)	PRIV	Golf Course	Lawn	stream, vegetate	flood plain, woody buffer	No	No	Yes	Golf Course, Forest	High	Water Quality, Flood Control, Water Quality, Wildlife	Downstream	More Difficult	H (25)	H (22)	M (1)	L+ (8)	M+ (14)	
RB-6	Hopedale	Mill Hopedale / 116	Mill River	2,000 (H)	PRIV	Fill, Ditched, Invasives	Invasive Shrubs	vegetate	flood plain, woody buffer	No	Yes	Yes	Industrial, Cemetery Light Residential and Commercial	High	Water Quality, Flood Control, Water Quality, Wildlife	None	More Difficult	M (25)	M+ (18)	H (2)	H (20)	L+ (11)	May impact adjacent roadway
RB-7	Douglas	Mumford Riddle / 067	Riddle Brook	1,200 (L+)	PRIV	Runoff	Lawn	vegetate	woody buffer	No	Yes	Yes	Commercial	Medium	Water Quality, Flood Control, Water Quality, Wildlife	Both	Moderate Difficulty	L+ (21)	M (16)	M (1)	L (4)	M (13)	Horse Field
RB-8	Douglas	Centreville / 064	Centreville Brook	1,800 (H)	PRIV	Fill	Bare Soil	remove fill vegetate	flood plain, woody buffer	No	No	Yes	Gravel Pit	High	Wildlife	Both	More Difficult	H (32)	M+ (17)	M (1)	M+ (15)	M+ (14)	Highly disturbed area, lots of fill
RB-9	Blackstone	Mill Central / 120	Mill River	2,000 (H)	PRIV	Gravel Pit	Bare Soil	regrade, vegetate	woody buffer	No	No	Yes	Gravel Pit, Forest	High	Water Quality	Both	Moderate Difficulty	M+ (27)	L (9)	M (1)	H (20)	L (10)	ANP Blackstone PP
RB-10	Bellingham	Arnolds Brook / 129	Arnolds Brook	1,000 (L)	PRIV	Field, Lawns	Lawn, Crops	vegetate	woody buffer	No	Yes	Yes	Mod Res, Agriculture	High	Water Quality, Flood Control, Water Quality, Wildlife	Both	Moderate Difficulty	M+ (28)	M (16)	H (2)	L (2)	L (10)	
RB-11	Wrentham	Burnt Swamp / 143	Burnt Swamp Brook	2,000 (H)	PRIV	Tilled Crops	Bare Soil	vegetate	woody buffer	No	No	Yes	Mod Res, Forest, Wetlands Dense and Mod Res, Forest	Medium	Water Quality, Recreation, Water Quality, Recreation	Downstream	Moderate Difficulty	M+ (29)	H (22)	M (1)	M+ (15)	H (15)	Visited with the Corps
RB-12	North Attleboro	Abbott Run	Abbott Run Reservoir	1,000 (L)	PRIV	Tilled Crops	Bare Soil	vegetate	woody buffer	No	No	No	Mod Res, Forest	High	Water Quality, Recreation	Upstream	Moderate Difficulty	L+ (22)	M (16)	M (1)	L (2)	M (12)	
RB-13	Northbridge	Mumford Purgatory / 071	Blackstone River	1,000 (L)	PRIV	Field	Grassland	vegetate	woody buffer	Yes	No	No	Mod Res, Agriculture Surface Waters, Commercial	Medium	Wildlife, Wildlife, Water Quality	Downstream	Moderate Difficulty	L (18)	L (8)	H (2)	L (3)	L (10)	Agricultural Field
RB-14	Northbridge	Farnumville / 040	Blackstone River	1,000 (L)	PRIV	Fill, Runoff	Developed Pavement	remove fill, vegetate	woody buffer	No	No	No	Commercial	High	Water Quality	None	Moderate Difficulty	M (23)	M (16)	M (1)	L (3)	M (12)	Located at a USGS Gauging Station
RB-15	Uxbridge	Mumford Warren / 071	Mumford River	1,000 (L)	PRIV	Developed	Disturbed Areas	remove fill, vegetate	Woody Buffer	No	Yes	No	Commercial, Cemetery	High	Water Quality	Downstream	Moderate Difficulty	L+ (21)	L (10)	M (1)	L (3)	L (10)	
Site #	Town	Subbasin Name & GIS #	Name of Adjacent Resource	Size in acres (Rank)	Owner Type	Impact Type	Existing Habitat (NWI)	Fix Type	Restored Habitat (NWI)	Rare Species Habitat	Invasive Species	100-Year Flood-plain	Adjacent Land Uses	Degree of Disturbance	Benefits	Connect to Other Habitats	Difficulty of Restoration	Impairment Rank (score)	Benefits Rank (score)	Impacts Rank (score)	Cost Rank (score)	Final Rank of Restoration Opportunity (score)	Comments
RH-1	Upton	Blackstone Northbridge / 045	Blackstone River	20 (H)	PRIV	Gravel Pit	Bare Soil	regrade and vegetate	Woody Buffer	No	No	Yes	Mod Res, Surface Waters	Low	Water Quality, Flood Control, Water Quality, Wildlife	None	Moderate Difficulty	L+ (20)	M+ (19)	L (0)	M (10)	H (17)	
RH-2	Bellingham	Peters Brook / 129	Arnolds Brook Meadow	5 (L)	PRIV	Old Drive-In	Disturbed	remove gravel and debris,	Woody Buffer	No	No	No	Dense Res Dense Residential, Roadway	High	Water Quality, Wildlife	Both	Moderate Difficulty	M (23)	M (17)	L (0)	L (3)	M (14)	
RH-3	Northbridge	Mumford Purgatory / 071	Mumford Meadow Pond	5 (L)	PRIV	Fill	disturbed buffer	vegetate	woody buffer	No	Yes	Yes	Roadway	Medium	Flood Control, Recreation	None	Moderate Difficulty	M (21)	H (23)	M (1)	L (3)	M (4)	
RH-4	Northbridge	Mumford Purgatory / 071	Mumford Meadow Pond	7 (L)	PRIV	Fill	disturbed buffer	vegetate	woody buffer	No	No	Yes	Mod Res, Surface Waters	Medium	Wildlife, Flood Control	Both	Moderate Difficulty	L+ (18)	M+ (19)	M (1)	L (3)	M (13)	May be under development in near future

Table A-1
Blackstone Feasibility Study
Task A - Final Site List

Site #	Town	Subbasin Name & GIS #	Name of Adjacent Resource	Size in acres (Rank)	Owner Type	Impact Type	Existing Habitat (NWI)	Fix Type	Restored Habitat (NWI)	Rare Species Habitat	Invasive Species	100-Year Flood-plain	Adjacent Land Uses	Degree of Disturbance	Benefits	Connect to Other Habitats	Difficulty of Restoration	Impairment Rank (score)	Benefits Rank (score)	Impacts Rank (score)	Cost Rank (score)	Total Rank of Restored Site (score)	Comments
RH-5	Uxbridge	Mumford Purgatory / 071	Mumford River	7 (L)	PRIV	Gravel pit	disturbed buffer	vegetate	woody buffer	No	No	No	Mod Res, Forest, Agriculture	Medium	Flood Control	Both	Moderate Difficulty	M (21)	L+ (12)	L (0)	L (3)	M (13)	Area threatened with residential development (pers
RH-6	Uxbridge	Mumford Purgatory / 071	Mumford River	5 (L)	PRIV	Field	Crops	vegetate	woody buffer	No	No	No	Mod Res, Gravel Pit	High	Recreation, Wildlife	Upstream	Moderate Difficulty	L+ (17)	L (10)	M (1)	L (2)	L+ (10)	Ag Field
RH-7	Uxbridge	Cold Spring / 069	Cold Spring Brook	6 (L)	PRIV	Field	Grassland Sparsely Vegetated Upland	vegetate	woody buffer, Wetland (EM)	No	Yes	No	Upland Forest, Mod Res	Low	Wildlife, Flood Storage	Both	Moderate Difficulty	L+ (17)	M (17)	M (1)	L (2)	M (12)	residential pasture
RH-8	Uxbridge	West Lower / 103	West River	5 (L)	PRIV	Gravel Pit	Upland	regrade and vegetate	Woody Buffer	No	No	No	Mod Res, Wetlands	Medium	Wildlife, Water Quality, Wildlife	Both	Moderate Difficulty	M+ (25)	L+ (12)	L (0)	L (3)	M+ (15)	
RH-9	Mendon	Muddy Brook / 114	Muddy Brook	15 (M+)	PRIV	Active Drive-In	Developed	vegetate	Woody Buffer	Yes	No	Yes	Commercial, Forest	Medium	Wildlife	Both	Less Difficult	M+ (25)	M (16)	H (2)	H (16)	L (9)	
RH-10	Uxbridge	West Lower / 103	West River	8 (L+)	PUB	Parking Lot, Junk Yard	Developed Scrubby Veg	remove fill, vegetate	Woody Buffer	Yes	No	Yes	Commercial, Dense Res	Medium	Water Quality	None	More Difficult	M+ (26)	M+ (18)	H (2)	L+ (6)	L+ (11)	
RH-11	Uxbridge	Blackstone Northbridge / 045	Blackstone River	5 (L)	PRIV	Abandoned Lot	Gravel with Golden Rod	remove fill, vegetate	Woody Buffer	No	No	Yes	Dense Res, Forest	Low	Water Quality, Wildlife	Both	Moderate Difficulty	M+ (27)	H (21)	L (0)	L+ (4)	M+ (15)	
RH-12	Uxbridge	Blackstone Uxbridge / 103	Hecla Canal	8 (L+)	PUB	Gravel Pit, Junk Yard	Bare Soil	remove fill, revegetate	Woody Buffer, Floodplain	No	No	Yes	Lawn, wetland	Medium	Water Quality, Flood Control, Wildlife	Both	Moderate Difficulty	M (22)	M+ (18)	M (1)	M (8)	M (12)	
RH-13	Mendon	Rock Meadow Brook / 117	Meadow Brook	20 (H)	PRIV	Pasture	Field	vegetate buffer	Woody Buffer	No	No	No	Agriculture	High	Water Quality	Both	Less Difficult	L (16)	M (16)	M (1)	M (10)	M (14)	
RH-14	Hopedale	Mill Hopedale / 116	Mill River	7 (L)	PRIV	Parking Lot	Pavement	remove pavement, vegetate	Woody Buffer	No	No	No	Industrial Mod Res,	High	Water Quality, Wildlife	None	More Difficult	H (30)	H (21)	L (0)	L+ (4)	M+ (15)	
RH-15	Uxbridge	Blackstone Uxbridge / 103	Blackstone River	5 (L)	PRIV	Junk Yard	Bare Soil	remove debris, vegetate	Woody Buffer	No	Yes	No	Commercial, Roadway	High	Water Quality	Downstream	Moderate Difficulty	M+ (25)	M+ (18)	L (0)	L+ (4)	M (14)	
RH-16	Uxbridge	Blackstone Uxbridge / 103	Blackstone River	5 (L)	PRIV	Tilled Field	Bare Soil	vegetate	Woody Buffer, Floodplain	No	No	Yes	Light Res, Forest	Low	Flood Control, Wildlife	Both	Less Difficult	L (15)	M (17)	M (1)	L (2)	M (12)	
RH-17	Uxbridge	Blackstone Uxbridge / 103	Blackstone River	5 (L)	PRIV	Tilled Field	Bare Soil	vegetate	Woody Buffer, Floodplain	No	No	Yes	Agriculture	High	Flood Control, Wildlife	Both	Less Difficult	M (21)	M (15)	L (0)	L (3)	M (14)	
RH-18	Uxbridge	Ironstone / 135	Bacon Brook	15 (M+)	PRIV	Gravel Pit	Bare Soil	regrade and vegetate	Woody Buffer	No	No	No	Roadway, Forest Mod Res, Transmission Lines	Medium	Water Quality, Wildlife	Both	More Difficult	M+ (26)	M (16)	M (1)	H (16)	L+ (11)	
RH-19	Uxbridge	Blackstone Uxbridge / 103	Blackstone River	8 (L+)	PRIV	Motor Bike Track	Bare Soil	regrade and vegetate	Woody Buffer	Yes	No	No	Forest	High	Water Quality	Downstream	Moderate Difficulty	M+ (27)	M (16)	H (2)	L+ (4)	L+ (10)	
RH-20	Wrentham	Miscoe Lake / 144	Miscoe Brook	5 (L)	PRIV	Sedimentation	Bare Soil	fence and vegetate	Woody Buffer	No	No	No	Mod Res, Forest	Medium	Water Quality, Wildlife	Both	Moderate Difficulty	L+ (18)	M+ (20)	M (1)	L (2)	M (13)	
RH-21	Uxbridge	Blackstone Uxbridge / 103	Blackstone River	15 (M+)	PRIV	Active Gravel Pit	Bare Soil	regrade and vegetate	Woody Buffer, Floodplain	No	No	Yes	Commercial, Forest	Low	Flood Control, Wildlife	Both	More Difficult	L+ (20)	M (15)	M (1)	H (16)	L+ (10)	
RH-22	Uxbridge	Emerson Emerson / 097	Emerson Brook	10 (L+)	PRIV	Gravel Pit	Bare Soil	regrade and vegetate	Woody Buffer	No	No	No	Mod Res, Forest Commercial, Industrial, Forest	Low	Water Quality, Wildlife	Both	Moderate Difficulty	M (23)	L+ (12)	M (1)	L+ (6)	L+ (11)	
RH-23	Uxbridge	Ironstone / 135	Bacon Brook	10 (L+)	PRIV	Gravel Pit	Bare Soil	regrade and vegetate	Woody Buffer	No	No	No	Forest	Medium	Water Quality, Wildlife	Both	Moderate Difficulty	M (21)	M (16)	M (1)	M (8)	L+ (11)	
RH-24	Uxbridge	Ironstone / 135	Ironstone Reservoir	130 (H)	PRIV	Active Gravel Pit	Bare Soil	regrade and vegetate	Woody Buffer	Yes	No	No	Abandoned Industrial, Roadway, Agriculture, Commercial	Medium	Water Quality, Wildlife	Upstream	More Difficult	M+ (27)	M+ (18)	H (2)	H (15)	L+ (11)	
RH-25	Douglas	Mumford Riddle / 067	Mumford River	5 (L)	PRIV	Field	Grassland	vegetate	woody buffer	No	Yes	No	Commercial Mod Res, Residential, Open Water	High	Flood Control	None	Moderate Difficulty	L (16)	L+ (12)	M (1)	L (2)	L+ (11)	High potential for future residential development
RH-26	Douglas	Mumford Dunleavy / 068	Mumford River	10 (L+)	PRIV	Field	Grassland	vegetate	woody buffer	No	No	Yes	Commercial Mod Res, Residential, Open Water	Low	Flood Control, Wildlife	Both	Moderate Difficulty	L (14)	L+ (14)	L (0)	L+ (4)	M (13)	High potential for future residential development

**Table A-1
Blackstone Feasibility Study
Task A - Final Site List**

Site #	Town	Subbasin Name & GIS #	Name of Adjacent Resource	Size in acres (Rank)	Owner Type	Impact Type	Existing Habitat (NWI)	Fix Type	Restored Habitat (NWI)	Rare Species Habitat	Invasive Species	100-Year Flood-plain	Adjacent Land Uses	Degree of Disturbance	Benefits	Connect to Other Habitats	Difficulty of Restoration	Impairment Rank (score)	Benefits Rank (score)	Impacts Rank (score)	Cost Rank (score)	Final Rank of Restoration Opportunity (score)	Comments
RH-27	North Attleboro	Abbott	Abbott Run	12 (M)	PRIV	Dairy Farm	Bare Soil	vegetate	Woody Buffer	No	Yes	No	Mod Res, Agriculture, Roadway Roads.	High	Water Quality	Upstream	Less Difficult	M (21)	M (15)	M (1)	L+ (4)	M (13)	
RH-28	Douglas	Mumford Dunleavy / 068	Mumford River	11.5 (M)	PRIV	Gravel pit	Gravel Pit	regrade, vegetate	Wetland (SS)	No	No	No	Forested and Shrub Roadway, Light Res., Open Water	Low	Wildlife	Both	More Difficult	M (22)	L (11)	M (1)	M (9)	L+ (10)	Access to site was difficult Some stone structures in stream downstream of site, possibly an old
RH-29	Douglas	Tinkerville/ 140	Tinkerville Brook	10 (L+)	PRIV	Field	Grassland	vegetate remove fill and waste, vegetate	woody buffer	Yes	No	Yes	Dense Res, Commercial	Low	Wildlife, Flood Control	Both	Moderate Difficulty	L+ (20)	M (16)	H (2)	L+ (4)	L+ (10)	
RH-30	Millville	Blackstone Uxbridge / 103	Blackstone River	10 (L+)	PRIV	Abandoned Lot	Developed and Disturbed	remove fill and waste, vegetate	Woody Buffer	No	Yes	No	Dense Res, Commercial	High	Water Quality, Wildlife	None	Moderate Difficulty	H (31)	L (9)	M (1)	M (8)	L (9)	
RH-31	Blackstone	Blackstone Aldrich / 133	Blackstone River	6 (L)	PUB	Abandoned Lot	Developed and Disturbed	remove fill and waste, vegetate	Woody Buffer	No	No	Yes	Dense Res, Lawn	High	Water Quality, Wildlife	None	Moderate Difficulty	M+ (25)	M (15)	M (1)	L (2)	M (12)	
RH-32	Blackstone	Mill Harris Pond / 126	Harris Pond	10 (L+)	PRIV	Abandoned Lot	Developed and Disturbed	regrade, vegetate	Woody Buffer	No	No	Yes	Mod Res, Industrial Light Res, Agriculture, Forest	High	Water Quality, Wildlife	None	Moderate Difficulty	M+ (27)	L+ (14)	L (0)	L+ (6)	M (13)	
RH-33	Bellingham	Peters Brook / 129	Peters Brook	10 (L+)	PRIV	Tilled Field	Bare Soil	vegetate	Woody Buffer	Yes	No	No	Light Res, Wetland	Medium	Water Quality, Wildlife	Both	Less Difficult	M (22)	L+ (13)	H (2)	L+ (4)	L (9)	
RH-34	Bellingham	Peters Brook / 129	Jenks Reservoir	5 (L)	PRIV	Pasture	Field	vegetate	Woody Buffer	No	No	No	Light Res, Wetland	Medium	Wildlife	None	Less Difficult	L+ (18)	L+ (14)	M (1)	L (1)	L+ (11)	
RH-35	Bellingham	Peters Brook / 129	Jenks Reservoir	10 (L+)	PRIV	Tilled Field	Bare Soil	vegetate	Woody Buffer	No	No	No	Light Res, Surface Waters mod Res, Abandoned Field	Medium	Water Quality, Wildlife	None	Less Difficult	M (21)	L (10)	M (1)	L+ (4)	L+ (10)	
RH-36	North Attleboro	Abbott	Abbott Run	20 (H)	PRIV	Gravel Pit	Bare Soil	vegetate	Woody Buffer	No	No	No	Dense Residential, Roadway Surface Waters, Upland Forest	Low	Wildlife, Water Quality	Both	Moderate Difficulty	M (22)	H (23)	M (1)	H (15)	M (14)	
RH-37	Northbridge	Blackstone Northbridge / 045	Blackstone River	5 (L)	PRIV	Fill	Developed Mixed, Upland and Wetland (SS)	remove fill hydrology	Wetland (SS)	No	No	No	Commercial, Surface Waters Dense Residential, Roadway	Low	Water Quality	Both	Moderate Difficulty	M (21)	H (21)	M (1)	L+ (4)	M (13)	Directed to site by MA EOEPA Personnel
RH-38	Northbridge	Blackstone Northbridge / 045	Blackstone River	7 (L)	PRIV	Fill	Developed	remove fill, vegetate	woody buffer	No	No	No	Commercial, Surface Waters Dense Residential, Roadway	Low	Water Quality	Both	Moderate Difficulty	M (21)	H (21)	M (1)	L+ (4)	M (13)	Purple Loostripe Riverdale Mill Shipping Area
RH-39	Northbridge	Blackstone Northbridge / 045	Blackstone River	5 (L)	PRIV	Fill, Runoff	Developed	remove fill, vegetate	woody buffer	No	No	No	Commercial, Surface Waters Dense Residential, Roadway	Low	Water Quality	Both	Moderate Difficulty	M (21)	H (21)	M (1)	L+ (4)	M (13)	Purple Loostripe Riverdale Mill Shipping Area
RH-40	Douglas	Mumford Dunleavy / 068	Mumford River	16 (M+)	PRIV	Runoff	Developed	treat runoff, vegetate	woody buffer	No	No	Yes	Commercial, Surface Waters Dense Residential, Roadway	High	Water Quality, Flood Control	Both	Less Difficult	M (24)	M+ (20)	M (1)	M+ (12)	M (13)	Large outfall just upstream
Site #	Town	Subbasin Name & GIS #	Name of Adjacent Resource	Size in acres (Rank)	Owner Type	Impact Type	Existing Habitat (NWI)	Fix Type	Restored Habitat (NWI)	Rare Species Habitat	Invasive Species	100-Year Flood-plain	Adjacent Land Uses	Degree of Disturbance	Benefits	Connect to Other Habitats	Difficulty of Restoration	Impairment Rank (score)	Benefits Rank (score)	Impacts Rank (score)	Cost Rank (score)	Final Rank of Restoration Opportunity (score)	Comments
S-1	Upton	Center Brook / 086	Center Brook	50 (L)	PRIV	Ditched	Stream	bank stabilization, in-stream cover	Stream	Yes	Yes	Yes	Dense Residential, Commercial	High	Fisheries	Both	Moderate Difficulty	H (22)	M+ (9)	H (2)	L (4)	L (10)	NHESP Rare Mussel Site
S-2	Mendon	Muddy Brook / 114	Muddy Brook	500 (H)	PUB	Stormwater	Stream	treat runoff	Stream	Yes	Yes	Yes	Commercial, Forest, Road Lawn, Wetlands, Forest	Medium	Fisheries, Water Quality	Both	More Difficult	M (18)	M+ (9)	M (1)	M (15)	M (15)	Brook Lamprey
S-3	Uxbridge	Blackstone Northbridge / 045	Blackstone Canal	1200 (H)	PUB	Invasives, erosion	Canal	vegetate, in-stream cover daylight stream, reroute	Canal	No	Yes	Yes	Commercial, Forest	Medium	Fisheries, Water Quality	Both	Less Difficult	L+ (15)	H (11)	M (1)	M (15)	M+ (16)	State Park
S-4	Mendon	Muddy Brook / 114	Willow Brook	200 (L+)	PRIV	Covered Stream, Ditched	Stream	vegetate, in-stream cover daylight stream, reroute	Stream	No	No	Yes	Commercial	High	Water Quality	Upstream	More Difficult	M (17)	M+ (10)	M (1)	L+ (8)	M (13)	
S-5	Mendon	Mill Central / 120	Unnamed stream	150 (L+)	PRIV	Ditched	Stream	reroute	Stream	Yes	No	Yes	Light Res, Mixed Forest	Low	Water Quality	Downstream	More Difficult	L+ (14)	M+ (10)	M (1)	L+ (10)	M (13)	
	Uxbridge	Ironstone / 135	Bacon Brook	100 (L)	PRIV	Streambank Erosion	Stream	stabilize bank	Stream	Yes	Yes	Yes	Agriculture, Commercial	High	Water Quality	Downstream	Less Difficult	M+ (19)	M (6)	M (1)	L (2)	L+ (12)	Horse Pasture

**Table A-1
Blackstone Feasibility Study
Task A - Final Site List**

Site #	Town	Subbasin Name & GIS #	Name of Adjacent Resource	Size - length in feet (Rank)	Owner Type	Impact Type	Existing Habitat (NWI)	Fix Type	Restored Habitat (NWI)	Rare Species Habitat	Invasive Species	100-Year Flood-plain	Adjacent Land Uses	Degree of Disturbance	Benefits	Connect to Other Habitats	Difficulty of Restoration	Impairment Rank (score)	Benefits Rank (score)	Impacts Rank (score)	Cost Rank (score)	Final Rank of Restoration Opportunity (score)	Comments
S-7	Northbridge	Blackstone Northbridge / 045	Unnamed stream	300 (M)	PRIV	Runoff	Mix stream bed and wooded buffer	treat runoff, vegetate	Stream	No	No	No	Commercial, Dense Res.	High	Water Quality	None	Moderate Difficulty	M+ (19)	L (3)	M (1)	L+ (6)	L+ (11)	May be intermittent stream
S-8	Upton	Miscoe Warren / 080	Miscoe Brook	400 (M+)	Multi	Obstruction Invasives	Stream	treat obstruction, treat invasives	Stream	No	Yes	Yes	Roadway, Dense Res	High	Fisheries, Water Quality	Upstream	Moderate Difficulty	M+ (20)	M (7)	M (1)	M+ (20)	L+ (12)	Located in ACEC, Purple Loostrike
S-9	Hopedale	Mill Hopedale / 116	Mill River	1000 (H)	PRIV	Ditched, Instream Cover, Outfalls	Stream	provide cover, treat outfalls	Stream	No	No	Yes	Industrial, Roadway	High	Fisheries, Water Quality	None	More Difficult	H (24)	H (11)	M (1)	H (25)	M (14)	
S-10	Uxbridge	Mumford Purgatory / 071	Mumford River	400 (M+)	PRIV	Channelized, Eroding Banks	Stream	reroute, stabilize	Stream	No	No	Yes	Industrial, Roadway	High	Fisheries	Downstream	More Difficult	M (18)	M (8)	L (0)	M+ (20)	M (14)	
S-11	Uxbridge	Emerson / 097	Emerson Brook	400 (M+)	PUB	Channelized, No vegetation	Stream	reroute, vegetate	Stream	No	No	Yes	Roadway, Forest	High	Fisheries	Both	Moderate Difficulty	M (18)	H (11)	L (0)	L+ (8)	H (18)	former Wild Trout Stream
S-12	Uxbridge	Ironstone / 135	Ironstone Brook	400 (M+)	PRIV	Road Runoff	Stream	treat runoff	Stream	No	No	Yes	Roadway, Forest, Mod Res, Roadway, Forest	Low	Fisheries, Water Quality, Fisheries	Both	Less Difficult	L (10)	M+ (9)	L (0)	L+ (8)	M+ (17)	Wild Trout Population is threatened
S-13	Blackstone	Mill 126	Mill River	200 (L+)	PUB	Erosion	Stream	stabilize banks	Stream	Yes	No	Yes	Roadway, Forest	Low	Water Quality, Fisheries	Both	Less Difficult	L+ (15)	M (8)	M (1)	L+ (8)	L+ (12)	Conservation Land
S-14	Blackstone	Mill Central / 120	Mill River	150 (L+)	PRIV	Erosion	Stream	stabilize banks	Stream	No	No	Yes	Roadway, Industrial	Medium	Water Quality, Fisheries	Both	Less Difficult	L+ (14)	M (8)	L (0)	L+ (8)	M (14)	ANP Blackstone
S-15	Bellingham	Peters Brook / 129	Peters Brook	500 (H)	PRIV	Lawn	Lawn	vegetate	Woody Buffer	No	Yes	No	Dense Res	High	Wildlife	Downstream	Less Difficult	M+ (21)	M+ (9)	M (1)	M+ (20)	M (14)	
Site #	Town	Subbasin Name & GIS #	Name of Adjacent Resource	Size in acres (Rank)	Owner Type	Impact Type	Existing Habitat (NWI)	Fix Type	Restored Habitat (NWI)	Rare Species Habitat	Invasive Species	100-Year Flood-plain	Adjacent Land Uses	Degree of Disturbance	Benefits	Connect to Other Habitats	Difficulty of Restoration	Impairment Rank (score)	Benefits Rank (score)	Impacts Rank (score)	Cost Rank (score)	Final Rank of Restoration Opportunity (score)	Comments
W-1	Upton	Fiske Mill / 107	Mill River	1 (L)	PRIV	Ditching	Wetland (PFO)	fill channels	Wetland (PFO)	No	No	Yes	Mod Res, Forest, Wetland	Low	Flood Control	Both	Less Difficult	L (15)	L+ (13)	L (0)	L (2)	M (13)	
W-2	Upton	Fiske Mill / 107	Mill River	5 (M)	PRIV	Ditching, Filling	Wetland (SS)	remove fill, fill ditches	Wetland (PFO)	No	Yes	Yes	Forest	Low	Flood Control	Both	Moderate Difficulty	L+ (18)	M (14)	L (0)	M (12)	M+ (14)	
W-3	Upton	Miscoe Warren / 080	Warren Brook	2 (L)	PRIV	Fill	Cleared Upland	remove fill	Wetland (PFO)	Yes	No	No	Mod Res, Powerlines	High	Wildlife, Flood Control	Downstream	More Difficult	L+ (19)	L+ (13)	M (1)	L (4)	L+ (11)	
W-4	Upton	Miscoe Warren / 080	West River	1 (L)	PRIV	Fill, Ditching	Wetland (EM)	remove fill, regrading	Wetland (EM)	No	Yes	No	Dense Res, Commercial	High	Flood Control, Wildlife	None	Moderate Difficulty	L+ (20)	12 (L+)	M (1)	L (3)	L+ (11)	
W-5	Upton	Center Brook / 086	Center Brook	1 (L)	PUB	Fill	Upland	remove fill, regrade	Wetland (SS)	No	Yes	No	Commercial, Wetland	Medium	Flood Control, Water Quality	Both	Moderate Difficulty	L+ (20)	15 (M)	M (1)	L (4)	M (12)	
W-6	Upton	Miscoe Warren / 080	West River	5 (M)	PUB	Fill	Upland	remove fill, regrade	Wetland (SS)	No	Yes	Yes	Industrial, Commercial	High	Flood Control, Water Quality	Downstream	More Difficult	M (21)	L (10)	M (1)	M (9)	L+ (10)	
W-7	Northbridge	Blackstone Farnumville / 042	Unnamed stream	3 (L+)	PRIV	Field	Grassland, Crops	vegetate	woody buffer	No	Yes	No	Agriculture, Upland Forest	High	Wildlife	Downstream	Moderate Difficulty	L (14)	L+ (11)	M (1)	L (4)	M (12)	
W-8	Northbridge	Mumford Purgatory / 071	Carpenter Reservoir Stream	3 (L+)	PRIV	Fill	Wetland (EM)	remove fill	Wetland (EM)	Yes	Yes	No	Mod Res, Abandoned quarry, Upland Forest	High	Wildlife	Downstream	Moderate Difficulty	M (21)	M (15)	H (3)	L+ (8)	L+ (10)	
W-9	Northbridge	Mumford Purgatory / 071	Linwood Pond	1.5 (L)	PRIV	Gravel pit	Wetland (EM), Wetland (SS)	regrade, vegetate	Wetland (EM)	Yes	Yes	No	Forest	Low	Wildlife	Both	Moderate Difficulty	M (21)	M (14)	M (1)	L (4)	M (12)	
W-10	Northbridge	Mumford Purgatory / 071	Mumford River	2 (L)	PRIV	Gravel pit	Upland	remove fill, vegetate	woody buffer	No	Yes	Yes	Gravel Pit, Upland Forest	Low	Flood Control	Both	Moderate Difficulty	M (23)	M+ (19)	L (0)	L (4)	M+ (15)	Area threatened with residential development (pers
W-11	Uxbridge	Cold Spring / 069	Cold Spring Brook	4 (L+)	PRIV	Field	Crops	vegetate	woody buffer	No	No	No	Mod Red, surface waters	Medium	Water Quality	None	Moderate Difficulty	L+ (17)	L (9)	M (1)	L (4)	L+ (11)	

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Site #	Town	Subbasin Name & GIS #	Name of Adjacent Resource	Size in acres (Rank)	Owner Type	Impact Type	Existing Habitat (NWI)	Fix Type	Restored Habitat (NWI)	Rare Species Habitat	Invasive Species	100-Year Flood-plain	Adjacent Land Uses	Degree of Disturbance	Benefits	Connect to Other Habitats	Difficulty of Restoration	Impairment Rank (score)	Benefits Rank (score)	Impacts Rank (score)	Cost Rank (score)	Final Rank of Restoration Opportunity (score)	Comments
W-12	Uxbridge	Cold Spring / 069	Cold Spring Brook	1 (L)	PUB	Fill, Runoff	Wetland (EM)	flood	Wetland (EM)	No	Yes	No	Roadway, Upland Forest	Medium	Wildlife, Water Quality,	None	Less Difficult	L+ (19)	L+ (12)	L (0)	L (2)	M (13)	Phrag and Loostribe
W-13	Uxbridge	Lower West / 103	West River	2 (L)	PRIV	Gravel Pit	Bare Soil	remove fill and waste fill channels, vegetate buffer	Wetland (EM)	No	No	No	Forested Wetland, Light Res., Agriculture, Forest	Low	Recreation, Water Quality, Flood Control	Both	Less Difficult	M (22)	L+ (13)	L (0)	L (4)	M (13)	
W-14	Mendon	Nipmuck Pond Brook / 094	Nipmuck Pond Brook	10 (M+)	PRIV	Ditching	Wetland (EM)	fill channels, buffer	Wetland (EM)	No	No	No	Mod Res, Roadway, Forest	Medium	Water Quality, Flood Control	Both	Less Difficult	L (16)	M (14)	M (1)	M (12)	M (13)	
W-15	Upton	East Upton / 108	Taft Pond Brook	5 (M)	PRIV	Ditching, Stormwater	Wetland (EM)	fill channels, treat runoff	Wetland (EM)	No	Yes	No	Mod Res, Roadway, Forest	Low	Water Quality, Flood Control	Downstream	More Difficult	M (21)	L+ (13)	L (0)	M (9)	M (13)	
W-16	Uxbridge	Emerson Brook / 097	Emerson Brook	1 (L)	PUB	Fill	Disturbed Upland	remove fill	Wetland (PFO)	No	No	Yes	Roadway, Forest	Medium	Water Quality, Flood Control	Downstream	More Difficult	M (23)	M+ (17)	L (0)	L+ (5)	M+ (14)	
W-17	Oxford	Mumford Headwtrs / 049	Mumford River	2 (L)	PRIV	Fill	Lawn	remove fill	Wetland (SS)	No	Yes	No	Recreation Fields	High	Water Quality	Both	More Difficult	M (21)	M (16)	H (2)	L (3)	L+ (10)	Road and Gun Club Ownership
W-18	Bellingham	Peters Brook / 129	Peters Brook	2 (L)	PRIV	Fill, Runoff	Developed Upland	remove fill, treat runoff	Wetland (EM)	No	No	No	Commercial, Industrial, Res	High	Water Quality, Wildlife, Water Quality, Flood Control	Downstream	More Difficult	M+ (26)	L+ (11)	M (1)	L (3)	L+ (11)	
W-19	Bellingham	Peters Brook / 129	Peters Brook	3 (L+)	PRIV	Fill, Runoff	Developed	remove fill, vegetate	Wetland (PFO)	No	No	Yes	Commercial Roadways, Commercial, Mod. Res.	High	Water Quality	Downstream	Moderate Difficulty	H (31)	L+ (13)	H (2)	L+ (8)	L (9)	Old Road through wetland, Phragmites and Loostribe
W-20	Northbridge	Mumford Warren / 071	Steamburg Brook Unnamed tributary of Burnt Swamp Brook	1.5 (L)	PRIV	Fill	Wetland (EM)	remove fill, treat runoff	Wetland (EM)	No	Yes	No	Mod Res, Forest, Forested Wetland	High	Water Quality	Upstream	Less Difficult	L+ (19)	M (16)	L (0)	L (2)	M+ (14)	
W-21	Wrentham	Burnt Swamp Upper	Burnt Swamp Brook	12 (H)	PRIV	Invasives	Wetland (EM)	flood	Wetland (EM)	No	Yes	No	Mod Res, Forest, Forested Wetland	Medium	Wildlife, Flood Control	Both	Less Difficult	L (16)	M+ (17)	L (0)	M+ (15)	H (16)	
W-22	Bellingham	Bungay / 128	Bungay Creek	1 (L)	PUB	Fill	Lawn	remove fill, vegetate	Wetland (SS)	No	Yes	Yes	Mod Res, Roadway	Medium	Flood Control	Downstream	Moderate Difficulty	L+ (20)	H (21)	L (0)	L (2)	H (16)	
W-23	Mendon	Mill / Central	Mill River	10 (M+)	PRIV	Sediment, Road Runoff, Fill, Channelized, Invasives	Wetland (EM)	treat runoff, remove fill, increase flood storage	Wetland (EM)	Yes	Yes	Yes	Mod Res, Roadway	Medium	Water Quality	Both	Moderate Difficulty	M (21)	M (16)	M (1)	L+ (8)	M+ (14)	
W-24	Upton	Center Brook / 086	Center Brook	5 (M)	PRIV	Fill, Channelized, Invasives	Wetland (SS)	remove fill, grade and vegetate	Wetland (SS)	Yes	Yes	Yes	Mod Res, Forest	Low	Flood Control, Wildlife, Water Quality, Flood Control	Both	Moderate Difficulty	L (16)	M+ (18)	M (1)	M (9)	M (13)	
W-25	Upton	West Mid	West River	12 (H)	PRIV	Fill, Sediment	Wetland (SS)	remove fill, grade and vegetate	Wetland (SS)	Yes	No	Yes	Mod Res, Forest, Residential, Open Water	Low	Water Quality, Flood Control	Both	Moderate Difficulty	L+ (19)	M+ (18)	H (2)	H (20)	L+ (11)	High potential for future residential development
W-26	Douglas	Centreville / 064	Centreville Brook	4 (L+)	PRIV	Field	Grassland	vegetate	woody buffer	No	No	Yes	Mod Res, Residential, Open Water	Low	Flood Control, Water Quality	Both	Moderate Difficulty	L (16)	L (10)	L (0)	L (4)	M (13)	
W-27	Plainville	Abbott	Unnamed Stream	2 (L)	PRIV	Pasture	Field	vegetate	Woody Buffer	No	No	No	Mod Res, Forest	Medium	Water Quality	Downstream	Less Difficult	L (14)	L+ (11)	M (1)	L (2)	L+ (11)	

Table A-2
Blackstone Feasibility Study
Task A - Secondary Site List

Site #	Town	Resource Type	Comments
BE-1	Bellingham	Riparian Habitat	Golf Course - no access
BE-2	Bellingham	Riparian Habitat	Lumber Yard - no access
BE-3	Bellingham	Riparian Habitat	Church Parking Lot
BL-1	Blackstone	Riparian Habitat	Gravel Pit - no access
BL-2	Blackstone	Riparian Habitat	Gravel Pit - no access
DG-1	Douglas	Wetland	Sand and Gravel Pit - no access
DG-2	Douglas	Riparian Habitat	Athletic Field along Mumford River
FR-1	Franklin	Riparian Habitat	Farm Field
FR-2	Franklin	Riparian Habitat	Farm Field
HP-1	Hopedale	Wetland	Large Active Gravel Pit - no access
HP-2	Hopedale	Wetland	Fill in wetland near Hopedale Airport
MN-1	Mendon	Riparian Habitat	Field near Muddy Brook
MN-2	Mendon	Wetland	Farm Pond
MN-3	Mendon	Riparian Habitat	Gravel Pit
MN-4	Mendon	Riparian Habitat	Farm Field
ML-1	Millville	Riparian Habitat	Large Residential Field
NA-1	North Attleboro	Riparian Habitat	Golf Course - no access
NB-1	Northbridge	Wetland	Gravel Pits next to wetland - noted in
NB-2	Northbridge	Riparian Habitat	Gravel Pit
NB-3	Northbridge	Riparian Habitat	Gravel Pit
UP-1	Upton	Riparian Habitat	Cleared field near stream and dam
UP-2	Upton	Wetland	Farm Field
UX-1	Uxbridge	Riparian Habitat	Sand and Gravel Pit (suggested by State
UX-2	Uxbridge	Wetland	Farm Pond w/ Phragmites, and associated
UX-3	Uxbridge	Riparian Habitat	Golf Course - no access
UX-4	Uxbridge	Riparian Habitat	Old Gravel Pit
UX-5	Uxbridge	Riparian Habitat	Commerical Lot
UX-6	Uxbridge	Riparian Habitat	Farm Field
UX-7	Uxbridge	Riparian Habitat	Old Drive-In
UX-8	Uxbridge	Riparian Habitat	Abandoned Commercial Lot
UX-9	Uxbridge	Riparian Habitat	Developed Area next to Post Office
WR-1	Wrentham	Wetland	Duck Pond and Horse farm