



Massachusetts  
Department  
*of*  
ENVIRONMENTAL  
PROTECTION

## **INDICATIVE PROJECT SUMMARIES**

### **SECTION 319 NONPOINT SOURCE COMPETITIVE GRANTS PROGRAM**

**FFY 2004 - 2008**

**Massachusetts Department of Environmental Protection  
Bureau of Resource Protection  
Glenn Haas, Acting Assistant Commissioner**

**2008**

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NONPOINT SOURCE PROGRAM  
INDICATIVE PROJECT SUMMARIES**

**FFY 2004 – 2008**

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**2008**

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Massachusetts Department of Environmental Protection  
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Worcester, MA 01608**

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<http://mass.gov/dep/water/grants.htm>**

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# TABLE OF CONTENTS

<b>Introduction</b>		1
<b>Figure 1: Massachusetts River Basins for Water Resources Planning</b>		3
<b>Table 1: Allocation of Dollars by Basin</b>		4
 <b>Indicative Project Summaries - FFY 2004:</b>		
00-16/319	Lake Wyola TMDL Implementation.....	5
00-17/319	Stormwater BMPs on Residential Property.....	6
02-11/319	Wachusett Mountain NPS .....	8
03-05/319	Bare Hill Pond Noxious Aquatic Plant Reduction .....	11
03-06/319	Pittsfield Water Supply Stormwater Remediation Project.....	12
03-07/319	Connecticut River Phase III.....	13
03-08/319	Powow River Stormwater Management.....	14
03-09/319	Clark and Cobb’s Pond Stormwater Management .....	15
03-10/319	Spy Pond Stormwater Management .....	16
03-11/319	Billington Sea Stormwater Remediation .....	17
03-12/319	Stormwater BMPs at Peppermint Brook and Lily Pond.....	18
04-01/319	Operation and Maintenance of MASSTC .....	19
04-02/319	UMass/EOEEA Innovative Stormwater Technology Transfer and Evaluation .....	20
04-03/319	LID Training and Technical Assistance for Local Decision Makers .....	21
 <b>Indicative Project Summaries - FFY 2005:</b>		
04-04/319	Upper Charles River Watershed Total Maximum Daily Load and Watershed-Based Plan .....	22
04-05/319	Phosphorus and Sediment Load Reduction at Quaboag and Quacumquasit Ponds .....	23
04-06/319	Enhancing Implementation of Nutrient Management on Massachusetts Crop/Livestock Farms to Reduce the Risk of Nonpoint Source Pollution.....	24
04-07/319	Stormwater BMP Implementation for Route 28 to Bass River Subwatershed .....	25
04-09/319	Stormwater Management Retrofits for the Samoset Street Outfall to Plymouth Harbor .....	26
04-10/319	Pontoosuc Lake Watershed Planning Program .....	27
04-11/319	Cold Spring Brook Watershed Remediation .....	28
04-12/319	Demonstration Boat Bottom Wash Water System .....	29
04-14/319	Development of Watershed-Based Plans .....	30
04-15/319	Dudley Pond Comprehensive Water Quality Improvement Project.....	31
05-01/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center.....	34
05-03/319	Windsor Reservoir Restoration Project.....	35
 <b>Indicative Project Summaries - FFY 2006:</b>		
01-27/319	Beaver Brook Culvert Rehabilitation and Improvements to Beaver Brook Park.....	7
04-16/319	Tree Box Filters as a Tool for Implementing the Neponset Bacteria TMDL.....	32
04-17/319	Erosion and Sediment Control and Stormwater Management at Construction Sites using Soils- and Compost-Based Best Management Practices.....	33
05-04/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center and Investigation into Onsite Treatment of Endocrine-Disrupting Compounds.....	36
05-05/319	Drumlin Farm Nonpoint Source Stormwater Management Project .....	37

05-06/319	Pembroke LID Retrofit Implementation Project .....	38
05-07/319	Kingston Elementary School LID Retrofit Implementation Project.....	39
05-08/319	Children’s Wharf Project: Growing the Next Generation of Environmental Stewards.....	40
05-09/319	Old Oaken Bucket Pond Watershed NPS Improvements.....	41
05-10/319	Lake Shirley Low Impact Development Stormwater Improvement Project.....	42
05-11/319	Congamond Lakes FY 06.....	43
06-01/319	Orange Riverfront Park: Using Low Impact Development Techniques to Manage Stormwater Runoff.....	45

**Indicative Project Summaries - FFY 2007**

02-12/319	Martins Pond Shoreline Restoration and Sediment Reduction Project .....	9
05-12/319	Manchaug Pond NPS Improvement Project.....	44
06-04/319	Oak Hill Tributary Improvement Project .....	46
06-05/319	First Herring Brook Low Impact Development Stormwater Enhancements.....	47
06-06/319	Herring River Coastal Low Impact Development Project.....	48
06-07/319	Reducing NPS from Equine Facilities.....	49
06-08/319	Bedford NPS Project .....	50
06-09/319	River Street Best Management Practice Implementation .....	51
07-01/319	Stormwater and Low Impact Development Technology Transfer .....	53
07-02/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center.....	54

**Indicative Project Summaries - FFY 2008**

02-13/319	Mill Creek Estuary Stormwater Mitigation .....	10
06-10/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center.....	52
07-03/319	Rockwell Pond Source Reduction Pilot Project .....	55
07-04/319	Improving Water Quality in the Hamilton Reservoir Watershed.....	56
07-05/319	Franklin Stormwater Retrofit Improvement Project.....	57
07-06/319	Stormwater BMP Implementation for Little Harbor .....	58
07-07/319	Jackson Square LID Program.....	59
07-08/319	Onota Lake Preservation Project .....	60
07-09/319	James Brook Urban Stormwater Improvements.....	61
08-01/319	Eel River Headwaters Restoration.....	62
08-02/319	Lake Waushakum LID BMP Implementation Project.....	63

<b>Appendix: 319 Nonpoint Source Program Projects 1990-2003.....</b>	<b>64</b>
--	-----------

**Indicative Summaries by Basin, FFY 2004 - 2008**

**Blackstone**

01-27/319 Beaver Brook Culvert Rehabilitation and Improvements to Beaver Brook Park..... 7  
05-12/319 Manchaug Pond NPS Improvement Project..... 44

**Boston Harbor**

03-09/319 Clark and Cobb’s Pond Stormwater Management ..... 15  
03-10/319 Spy Pond Stormwater Management ..... 16  
04-16/319 Tree Box Filters as a Tool for Implementing the Neponset Bacteria TMDL..... 32  
05-08/319 Children’s Wharf Project: Growing the Next Generation of Environmental Stewards..... 40

**Buzzards Bay**

No projects

**Cape Cod**

04-07/319 Stormwater BMP Implementation for Route 28 to Bass River Subwatershed ..... 25  
02-13/319 Mill Creek Estuary Stormwater Mitigation ..... 10

**Charles**

04-04/319 Upper Charles River Watershed Total Maximum Daily Load and Watershed-Based Plan ..... 22  
04-11/319 Cold Spring Brook Watershed Remediation ..... 28  
04-17/319 Erosion and Sediment Control and Stormwater Management at Construction Sites using  
Soils- and Compost-Based Best Management Practices ..... 33  
05-05/319 Drumlin Farm Nonpoint Source Stormwater Management Project ..... 37  
07-05/319 Franklin Stormwater Retrofit Improvement Project..... 57  
07-07/319 Jackson Square LID Program..... 59

**Chicopee**

04-05/319 Phosphorus and Sediment Load Reduction at Quaboag and Quacumquasit Ponds ..... 23  
06-09/319 River Street Best Management Practice Implementation ..... 51

**Concord**

04-15/319 Dudley Pond Comprehensive Water Quality Improvement Project..... 31  
08-02/319 Lake Waushakum LID BMP Implementation Project..... 63

**Connecticut**

00-16/319 Lake Wyola TMDL Implementation ..... 5  
03-07/319 Connecticut River Phase III..... 13

**Deerfield**

No projects

**Farmington**

No projects

**French**

No projects

**Housatonic**

03-06/319 Pittsfield Water Supply Stormwater Remediation Project..... 12  
04-10/319 Pontoosuc Lake Watershed Planning Program ..... 27  
05-03/319 Windsor Reservoir Restoration Project ..... 35  
06-04/319 Oak Hill Tributary Improvement Project ..... 46  
07-08/319 Onota Lake Preservation Project ..... 60

**Ipswich**

02-12/319 Martins Pond Shoreline Restoration and Sediment Reduction Project ..... 9

**Islands**

No projects

**Hudson (Hoosic, Kinderhook, BashBish)**

No projects

**Merrimack**

03-08/319 Powow River Stormwater Management..... 14

**Millers**

06-01/319 Orange Riverfront Park: Using Low Impact Development Techniques to Manage Runoff ..... 45

**Narragansett Bay/Mt. Hope**

No projects

**Nashua**

02-11/319 Wachusett Mountain NPS ..... 8  
03-05/319 Bare Hill Pond Noxious Aquatic Plant Reduction ..... 11  
05-10/319 Lake Shirley Low Impact Development Stormwater Improvement Project..... 42  
07-03/319 Rockwell Pond Source Reduction Pilot Project ..... 55  
07-09/319 James Brook Urban Stormwater Improvements ..... 61

**North Coastal**

04-12/319 Demonstration Boat Bottom Wash Water System ..... 29

**Parker**

No projects

**Quinebaug**

07-04/319 Improving Water Quality in the Hamilton Reservoir Watershed ..... 56

**Shawsheen**

06-08/319 Bedford NPS Project ..... 50

**South Coastal**

03-11/319 Billington Sea Stormwater Remediation ..... 17  
03-12/319 Stormwater BMPs at Peppermint Brook and Lily Pond..... 18  
04-03/319 LID Training and Technical Assistance for Local Decision Makers ..... 21  
04-07/319 Stormwater BMP Implementation for Route 28 to Bass River Subwatershed ..... 25  
04-09/319 Stormwater Management Retrofits for the Samoset Street Outfall to Plymouth Harbor ..... 26  
05-06/319 Pembroke LID Retrofit Implementation Project ..... 38

05-07/319	Kingston Elementary School LID Retrofit Implementation Project.....	39
05-09/319	Old Oaken Bucket Pond Watershed NPS Improvements.....	41
06-05/319	First Herring Brook Low Impact Development Stormwater Enhancements.....	47
06-06/319	Herring River Coastal Low Impact Development Project.....	48
07-06/319	Stormwater BMP Implementation for Little Harbor .....	58
08-01/319	Eel River Headwaters Restoration.....	62

**Taunton**

No projects

**Ten Mile**

No projects

**Westfield**

05-11/319	Congamond Lakes FY 06.....	43
-----------	----------------------------	----

**Statewide Projects**

04-01/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center.....	19
04-02/319	UMass/EOE(E)A Innovative Stormwater Technology Transfer and Evaluation.....	20
04-06/319	Enhancing Implementation of Nutrient Management on Massachusetts Crop/Livestock Farms to Reduce the Risk of Nonpoint Source Pollution .....	24
04-14/319	Development of the Massachusetts Watershed-Based Plan .....	30
05-01/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center.....	34
05-04/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center and Investigation into Onsite Treatment of Endocrine-Disrupting Compounds .....	36
06-07/319	Reducing NPS from Equine Facilities.....	49
06-10/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center.....	52
07-01/319	Stormwater and Low Impact Development Technology Transfer .....	53
07-02/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center.....	54

<b>Appendix: 319 Nonpoint Source Program Projects 1990-2003 .....</b>	<b>64</b>
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## INTRODUCTION

This report presents indicative summaries of the projects partially financed by the Section 319 Massachusetts Nonpoint Source Competitive Grants Program during federal fiscal years (FFY) 2004 through 2008. Projects funded from the inception of the program in 1990 through 2003 are listed in the Appendix at the end of this report.

Congress annually appropriates funds under Section 319 (319) of the Clean Water Act of 1987 (33 U.S.C.A., Sc. 1251 et. seq.) to assist states in implementing their approved nonpoint source (NPS) programs. Section 319 is administered by the US Environmental Protection Agency (EPA), which oversees the awards to individual states. The Massachusetts Department of Environmental Protection (Department), Bureau of Resource Protection, administers this award as part of the Massachusetts Nonpoint Source Program.

The 319 program focuses on the implementation of activities and projects for the control of nonpoint source pollution. EPA defines NPS pollution as that which is "caused by diffuse sources that are not regulated as point sources and are normally associated with precipitation and runoff from the land or percolation." The awards are intended to provide financial support for the state's programs for controlling the major statewide categories of NPS pollution or for protecting or improving NPS-impaired or threatened targeted water resources.

Each year, a portion of the 319 funds awarded to the state is used for specific watershed implementation projects that improve or protect threatened or impaired priority freshwater and coastal waters. Projects funded under this program must implement measures that address the prevention, control, and abatement of NPS pollution, and must result in restoration of beneficial uses or achieving or maintaining state water quality standards. A Request for Responses for competitive projects is issued by the Massachusetts Department of Environmental Protection in the spring. Proposals may be submitted by any interested Massachusetts public or private organization. The Department encourages all types of eligible, competitive proposals from all watersheds.

Since FFY '01, the Department has particularly encouraged proposals that will begin implementation of Massachusetts's Total Maximum Daily Load (TMDL) analyses, or that implement recommendations made in Diagnostic/Feasibility (D/F) or other studies for waters that do not meet Water Quality Standards. The Department also continues to encourage applicants to propose projects that support the Department's ongoing basin-wide water quality activities. The Massachusetts Nonpoint Source Management Plan (<http://mass.gov/dep/water/resources/nonpoint.htm>), is a primary source of information for identification of comprehensive, 319-eligible projects that will lead to water quality improvement. The Massachusetts Watershed-based Plan, <http://public.dep.state.ma.us/Watershed/Intro.aspx>, was developed in 2007 as an additional tool specifically for the purpose of identifying and developing priority projects to be funded using 319 funds. All projects represented in these Indicative Summaries are consistent with both the Massachusetts Watershed-based Plan and the Massachusetts Nonpoint Source Management Plan.

An intra- and inter-agency screening committee reviews all eligible 319 proposals. Projects selected by the Department for funding are included in the Department's yearly program plan, which is submitted to EPA prior to the start of the federal fiscal year. Once the program plan has been approved, the Department enters into a contractual agreement with the applicant to conduct the project.

A 40% non-federal match is required from the grantee. This match may be in cash or from in-kind services performed as part of the approved project activities. Unless specifically recommended in a TMDL, research, program development, assessment, planning, and water quality monitoring for assessment purposes are not considered implementation activities and are not eligible for 319 funding or match credit. The typical project timeline is for three years.

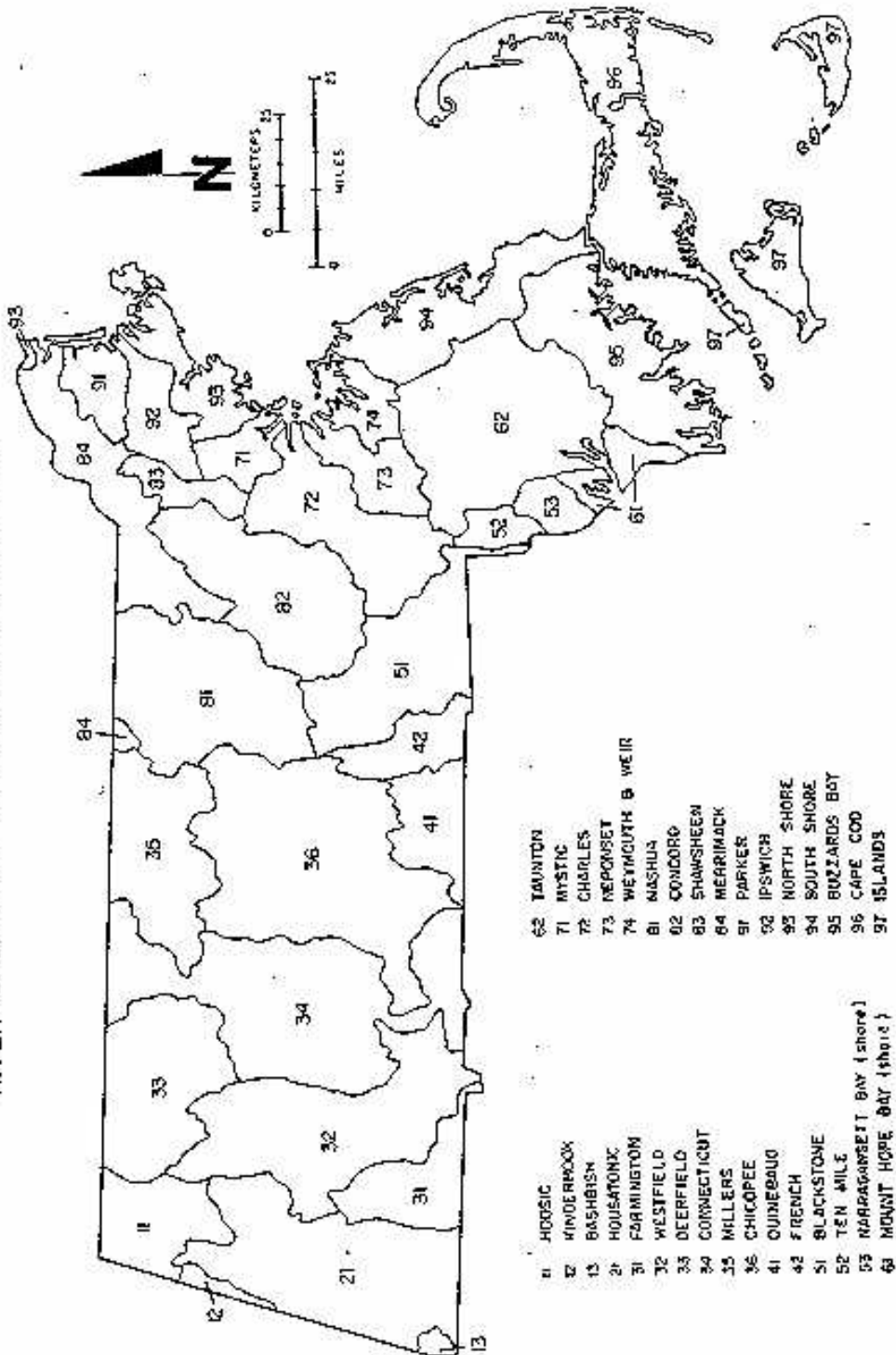
In March of 2006, MassDEP developed and received EPA approval for a Program Quality Assurance Project Plan that covers all projects that do not have a sampling component. The Program QAPP applies to implementation projects beginning in FFY 2006, as well as some projects from previous years. Therefore, most 319 funded projects no longer

require a project-specific Quality Assurance Project Plan. However, an Operation and Maintenance Plan is required for each implementation project.

Final reports for completed projects are available from the Division of Watershed Management, Massachusetts Department of Environmental Protection, 627 Main Street, Worcester, MA 01608, 508-792-7470.

The Massachusetts river basins used in watershed planning are illustrated in Figure 1. Table 1 shows a comparison between the total number of projects funded through the 319 program in each basin, and the total project costs in each basin since the inception of the program in 1990. Indicative summaries are presented in numerical order rather than by the fiscal year in which the project was selected.

**COMMONWEALTH of MASSACHUSETTS  
RIVER BASINS and COASTAL DRAINAGE AREAS**



**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION  
Number of 319 Projects and Allocation of Funds by Basin (1990-2008)**

**Table I**

<u>Basin Name</u>	<u>Number of Projects</u>	<u>Dollars Allocated</u> <u>(match plus 319 funds)</u>
Hudson (Hoosic, Kinderhook, BashBish)	0	0
Housatonic	14	\$ 2,446,650
Deerfield	2	\$ 62,500
Westfield	3	\$ 568,670
Farmington	4	\$ 173,200
Connecticut	11	\$ 2,065,000
Millers	2	\$ 704,330
Chicopee	6	\$ 931,190
Quinebaug	2	\$ 467,080
French	0	0
Nashua	8	\$ ,490,480
Blackstone	9	\$ 2,257,010
Merrimack	5	\$ 620,600
Concord (SuAsCo)	9	\$ 1,274,450
Shawsheen	1	\$ 159,650
Parker	1	\$ 88,300
Ipswich	3	\$ 844,920
North Coastal	4	\$ 453,600
Boston Harbor (Mystic, Neponset, Weymouth & Weir)	11	\$ 2,553,730
Charles	10	\$ 2,171,280
South Coastal	19	\$ 5,005,890
Cape Cod	15	\$ 2,062,220
Islands	2	\$ 218,600
Buzzards Bay	19	\$ 2,560,800
Taunton	3	\$ 146,800
Narragansett Bay & Mount Hope Bay	0	0
Ten Mile	1	\$ 260,800
Statewide	42	\$ 5,087,070
<b>Total for 1990-2008</b>	<b>206</b>	<b>\$34,674,820</b>

Notes:

- Where projects encompass more than one basin, the grant allocation has been divided evenly among basins.
- Dollar amounts shown are total project costs and include 40% non-federal matching funds.
- All dollar amounts are rounded to the nearest \$10.

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 00-16/319**

**PROJECT TITLE:** Lake Wyola TMDL Implementation Project  
**NPS CATEGORY:** Resource Restoration  
**INVESTIGATOR:** EOEEA, Division of Conservation and Recreation (formerly Department of Environmental Management)  
**LOCATION:** Connecticut Watershed

**DESCRIPTION:**

Lake Wyola is a 129-acre recreational lake that supports swimming, boating, and fishing. The watershed of the Lake is 6.8 square miles in the towns of Shutesbury and Wendell. Lake Wyola is a Category 4A water (TMDL for phosphorus has been completed). In addition to phosphorus, Lake Wyola is impaired by organic enrichment/low dissolved oxygen and noxious aquatic plants. A Lake Management Plan was completed in 1997. Both the TMDL and the Lake Management Plan identify nonpoint source problems, and each presents recommendations to address them. Major problems are road management issues, shoreline erosion, septic system management, and invasive aquatic plants.

The goal of this project is to implement selected recommendations from the Lake Wyola Management Plan and Lake Wyola TMDL, and to continue the efforts of the towns of Shutesbury and Wendell, the Lake Wyola Advisory Committee, DCR, and the MDC to protect Lake Wyola and its watershed.

**Project tasks include:**

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Implementation of residential and roadway BMPs to control erosion and sedimentation;
3. Implementation of a comprehensive septic system management plan;
4. Prevention of the introduction of aquatic invasive species; and
5. Development of effective outreach and education materials to share lessons learned.

**PROJECT COST:** \$ 124,201

**FUNDING:** \$ 74,100 by the US EPA  
\$ 41,351 by EOEEA/DCR  
\$ 8,750 by the Town of Shutesbury

**DURATION:** 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 00-17/319**

PROJECT TITLE: Local Development of Stormwater Best Management Practices on Residential Property:  
Overcoming Barriers to Implementation  
NPS CATEGORY: Urban Runoff/Outreach and Education  
INVESTIGATOR: EOEEA: DFWELE/Riverways  
LOCATION: Connecticut, South Coastal Watersheds

**DESCRIPTION:**

Municipalities are faced with many challenges when dealing with stormwater and its impacts on local river and stream systems. In addition to the changes that town government should make to institute best management and good housekeeping practices, the challenge is also to educate and engage citizens to enlist their participation in mitigating stormwater impacts. As we learn more about stormwater and the best ways to manage its impacts, the information must be shared with homeowners. This may involve changing their fundamental assumptions about stormwater and how to manage it.

This project will identify the barriers and motivations to people implementing stormwater Low Impact Development BMPs on their property, and will apply that information to the development of a targeted outreach and education program. Residents will become involved in developing projects so that they begin to reduce the amount of lawn they cultivate, replacing that area with rain gardens, trees, and native plantings. This will reduce the volume of stormwater runoff and the amount of nonpoint source pollution being contributed to stormwater from residential property.

Project tasks include:

1. The formation of focus groups;
2. Design and implementation of a survey to help identify barriers and motivations;
3. Educational workshops and outreach in response to survey feedback;
4. Design and installation of Low Impact Development BMPs; and
5. Project evaluation.

PROJECT COST: \$ 109,645

FUNDING: \$ 62,090 by the US EPA  
\$ 34,355 by DFWELE/Riverways  
\$ 13,200 by Stream Team volunteers

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 01-27/319**

PROJECT TITLE: Beaver Brook Culvert Rehabilitation and Improvements to Beaver Brook Park  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: City of Worcester  
LOCATION: Blackstone Watershed

**DESCRIPTION:**

This project will offset construction costs related to the stream restoration (daylighting) of approximately 1,175 linear feet of Beaver Brook within Beaver Brook Park. This is part of a larger project that will improve recreational fields within the park. Beaver Brook Park is located within a 100-year flood plain associated with Beaver Brook, which is currently culverted. During storm events, the water surface within a failed portion of the existing culvert overflows through the lower sidewalls adjacent to the playing fields, resulting in flooding. The functional value of the water resource is extremely limited due to its culverted state, and it primarily serves as a conduit for water flow. Beaver Brook is listed as a Category 5 water, impaired by habitat alteration, pathogens, and objectionable deposits.

The goal is to improve water quality by exposing the stream to air and sunlight. The project will result in approximately 1,175 linear feet of open channel and new bank, with significantly improved wildlife habitat values.

Stream daylighting will include excavation and removal of approximately 1,175 linear feet of culvert to create an open channel. The new channel will be 16 feet wide at its base and will be constructed with stone and habitat structures to encourage the development of meanders. The wetland shelf and upland side slope will be vegetated with native plants appropriate to the newly created habitat. The stream daylighting and related reconstruction of the floodplain will result in flood mitigation and improved habitat and water quality as follows:

- The banks and open channel will allow for free groundwater discharge to the brook, thereby reducing the water temperature and allowing more dissolved oxygen in the water
- Dissolved oxygen will also be increased by exposure to wind and turbulence from cascading over instream stones
- The banks will be partially vegetated, thereby improving slope stability and wildlife habitat.
- Vegetation on the banks will shade and cool the water
- Vegetated banks will also improve water quality by providing a buffer to slow and treat NPS pollutants carried by runoff

The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

PROJECT COST: \$ 433,334

FUNDING: \$ 260,000 by the U.S. EPA  
\$ 173,334 by the City of Worcester

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 02-11/319**

PROJECT TITLE: Wachusett Mountain NPS Pollution Management  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Wachusett Mountain Associates (WMA)  
LOCATION: Nashua Watershed

**DESCRIPTION:**

Wachusett Mountain State Reservation is home to a number of water resources including intermittent and perennial streams, ponds, vernal pools, and wetlands. The condition of Wyman Pond, a 200-acre lake in the 4C category of the Integrated List ( “impairments not caused by pollutants” ), has been documented over two decades, including a 1983 Diagnostic/Feasibility Study and a 2000 stream and stormwater monitoring and evaluation program. Excessive sediment (TSS) has been identified as one of the main water quality concerns for Wyman Pond.

This project will build upon an existing stormwater management system by installing a number of BMPs that will significantly reduce or eliminate future degradation of the receiving waters and downstream resource areas, as well as provide an opportunity to educate a large number of guests that visit this Wachusett Mountain Ski Area. Runoff from a portion of the five-acre parking lot receives minimal treatment before it is discharged to a resource area. In order to bring the stormwater management system into compliance with Massachusetts Stormwater Standards, WMA proposes to install a series of BMPs that will reduce TSS below the recommended 80% levels as well as increase groundwater recharge at the site. BMPs to be installed include a grit separator, stormwater filtration, and an infiltration gallery.

**Project tasks include:**

1. Development and implementation of a Quality Assurance Project Plan;
2. Installation of a series of structural BMPs to control and treat stormwater flow;
3. Development and implementation of an Operation and Maintenance Plan;
4. Construction of educational kiosks for outreach and education about NPS issues; and
5. Watershed BMPs to reduce the amount of sediment entering the system.

PROJECT COST: \$ 161,000

FUNDING: \$ 97,000 by the US EPA  
\$ 64,000 by Wachusett Mountain Associates

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 02-12/319**

PROJECT TITLE: Martins Pond Shoreline Restoration and Sediment Reduction Project  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of North Reading  
LOCATION: Ipswich Watershed

**DESCRIPTION:**

Martins Pond is 303d listed for turbidity and noxious aquatic plants. Water clarity in the pond falls short of the minimum requirement for swimming, and a local beach that once offered swimming has been closed. The Pond is currently undergoing a diagnostic/feasibility study, funded through a 2005 Massachusetts Supplemental Budget award. While there are several factors contributing to the turbidity levels in the Pond, one obvious cause is the suspended sediment contributed by direct discharges and eroding shoreline.

With this project, the Town of North Reading will move forward with addressing several priority sources of suspended sediment. Structural Best Management Practices will be implemented at three priority sites, and several non- structural and outreach activities will also be conducted to mitigate the problem. Boat no-wake zones will be created and enforced, landowner Best Management Practices will be encouraged, and town policies will be reevaluated to maximize protection of the Martins Pond shoreline.

Project tasks include:

1. Structural Best Management Practices for erosion control at Traveled Way and Poplar Terrace;
2. Construction of a rain garden at Clarke Park;
3. Creation of no-wake zones;
4. Noxious aquatic plant harvesting;
5. An operation and maintenance plan for the Best Management Practices; and
6. Outreach and technology transfer to encourage good homeowner practices.

PROJECT COST: \$384,920

FUNDING: \$ 218,600 by the U.S. EPA  
\$ 13,600 by shoreline property owners  
\$152,720 by the Town of North Reading

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 02-13/319**

PROJECT TITLE: Mill Creek Estuary Stormwater Mitigation  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Sandwich  
LOCATION: Cape Cod Watershed

**DESCRIPTION:**

This project will remediate pathogenic contamination within the Mill Creek Estuary as recommended in the Mill Creek Assessment Report of 2003 funded under the Coastal Pollution Remediation Program (CPR). Specifically, the proposed project will provide for the design and construction of BMPs that mitigate stormwater discharges from six subdrainage basins and eight outfalls into the Mill Creek Estuary. The project is a natural follow-on to prior work completed on five outfalls discharging from the Town Neck area into Mill Creek, funded under CPR between 2000 and 2002.

The proposed project is organized to be completed in two Phases over a six-year period to enable the Town to meet its funding obligations in a manageable way. This proposal is for Phase 1, the first three years of work. A proposal for Phase 2 will be made three years hence.

The overarching objective is to enable the reopening of Sandwich Harbor, an 88-acre shellfishing area impacted by Mill Creek (Marine Fisheries designation CCB:37). The objective for Phase 1-Year 1 is to complete the design and construction necessary to mitigate two sites in Subbasin 7. The balance of Subbasin 7 and all of Subbasin 6 will be completed in Phase 1-Year 2. The objective for Phase 1 -Year 3 is to design and construct mitigation systems serving Subbasin 4. The remaining sites will be mitigated in a similar manner during Phase 2. This project will address activities consistent with the Massachusetts Watershed-Based Plan and the Massachusetts NPS Management Plan. While the project will complement the Town's Phase II program, none of the activities proposed are required by the permit.

PROJECT COST: \$ 425,518

FUNDING: \$ 255,300 by the U.S. EPA  
\$ 170,218 by the Town of Sandwich

DURATION: 2007 – 2010

**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 03-05/319**

PROJECT TITLE: Bare Hill Pond Noxious Aquatic Plant Reduction  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of Harvard  
LOCATION: Nashua Watershed

**DESCRIPTION:**

Bare Hill Pond in Harvard, Massachusetts is a 321- acre municipally managed pond in the Nashua basin. The watershed is moderately developed, although it maintains the rural nature of the community due to largely forested environs. The pond has elevated nutrient levels and suffers from extensive growths of invasive plants including variable milfoil, water chestnut, water lilies, fanwort, smartweed, and pondweed. The excessive weed growth is attributable to shallow water depth, nutrient rich bottom sediments, and sustained nutrient input from the watershed.

This project will address recommendations made in the Bare Hill Pond TMDL by reducing the biomass of noxious aquatic plants through monitored winter drawdowns and harvesting, and will reduce the levels of phosphorus through outreach and education. It proposes to provide an interesting tool that may be useful to other waterbodies in the Commonwealth. The town routinely addresses invasive aquatic species through an annual drawdown. The drawdown is limited to a four-foot depth because of the physical constraints of the dam. This project proposes to develop a floating mounted pump that will enable the grantees to implement a deeper drawdown, thus enabling better weed control.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan;
2. Develop a mobile pumping station to facilitate drawdowns;
3. Drawdowns, weed harvesting and manual weed pulling to reduce macrophytes;
4. A NPS survey of the lake watershed; and
5. Development of a community outreach and education program to improve watershed management and reduce phosphorus inputs.

PROJECT COST: \$ 329,850

FUNDING: \$ 195,000 by the US EPA  
\$ 134,850 by the Town of Harvard and its Bare Hill Pond Watershed Management Committee

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 03-06/319**

PROJECT TITLE: Pittsfield Water Supply: Stormwater Remediation Project  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: City of Pittsfield  
LOCATION: Housatonic Watershed

**DESCRIPTION:**

The City of Pittsfield maintains and operates six surface water supply sources and two water treatment facilities for their drinking water supply. Both the Cleveland and the Sackett Brook reservoirs are threatened by stormwater runoff from adjacent roadways. At Cleveland Reservoir, approximately 4462 feet of roadway lies within Zone A, some of which is unpaved and all of which directs sheet flow directly into the reservoir. At Sackett Brook Reservoir, two roads hug the shoreline for 3103 feet within the Zone A. The eastern side of the roadway is bounded by steep upward slopes, forcing untreated stormwater to run into the reservoir.

This project seeks to remediate stormwater runoff to these two surface water supplies, as recommended in the MassDEP SWAP report and the BRPC Draft Pittsfield Watershed Plan. Stormwater BMPs will be designed and installed to mitigate roadway runoff. In addition, the project will initiate outreach to City residents regarding the NPDES Phase II stormwater management plan and the impacts of nonpoint source pollution. The volume of sediment entering into the reservoirs is unknown at this time, although sedimentation problems are evident upon visual inspection. The project will develop a method for measuring the volume of sediment prevented from entering the surface water supplies based on mitigation of current roadway conditions through the implementation of stormwater BMPs. The stormwater BMPs will be designed to meet the 80% TSS removal requirement of the MA Stormwater Management Policy.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Final designs, permits, and installation of three BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs; and
4. Outreach and education about the project.

PROJECT COST: \$ 105,900

FUNDING: \$ 63,540 by the US EPA  
\$ 42,360 by the City of Pittsfield

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 03-07/319**

PROJECT TITLE: Connecticut River Watershed Restoration Phase III  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Franklin Regional Council of Governments  
LOCATION: Connecticut Watershed

**DESCRIPTION:**

Federal and state agencies and watershed groups have identified bank erosion in the 22-mile reach of the Connecticut River known as the Turners Falls Power Pool as a significant source of nonpoint source pollution. Severe bank erosion is contributing sediment to an important anadromous and freshwater fisheries habitat and is also responsible for the loss of prime agricultural cropland and the degradation of riparian habitat used by rare species of dragonflies, bald eagles, migratory birds, and other wildlife. Two previous 319 grants introduced several different bioengineering techniques for riverbank restoration at four priority sites in this reach.

The objectives of this proposal include continuation of this innovative work at another priority site; continued monitoring of the restored sites to evaluate their long-term effectiveness and maintenance requirement; and expanding the technology transfer component of the ongoing work. The technology transfer work will focus on resource and regulatory agency personnel and design professionals who may be interested in learning about and applying similar techniques at other locations.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan for continuous monitoring of sites previously repaired as well as sites to be repaired in this phase of the work;
2. Repair of approximately 1600 linear feet of eroded riverbank;
3. Technical support to the Connecticut River Streambank Erosion Committee; and
4. Technology transfer to private sector professionals as well as local, state, and federal agency personnel.

PROJECT COST: \$ 642,196

FUNDING: \$ 270,716 by the US EPA  
\$ 371,480 by Northeast Generation Services

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 03-08/319**

PROJECT TITLE: Powow River Stormwater Management Program  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Amesbury  
LOCATION: Merrimack Watershed

**DESCRIPTION:**

The section of the Powow River running through Amesbury is a popular recreational resource for town residents. Boating, water skiing, fishing and swimming are all common recreation activities performed on the river. Water quality has been a problem for several years with suspended solids, aquatic weed growth, and pathogens predominating causing impairment, resulting in a Category 5 listing for the waterbody. Previous studies have identified stormwater as a likely contributor to water quality problems in the river. Based on recommendations from these reports, several areas along the river and associated tributaries have been selected for installing stormwater best management practices.

Anticipated pollutant load removal for this project is 10,187 lbs. of sediment (TSS) per year and 91lbs. of phosphorus per year. BMPs will consist of 3 narrow baffled tanks, 6 leaching catch basins, and 7 deep sump leaching catch basins. Outreach and education will reduce NPS in the watershed.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Final designs, permits, and installation of BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs;
4. A storm drain stenciling program;
5. Modification of local bylaws for erosion and sedimentation controls; and
6. Outreach and education to further reduce NPS in the watershed.

PROJECT COST: \$ 224,100

FUNDING: \$ 124,720 by the US EPA  
\$ 99,380 by the Town of Amesbury

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 03-09/319**

PROJECT TITLE: Clark and Cobbs Pond Stormwater Management Program  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Walpole  
LOCATION: Boston/Neponset Watershed

**DESCRIPTION:**

Clark and Cobbs Ponds are popular recreational resources for town residents in Walpole. Boating, fishing, swimming and water skiing are all popular activities in the ponds. Water quality in the ponds has been a problem for several years with sedimentation, turbidity, and aquatic weed growth predominating and causing Category 5 water quality impairment. Previous studies have identified stormwater as a likely contributor to water quality problems in the ponds. A two-year SRF-funded project to create a Stormwater Management Plan is underway in town. The proposed implementation of Best Management Practices is consistent with the Stormwater Management Plan's ultimate goal of treating and/or reducing stormwater runoff.

Based on recommendations from a previous report, BMPs have been selected to capture and remove pollutants in stormwater runoff that currently discharges into the ponds. The BMPs will consist of four baffled sediment tanks, and eight deep sump/ off-line leaching catch basins with a grassed infiltration strip. Anticipated pollutant load removal from the BMP installation is 6,670 lbs. of sediment (TSS) per year, and 50 lbs. of phosphorus per year.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Final designs, permits, and installation of BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs;
4. A storm drain stenciling program; and
5. Outreach and education to further reduce NPS in the watershed.

PROJECT COST: \$ 206,728

FUNDING: \$ 123,720 by the US EPA  
\$ 82,308 by the Town of Walpole

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 03-10/319**

PROJECT TITLE: Spy Pond Stormwater Management Program  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Arlington  
LOCATION: Boston Harbor/Mystic Watershed

**DESCRIPTION:**

Spy Pond is a popular recreational resource for town residents in Arlington and Belmont. Boating, fishing, and swimming are all popular activities in the pond. Studies have documented that poor water quality has been a problem for a long time in Spy Pond. Five different studies have concluded that high levels of phosphorus found in the pond, transported by stormwater, have impaired the pond's water quality. Category 5 impairments include sediment, phosphorus, weeds, and turbidity. Based on recommendations from these reports and in order to correct sedimentation problems, BMPs were installed in several areas within the Spy Pond watershed and associated tributaries through a DEM grant in 2001. These BMPs include leaching catch basins, storm drain marking, alum and aeration treatment, and a public education program.

Direct discharge of stormwater runoff from the Route 2 sub-basin still poses a threat to the pond's water quality. This project will install additional BMPs to address the Route 2 discharge. BMPs to be installed include six baffled sediment tanks and sixteen deep sump/leaching catch basins. Anticipated pollutant load removal is 10,070 lbs. of sediment (TSS) per year and 87 lbs. of total phosphorus per year.

**Project tasks include:**

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Final designs, permits, and installation of BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs;
4. A Storm Drain marking program; and
5. Outreach and education to further reduce NPS in the watershed.

PROJECT COST: \$ 298,100

FUNDING: \$ 177,520 by the US EPA  
\$ 120,580 by the Town of Arlington

DURATION: 2004 - 2007

# MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

## SECTION 319 NPS PROJECT 03-11/319

PROJECT TITLE: Billington Sea Stormwater Remediation Project  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Plymouth Engineering Department  
LOCATION: South Coastal Watershed

### DESCRIPTION:

Billington Sea is a natural 269-acre warmwater kettle pond located southwest of the center of Plymouth. The pond is the headwaters of Town Brook, a 1-1/2 mile long stream that empties into Plymouth Harbor. Town Brook is an anadromous fish run for alewife and blueback herring that migrate upstream each spring to spawn in Billington Sea. The pond serves as an important recreational facility, as its eastern shoreline is part of Morton Park, a 180 acre park and recreation area. In addition, a state boat ramp is located on the eastern shore. The eastern portion of the pond is also within the recharge area of a public water supply well.

The primary objective of this project is to improve the water quality in Billington Sea by mitigating the adverse impacts of stormwater runoff and sedimentation through the implementation of Best Management Practices along Billington Sea Road and Black Cat Road. The project will support draft TMDL implementation efforts by reducing pollutant loadings to Billington Sea, which is listed in Category 5 for noxious aquatic plants and turbidity. In addition, it is anticipated that this stormwater pollution remediation project, coupled with several other pollution remediation projects along Town Brook, will significantly improve water quality in the Billington Sea/Town Brook region. Targeted pollutants include fecal coliform, E. coli, total phosphorus, suspended sediments, and nitrogen. It is anticipated that phosphorus loading will be reduced from 52 lbs/yr to 15.6 lbs/yr, and nitrogen loads from 546.70 lbs/yr to 218.70 lbs/yr. BMPs include deep sump/hooded catch basins followed by infiltration galleys. The project also includes an innovative, intensive outreach and education task, based on the principles of community-based social marketing, to encourage the local use of watershed-friendly landscaping techniques.

### Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Final designs, permits, and installation of BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs; and
4. A Plymouth Greenscapes campaign to encourage the use of landscape-friendly BMPs.

PROJECT COST: \$ 280,292

FUNDING: \$ 167,773 by the US EPA  
\$ 112,519 by the Town of Plymouth

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 03-12/319**

PROJECT TITLE: Stormwater BMPs for Peppermint Brook and Lily Pond  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Cohasset Board of Water Commissioners  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

Lily Pond, representing approximately 90 percent of the drinking water supply for the Town of Cohasset, currently receives a nutrient load from its watershed in excess of that predicted for good water quality. Studies have classified the pond as eutrophic, with reductions in the nutrient budget required to improve water quality and to preserve the integrity of the drinking water supply. Urban land use and uncontrolled street runoff within the Peppermint Brook sub basin of the Lily Pond watershed contribute a disproportionate share of nutrients and other contaminants to the Pond. Stormwater collection systems within these areas provide little if any pollutant attenuation and represent the areas of greatest risk of catastrophic contamination of the pond.

This project will implement BMP stormwater control devices to improve the water quality and protect Lily Pond. BMP designs will utilize structural best management practices, and will incorporate Low Impact Development urban retrofit strategies wherever possible to contain and minimize off-site flows and pollutant loading in these areas. Structural BMP improvement options to be considered will include hooded catch basins, bioretention facilities, rain gardens, roadside swales with biofilters, and spill containment facilities. Anticipated pollutant load removal is 658 kg/year of nitrogen and 22 kg/year of phosphorus.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Final designs, permits, and installation of BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs; and
4. Outreach and education to further reduce NPS in the watershed.

PROJECT COST: \$ 425,000

FUNDING: \$ 255,000 by the US EPA  
\$ 170,000 by the Cohasset Board of Water Commissioners

DURATION: 2004 – 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-01/319**

PROJECT TITLE: Operation and Maintenance of the Massachusetts Alternative Septic System Test Center  
NPS CATEGORY: Land Disposal  
INVESTIGATOR: Barnstable County Dept. of Health and the Environment  
LOCATION: Statewide

**DESCRIPTION:**

The Massachusetts Septic System Test Center serves as a resource for quality third-party performance information regarding advanced onsite septic system technologies. In addition, the existence of the Test Center promotes the trial of new technologies to reduce nitrogen and phosphorus from wastewater.

This continuing project endeavors to support the state's TMDL program by providing environmental decision makers with the tools by which the goals of the TMDL program can be achieved, especially where wastewater is a major source of pollutant loading. The project proposes to continue the ongoing work of the MASSTC.

**Project tasks include:**

1. Development of a Quality Assurance Project Plan;
2. Conducting facility operations,
3. Synthesizing data derived from testing new systems,
4. Reporting on test results, and
5. Outreach and education through published articles and facility tours.

PROJECT COST: \$ 228,025

FUNDING: \$ 135,775 by the US EPA  
\$ 92,250 by various onsite system vendors

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-02/319**

PROJECT TITLE: Innovative Stormwater Technology Transfer and Evaluation Project  
NPS CATEGORY: Urban Runoff/Technology Transfer  
INVESTIGATOR: UMass/Amherst  
LOCATION: Statewide

**DESCRIPTION:**

Municipalities in Massachusetts are becoming the first line of defense against nonpoint source pollution. To address this ubiquitous environmental problem, communities need cost-effective stormwater pollution control measures that can treat a range of environmental pollutants, including nutrients, pathogens, organic contaminants, and sediment. Municipal officials are also looking for ways to preserve land for other municipal purposes and improve the quality of their environmental resources through open space preservation. Stormwater BMPs that can effectively treat stormwater runoff with limited land area requirements are highly sought after by communities because the technologies support both of these goals.

The goal of this project is to provide technology transfer information about innovative stormwater BMPs to MassDEP, conservation commissions, local officials, and other BMP Users. The project will develop a validated source of technical information on stormwater BMPs, provide end users with qualified information to make appropriate technology implementation decisions, and will assist communities to maximize environmental benefits of grant programs by focusing efforts on technologies that have the most promising potential to reach specific water quality objectives.

Project tasks include:

1. Development of a web-based technology transfer clearinghouse;
2. A critical assessment of stormwater technology user and demonstration needs;
3. Identification and prioritization of available BMP information; and
4. Monitoring to ensure maximum user friendliness.

PROJECT COST: \$ 336,827

FUNDING: \$ 202,096 by the US EPA  
\$ 18,376 by EOEEA  
\$ 116,355 by the University of Massachusetts, Amherst

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-03/319**

PROJECT TITLE: Low Impact Development Training and Technical Assistance for Local Decision Makers  
NPS CATEGORY: Outreach and Education, Technology Transfer  
INVESTIGATOR: North and South Rivers Watershed Association  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

Low Impact Development (LID) is a site design strategy with a goal of reducing water quality impacts from residential and commercial development. The primary goal of LID methods is to mimic the predevelopment site hydrology by using site design techniques that store, infiltrate, evaporate, and detain runoff. Use of these techniques helps to reduce off site runoff and ensure adequate groundwater recharge. Since every aspect of site development affects the hydrologic response of the site, LID control techniques mainly focus on site hydrology. Many existing local development rules in Massachusetts's communities do not recognize, allow, or encourage the use of LID tools. In addition, local officials, engineers, developers, and landscape architects are often not fully aware of these techniques that can be utilized to protect natural resources if they are incorporated into local development rules and decision-making processes.

This project will provide direct training and technical assistance to four Southeastern Massachusetts communities (Plymouth, Kingston, Pembroke and Hanover) to promote and implement LID techniques through changes in local regulations and by implementation of direct LID control measures. A conceptual LID design will be developed for each of the four communities.

Project tasks include:

1. Direct assistance to local officials;
2. A series of training workshops for development decision makers at the local, regional, and state levels;
3. Community based social marketing methods to evaluate the effectiveness of the program; LID case studies and design development; and
4. Pollutant load reduction analysis.

PROJECT COST: \$ 126,600

FUNDING: \$ 84,550 by the US EPA  
\$ 42,050 by the North and South Rivers Watershed Association

DURATION: 2004 - 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-04/319**

PROJECT TITLE: Upper Charles River Watershed Total Maximum Daily Load  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Charles River Watershed Association  
LOCATION: Charles Watershed

**DESCRIPTION:**

In 1995, the EPA launched an effort to restore the Charles River, with a goal of a fishable and swimmable river by Earth Day 2005. Since then, combined sewer overflows have been reduced or eliminated, and over one million gallons per day of raw sewage have been stopped from discharging into the river. Nevertheless, high phosphorus levels remain as a major water quality impairment in the Charles River. This project represents Phase III of a multi-year effort to develop a phosphorus TMDL for the Charles River.

The phosphorus TMDL will be completed, and CRWA will assist with development of a Watershed-Based Plan to support and begin implementation of the TMDL. The project will be evaluated on the timely completion of the tasks, including development of the TMDL and its acceptance by MassDEP and EPA. A MassDEP- and EPA-approved Quality Assurance Project Plan will be developed and implemented for monitoring work.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Water quality monitoring;
3. An aquatic plant survey;
4. Flow monitoring;
5. Modeling;
6. Assistance with development of a TMDL and Watershed-Based Plan; and
7. Project Evaluation.

PROJECT COST: \$426,067

FUNDING: \$ 235,440 by the U.S. EPA  
\$ 190,627 by Charles River Watershed Association

DURATION: 2005 – 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-05/319**

PROJECT TITLE: Phosphorus and Sediment Load Reduction at Quaboag and Quacumquasit Ponds  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of Brookfield  
LOCATION: Chicopee Watershed

**DESCRIPTION:**

Quaboag and Quacumquasit Ponds are two of the most highly prized and intensely utilized waterbodies in the state. Quaboag is a relatively shallow (average 6 feet deep) waterbody of 560 acres, located within a drainage area almost 100 times its surface area. It is listed as a Category 5 waterbody, requiring a TMDL for phosphorus. A TMDL is being prepared by the Department and is anticipated to be available in early 2005. Quacumquasit is an adjacent deeper, smaller (220 acres) waterbody that has also been shown in a 1986 Diagnostic/Feasibility study to have excessively high levels of phosphorus.

The goal of this project is to support the TMDL development and implementation by prioritizing and addressing pollutant sources within the shared watershed of the two lakes. Some implementation work that has been previously recommended will be undertaken, and plans will be developed for future implementation that will further reduce the NPS coming into the lakes. Targeted pollutants are nutrients and TSS. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved Quality Assurance Project Plan (QAPP).

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Prioritization of pollutant sources;
3. Development of conceptual plans for two or more high-priority BMPs;
4. Evaluation of additional control measures, including the backflow between the two lakes; and
5. Aquatic vegetation management.

PROJECT COST: \$ 270,833

FUNDING: \$ 162,500 by the U.S. EPA  
\$ 88,933 by the Quaboag/Quacumquasit Lake Association  
\$ 10,000 by the ESS Group, Inc.  
\$ 9,400 by the Town of Brookfield

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-06/319**

PROJECT TITLE: Enhancing Implementation of Nutrient Management on Massachusetts Crop/Livestock Farms  
NPS CATEGORY: Outreach/Education  
INVESTIGATOR: UMass/Amherst  
LOCATION: Statewide

**DESCRIPTION:**

Animal agriculture remains a major threat to the environment through nonpoint source pollution from manure and cropping practices. The main focus of nutrient management planning in Massachusetts has been to reduce the threat from dairy farms. While the dairy industry has the greatest cash receipts and is still the largest holder of open space among the livestock groups, all livestock are important local economic contributors to the Massachusetts economy. This project will continue ongoing work to develop nutrient management plans for livestock operations, with a special focus on equine operations. The sizeable equine industry has often been overlooked as a major livestock group. Many horse owners, like other livestock owners, are not well versed in agriculture and nutrient management practices, and their keeping of animals is often a concern to towns and communities.

The goal of the project is to address nutrient concerns from livestock to reduce the risk of nonpoint source pollution through outreach and educational activities with full and part-time livestock farmers and with service providers who interact with the various livestock groups. The project will be evaluated on the timely completion of the tasks and the number of nutrient management plans that are developed and implemented as a result of this project.

Project tasks include:

1. Coordination with an inter-agency and farmer advisory committee;
2. Educational workshops and meetings for farmers
3. Training for public and private sector service providers and certified planners;
4. Evaluation and improvement of current nutrient management planning process;
5. Implementation of farm nutrient management plans; and
6. On-farm demonstrations.

PROJECT COST: \$179,388

FUNDING: \$ 99,360 by the U.S. EPA  
\$ 80,028 by UMass/Amherst

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-07/319**

PROJECT TITLE: Stormwater BMP Implementation for Route 28 to Bass River Subwatershed  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of Yarmouth  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

The Bass River is an important recreational and economic resource for the towns of Yarmouth and Dennis. Testing and studies have determined that Route 28 road runoff is the highest priority source of contamination of the shellfish beds and general water quality of the Bass River.

This project implements stormwater BMPs under an urban retrofit strategy within a 10-acre drainage area that is tributary to the Bass River at the Route 28 outfall. Four drainage interception and diversion systems are proposed for construction along the half-mile stretch of Rte. 28 in this section. The goal of the project is to improve water quality in the Bass River by treating and infiltrating stormwater runoff from Route 28. BMPs will include hooded catch basins, first flush flow diversion, water quality inlet tanks, and recharge chamber systems. Pollutants of concern include sediment and nutrients. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

**Project tasks include:**

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Design, permitting, and installation of BMPs;
3. Development of an Operation and Maintenance Plan for the BMPs; and
4. Public outreach and education.

PROJECT COST: \$295,000

FUNDING: \$ 174,400 by the U.S. EPA  
\$ 36,400 by MassHighway  
\$ 84,200 by the Town of Yarmouth

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-09/319**

PROJECT TITLE: Stormwater Management Retrofits for the Samoset Street Outfall to Plymouth Harbor  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of Plymouth Engineering Division  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

The Town of Plymouth has undertaken a long-term strategy to improve water quality in Plymouth Harbor, which is impaired by pathogens. The Samoset Street outfall, which discharges to the harbor on the southern side of Town Wharf, drains approximately 118 acres of roadway and high-density residential and commercial property. The outfall is of great concern because of its proximity to 2,204 acres of closed shellfish beds.

The goal of this project is to improve the quality of surface water runoff entering Plymouth Harbor at the Samoset Street outfall. Bioretention facilities will be constructed at three priority sites to capture and treat surface runoff. Designs for the work were produced under a 2003 Coastal Pollution Remediation grant from the CZM program. The pollutant of concern is bacteria, although it is anticipated that other pollutants will also be removed by the BMPs. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan;
2. Final designs, permits, and installation of three BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs; and
4. Outreach and education about the project.

PROJECT COST: \$208,050

FUNDING: \$ 124,780 by the U.S. EPA  
\$ 83,270 by the Town of Plymouth

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-10/319**

PROJECT TITLE: Pontoosuc Lake Watershed Planning Program  
NPS CATEGORY: Watershed-Based Plan  
INVESTIGATOR: Berkshire Regional Planning Commission  
LOCATION: Housatonic Watershed

**DESCRIPTION:**

Pontoosuc Lake is a Category 5 waterbody, impaired by metals and exotic aquatic vegetation. The presence of several species of non-native invasive aquatic plants also represents a threat to downstream waterbodies where the plants may spread. Physical and chemical analyses from a recent Diagnostic/feasibility study, ENSR 2000, indicate that there are several management techniques that can be employed to retard eutrophication and weed spread and improve water quality for recreational use.

This project is a combination of research, monitoring, planning, and education activities that builds upon previous studies and 319 projects (99-03/319, 01-14/319). The goal is to develop a Watershed-based Plan consistent with EPA requirements that will support the development and implementation of a TMDL and will lay the groundwork for development and implementation of effective remediation techniques. Project success will be measured through development and implementation of a MassDEP-and EPA-approved Quality Assurance Project Plan (QAPP).

Project tasks include:

1. Development and implementation of an approved Quality Assurance Project Plan;
2. Conduct water quality monitoring;
3. Conduct a Lake Watershed Survey and develop and Action Plan;
4. Conduct lake watershed cleanups; install lakefront vegetated buffers; and
5. Conduct a public education and outreach effort.

PROJECT COST: \$110,350

FUNDING: \$ 64,500 by the U.S. EPA  
\$ 45,850 by the Friends of Pontoosuc

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-11/319**

PROJECT TITLE: Cold Spring Brook Watershed Remediation  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of Wellesley  
LOCATION: Charles Watershed

**DESCRIPTION:**

This project is intended to restore the structure, function, and water quality of Duck Pond, located on Cold Spring Brook near the Town Hall in Wellesley, MA. The Cold Spring Brook drainage area is comprised of 467 acres of highly developed land that includes Route 9 as well as other town-owned roads and parking areas. Duck Pond, located within this drainage, is highly influenced by stormwater runoff and pollution. In addition to high loads of sediment and associated pollutants, Duck Pond experiences elevated levels of fecal coliform bacteria due to a combination of the resident waterfowl population as well as nonpoint source of bacteria associated with stormwater runoff.

The goal of this project is to reduce sediment, nutrient, and fecal coliform loads to the Charles River via Cold Spring Brook and Fuller Brook through the implementation of structural and non-structural BMPs. Structural BMPs will include a flow distribution pipe for enhanced wetland treatment, and stormwater control devices in the upstream watershed. Project success will be measured through modeling of load reduction estimates brought about by BMP implementation, following a MassDEP-and EPA-approved Quality Assurance Project Plan (QAPP).

Project tasks include:

1. Development and implementation of an approved Quality Assurance Project Plan (QAPP);
2. Final designs, permits, and installation of BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs; and
4. Outreach and education about the project.

PROJECT COST: \$197,800

FUNDING: \$ 118,700 by the U.S. EPA  
\$ 79,100 by the Town of Wellesley

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-12/319**

PROJECT TITLE: Demonstration Boat Bottom Wash Water System  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Manchester Marine  
LOCATION: Statewide/Coastal

**DESCRIPTION:**

Ordinary maintenance of boats includes power washing of boat bottoms to remove accumulated material that may contribute to degradation of the hull material and interfere with the boat's operation. Studies have shown that boat bottom washwater may contain pollutants including toxic metals, oil and grease, chlorine, ammonia, antifreeze, solvents, and other harmful material. The USEPA has promulgated regulations that require this washwater to be treated as industrial or process wastewater, but has offered few definitive means or recommended BMPs to assist boatyards to comply with the regulations. With the support of the Massachusetts Office of Coastal Zone Management, Manchester Marine will install a recycling boat bottom washing system. They will then conduct an extensive education and outreach program aimed at demonstrating this BMP to other boatyards, to make them aware of this BMP and encourage its adoption in other boatyards.

Currently, despite the regulations, boat bottom wash water is frequently allowed to run onto the ground. The goal of this project is to encourage the adoption of an effective BMP that will eliminate this significant source of NPS at boatyards. The project will be evaluated through development and implementation of a Quality Assurance Project Plan (QAPP).

Project tasks include:

1. Development and implementation of an approved Quality Assurance Project Plan;
2. Design and construction of a recycling boat bottom washing system;
3. An extensive outreach and education campaign to make other boatyards aware of this BMP and encourage its adoption elsewhere.

PROJECT COST: \$195,595

FUNDING: \$ 117,357 by the U.S. EPA  
\$ 78,238 by Manchester Marine

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-14/319**

PROJECT TITLE: Development of Watershed-Based Plans  
NPS CATEGORY: n/a  
INVESTIGATOR: BETA Group, Inc.  
LOCATION: Statewide

**DESCRIPTION:**

The purpose of this project is to develop a Watershed-Based Plan for each of the 27 major Massachusetts basins. As outlined in the EPA's **Nonpoint Source Program and Grants Guidelines for States and Territories** (Oct. 23, 2003), EPA is requiring that a WBP be developed as a prerequisite for funding future 319 projects. Watershed-Based Plans developed under this project must contain the following elements:

1. Identification of causes and sources or groups of similar sources that will need to be controlled
2. Estimate of load reductions expected for the management measures described
3. Description of management measures that will need to be implemented to achieve the load reductions and identification of critical areas in which those measures will be needed.
4. Estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement the plan.
5. Education/outreach used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the NPS management measures that will be implemented.
6. A reasonably expeditious schedule for implementing the NPS management measures ID'ed in the plan.
7. Description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented.
8. Criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made towards attaining WQ standards. And, if not, criteria for determining whether the plan or TMDL needs to be revised.
9. Monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria in item 8. above.

Wherever possible, the Watershed-Based Plan will incorporate existing information from other documents, e.g. various state and local watershed planning documents or watershed plans. The resulting Watershed-Based Plan must be designed to achieve the load reductions called for in a NPS TMDL, and, in doing so, should be designed to meet water quality standards.

**Project tasks include:**

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Identification and compilation of existing documents and data that will be used to satisfy the required elements;
3. Identification of data gaps and modeled estimates to address them;
4. Development and implementation of a workplan to address any elements that have not already been addressed in previous studies; and
5. Synthesis of new and existing information into an individual WBP for each of 27 major basins.

PROJECT COST: \$970,283

FUNDING: \$ 582,170 by the U.S. EPA  
\$ 388,113 by the Commonwealth of Massachusetts

DURATION: 2005 – 2007

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-15/319**

PROJECT TITLE: Dudley Pond Comprehensive Water Quality Improvement Project  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of Wayland  
LOCATION: SuAsCo Watershed

**DESCRIPTION:**

Dudley Pond is an 84-acre great pond in the Concord River watershed. The Pond is Category 5 listed for turbidity and exotic species. In addition to turbidity from nonpoint watershed sources, nuisance growth of Eurasian milfoil is a serious problem for the Pond that significantly impairs its ecological and recreational value. This project is part of a long-term strategy to mitigate water quality impairment in Dudley Pond using both in-lake and watershed BMPs.

This project will reduce sediment and nutrient loads to Dudley Pond by implementing low impact development BMPs and restoring a section of eroding riverbank. To help control aquatic vegetation, milfoil weevils will be introduced and diver hand-pulling will be conducted in targeted areas. Targeted pollutants include sediment, nutrients, and Eurasian milfoil. Project success will be measured through development and implementation of a MassDEP-and EPA-approved Quality Assurance Project Plan (QAPP).

Project tasks include:

1. Development and implementation of an approved Quality Assurance Project Plan;
2. Construction of a bioretention cell;
3. Outlet protection/bank restoration;
4. Introduction of milfoil weevils;
5. Milfoil hand pulling;
6. Catch basin stenciling; and
7. Public outreach and education.

PROJECT COST: \$ 70,458

FUNDING: \$ 42,150 by the U.S. EPA  
\$ 9,200 by the Town of Wayland  
\$ 19,108 by the Dudley Pond Association

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-16/319**

PROJECT TITLE: Tree Box Filters as a Tool for Implementing the Neponset Bacteria TMDL  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Neponset River Watershed Association  
LOCATION: Boston Harbor Watershed/Neponset

**DESCRIPTION:**

Despite tremendous improvements in water quality along the Neponset River in the last two decades, much of the Neponset River and many of its tributaries continue to fall short of their designated standards for primary and secondary recreational contact because of bacteria related to pet waste, wildlife and other sources entering the river from stormwater runoff. In response to these continued problems, a TMDL has been developed which cites Nonpoint sources in urban runoff as a major contributor of the bacteria.

This project will partially implement the Neponset River Watershed bacteria TMDL by retrofitting an existing “curb and catch basin” drainage system in the Central Crossing neighborhood of Milton using tree filter boxes. Tree filter boxes are prefabricated bioretention cells that can be readily integrated into existing streetscapes with minimal engineering and permitting costs. Research on bioretention and tree filter boxes has indicated that fecal coliform removal rates will be 80% or higher. The project goal is to reduce bacterial loading to Pine Tree Brook and the lower Neponset River while raising awareness of tree filter boxes as a cost- and value-effective means of addressing the widespread problem of bacteria from untreated stormwater runoff in the Neponset Basin.

The anticipated environmental results include an 80%+ reduction in bacteria, nutrient, and sediment loading from urban runoff in the treated drainage system. A modest reduction in total runoff volumes and corresponding increase in groundwater recharge and stream base flow is also expected. Substantial technology transfer and public education benefits are expected as well.

Project tasks include:

1. Development of a MassDEP and EPA Approved Quality Assurance Project Plan;
2. Implementation of nineteen tree box filters;
3. Development of an Operations and Maintenance Plan; and
4. A public Education and Outreach program.

PROJECT COST: \$ 221,309

FUNDING: \$ 132,433 by the U.S. EPA  
\$ 7,755 by NepRWA  
\$ 81,121 by the Town of Milton

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 04-17/319**

**PROJECT TITLE:** Erosion and Sediment Control and Stormwater Management at Construction Sites using Soils- and Compost-Based Best Management Practices  
**NPS CATEGORY:** Urban Runoff  
**INVESTIGATOR:** Patriot Resource Conservation and Development Area Council, Inc.  
**LOCATION:** Charles River Watershed

**DESCRIPTION:**

Statistics from the US EPA show that sediment loads from construction activities are among the greatest compared to other land uses and activities. Assessments have documented that a construction site of 4.75 acres where 4.2 percent of the site is disturbed will increase the sediment yield three fold above natural levels. The goal of this project is to demonstrate and help institutionalize the use of compost and amended soil BMPs for erosion and sediment control and stormwater runoff at active construction sites. This will be done by employing these best management practices at a redevelopment project and comparing the methods with more traditional practices.

The Olmsted Green mixed use development project at the former Boston State Hospital in Mattapan will be the site of this project. This property is within a highly urbanized area of the Charles River basin. During the redevelopment project, soil and compost-based erosion controls will be employed side-by-side with standard BMPS such as geosynthetic silt fence and hay bales, to determine and demonstrate the effectiveness of the compost-based BMPs for erosion control. Extensive outreach and education will be conducted concurrently to encourage more widespread use of compost BMPs. Target audiences include construction companies, land developers, stormwater permitting agencies and other stakeholders involved or interested in construction and development. Findings will be disseminated through publications and presentations.

The targeted pollutant is sediment. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

**PROJECT COST:** \$ 440,492

**FUNDING:** \$ 229,881 by the U.S. EPA  
\$ 210,611 non-federal match from the following sources:

\$ 2,160 WeCare Organics	\$ 2,050 Kuhn-Knight
\$ 9,255 Apple D'Or Tree, Inc.	\$ 2,000 BioCycleMagazine
\$ 101,778 Lena New Boston	\$ 5,180 Patriot RC&D
\$ 9,085 New Ecology Inc.	\$ 5,000 Roto-Mix
\$ 4,600 Vanasse Hangen Brustlin, Inc	\$ 2,050 Pro-Bark, Inc.
\$ 19,930 City Soil and Greenhouse Co.	
\$ 18,000 Boston Public Works Department	
\$ 9,965 Soil and Water Quality Alliance	
\$ 9,703 Massachusetts Audubon	
\$ 8,910 Suffolk Conservation District	
\$ 525 Boston Parks and Recreation Department	
\$ 420 Boston Conservation Commission	

**DURATION:** 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-01/319**

PROJECT TITLE: Operation and Maintenance of the Massachusetts Alternative Septic System Test Center  
NPS CATEGORY: Land Disposal  
INVESTIGATOR: Barnstable County Dept. of Health and the Environment  
LOCATION: Statewide

**DESCRIPTION:**

The Massachusetts Estuaries Program (Project 01-26/319) is in the final phase of developing Total Maximum Daily Load (TMDL) allocations for nitrogen in some marine estuaries in Barnstable County. As implementation strategies begin to be developed in Barnstable County and elsewhere, the question remains as to whether innovative/alternative septic systems can provide an enhanced level of treatment that will help provide the necessary pollutant load reductions to meet TMDL goals.

The Massachusetts Septic System Test Center serves as a resource for quality third-party performance information regarding advanced onsite septic system technologies. In addition, the existence of the Test Center promotes the trial of new technologies to reduce nitrogen and phosphorus from wastewater. This continuing project endeavors to support the state's TMDL program by providing environmental decision makers with the tools by which the goals of the TMDL program can be achieved, especially where wastewater is a major source of pollutant loading. The project proposes to continue the ongoing work of the MASSTC. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved Quality Assurance Project Plan (QAPP).

Project tasks include:

1. Development of a Quality Assurance Project Plan;
2. Conducting facility operations,
3. Synthesizing data derived from testing new systems,
4. Reporting on test results, and
5. Outreach and education through published articles and facility tours.

PROJECT COST: \$ 265,805

FUNDING: \$ 116,555 by the U.S. EPA  
\$ 149,250 by various onsite system vendors

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-03/319**

PROJECT TITLE: Windsor Reservoir Restoration Project  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Dalton Fire District  
LOCATION: Housatonic Watershed

**DESCRIPTION:**

Windsor Reservoir is an approximately 62-acre drinking water reservoir located in the towns of Hinsdale and Windsor. It serves as the primary drinking water source for the town of Dalton. The Dalton Fire District is charged with providing drinking water to Dalton from this reservoir and two other surface water sources as well as one groundwater source. In August 2003, severe storms dumped 10" of rainfall on the area in a one-hour period. The resulting local flooding and erosion of the gravel roadways adjacent to the Windsor Reservoir caused an immediate shutdown of the water supply due to excess turbidity. The instability of the roadway and excessive deposits of sediment have caused problems ever since. The watershed towns of Hinsdale and Windsor have been reluctant to allocate scarce local resources to address roadway problems in an area that is not a priority part of their own infrastructure.

The goal of this project is to repair and stabilize the roadways, install flood protection and stormwater BMPs, and remove accumulated sediment from the inlet tributary. This work is recommended in a SWAP report for the water supply. Pollutants of concern are sediment, turbidity, and phosphorus. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

Project tasks include:

1. Development and implementation of a Quality Assurance Project Plan (QAPP);
2. Final designs, permits, and installation of BMPs;
3. Development and implementation of an Operation and Maintenance Plan for the BMPs; and
4. Outreach and education about the project.

PROJECT COST: \$150,000

FUNDING: \$ 90,000 by the U.S. EPA  
\$ 60,000 by the Dalton Fire District

DURATION: 2005 - 2008

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-04/319**

**PROJECT TITLE:** Operation and Maintenance of the Massachusetts Alternative Septic System Test Center and Investigation into Onsite Treatment of Endocrine-Disrupting Compounds  
**NPS CATEGORY:** Land Disposal  
**INVESTIGATOR:** Barnstable County Dept. of Health and the Environment  
**LOCATION:** Statewide

**DESCRIPTION:**

The Massachusetts Estuaries Program (Project 01-26/319) is in the final phase of developing Total Maximum Daily Load (TMDL) allocations for nitrogen in some marine estuaries in Barnstable County. As implementation strategies begin to be developed in Barnstable County and elsewhere, the question remains as to whether innovative/alternative septic systems can provide an enhanced level of treatment that will help provide the necessary pollutant load reductions to meet TMDL goals.

The Massachusetts Septic System Test Center serves as a resource for quality third-party performance information regarding advanced onsite septic system technologies. In addition, the existence of the Test Center promotes the trial of new technologies to reduce nitrogen and phosphorus from wastewater. This continuing project endeavors to support the state's TMDL program by providing environmental decision makers with the tools by which the goals of the TMDL program can be achieved, especially where wastewater is a major source of pollutant loading. The project proposes to continue the ongoing work of the MASSTC.

In addition to nitrogen, another emerging concern of onsite wastewater disposal is the treatment of pharmaceuticals and personal care products (PPCPs) and their possible role in the disruption of normal endocrine functions in humans and wildlife. Initial data taken from beneath standard the Title 5 system and the recirculating sand filter systems at the MASSTC suggest that these systems may not adequately treat for PPCPs. A study will be conducted to develop information vital to decision makers involving the effectiveness of onsite systems for treatment of these potentially endocrine disrupting compounds. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved Quality Assurance Project Plan (QAPP).

**Project tasks include:**

1. Development of a Quality Assurance Project Plan;
2. Conducting facility operations;
3. Synthesizing data derived from testing new systems;
4. Evaluating PPCP treatment;
5. Reporting on test results; and
6. Outreach and education through published articles and facility tours.

**PROJECT COST:** \$ 256,361

**FUNDING:** \$ 153,611 by the U.S. EPA  
\$ 102,750 by various onsite system vendors

**DURATION:** 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-05/319**

PROJECT TITLE: Drumlin Farm Nonpoint Source Stormwater Management Project  
NPS CATEGORY: Agricultural Runoff  
INVESTIGATOR: Massachusetts Audubon Society, Inc.  
LOCATION: Charles River Watershed

**DESCRIPTION:**

Drumlin Farm Wildlife Sanctuary in Lincoln is the Massachusetts Audubon Society's flagship sanctuary. The farm property includes 232 acres of fields, forests, and ponds, highlighted by a working farm complex. Drumlin Farm has as many as 150,000 visitors per year.

A pond on the property serves as an important educational resource for thousands of students, educators and parents who come to the Farm each year to learn about pond organisms and ecology. Runoff from the main farm complex, including pens and pastures for poultry and livestock, drains via overland flow into the pond. Runoff from adjacent Route 117 also carries pollutants into the pond. The overload of sediment, nutrients and bacteria from these combined sources causes increasing sedimentation, elevated coliform levels, and algal blooms, impairing the habitat of the pond and limiting its usefulness as a unique resource and teaching tool.

Best Management Practices designed to treat agricultural runoff will be constructed to retain, treat and disperse the runoff from the farm area concurrently with construction of a new farm building. Educational and interpretive resources will also be created to inform the general public and potential BMP users about the water quality improvement practices being put into place. Pollutants of concern are pathogens, nutrients, and total suspended solids. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

PROJECT COST: \$ 49,990

FUNDING: \$ 29,994 by the U.S. EPA  
\$ 19,996 by Massachusetts Audubon Society Inc.

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-06/319**

PROJECT TITLE: Pembroke LID Retrofit Implementation Project  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: North and South Rivers Watershed Association  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

The Town of Pembroke is one of many rapidly growing communities in the south coastal area. It currently has 4 waterbodies listed as Category 5 waters on the MA Year 2002 Integrated List of Impaired Waters. Impairments include organic enrichment, low dissolved oxygen, nutrients, pathogens, and metals. Additionally, Pembroke has 3 waterbodies listed as impaired by exotic species. Previous studies have indicated that nonpoint source pollutants are one of the greatest factors impacting water quality in the listed waterbodies.

The goal of this project is to improve water quality and enhance groundwater levels through the implementation of Low Impact Development (LID) Best Management Practices (BMPs). LID is a design strategy that seeks to maintain or replicate the pre-development hydrology on a site. The project will focus on retrofitting the Town Hall and the Oldham Pond Boat Ramp with Low Impact Development (LID) techniques to help improve water quality. LID BMPs to be utilized include rain gardens, leaching catch basins, permeable pavers, and grassed level spreaders.

Tasks include

1. Development of a MassDEP and EPA Approved Quality Assurance Project Plan;
2. Implementation of LID retrofit BMPs;
3. Development of an Operations and Maintenance Plan;
4. A public Education and Outreach program; and
5. Continuation of the Greenscapes Program.

Anticipated pollutant load removals per year:

- 18,730 lbs. of total suspended solids
- 2 lbs. total phosphorus
- 17 lbs. nitrogen
- 5 lbs. metals
- 100% bacteria removal

PROJECT COST: \$ 271,924

FUNDING: \$ 160,800 by the U.S. EPA  
\$ 111,124 by the Town of Pembroke

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-07/319**

PROJECT TITLE: Kingston Elementary School LID Retrofit Implementation Project  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: North and South Rivers Watershed Association  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

The Town of Kingston is one of many rapidly growing communities in the south coastal area. It currently has 3 waterbodies listed as Category 5 waters on the MA 2002 Integrated List of Impaired Waters, including the Jones River. Impairments include pathogens, turbidity and noxious aquatic plants. Additionally, Kingston has 3 listed waterbodies as Category 4C for exotic species. Previous studies of these impaired waters have clearly indicated nonpoint source pollutants to be one of the greatest sources of water quality problems in the watershed.

Low Impact Development (LID) is a design strategy with a goal of maintaining or replicating the pre-development hydrologic regime on a site. LID elements incorporate techniques that focus on stormwater storage, infiltration, and groundwater recharge. The proposed project will focus on retrofitting the Kingston Intermediate School with various LID techniques designed under a previous 319 project (04-03/319) to help improve the water quality of the Jones River Watershed and reestablish the site's natural hydrology.

Tasks include

1. Development of a MassDEP and EPA Approved Quality Assurance Project Plan;
2. Implementation of LID retrofit BMPs;
3. Development of an Operations and Maintenance Plan;
4. A public Education and Outreach program; and
5. Continuation of the Greenscapes Program.

Anticipated pollutant load removals per year:

1. 31,501 lbs. of total suspended solids
2. 23 lbs. total phosphorus
3. 180 lbs. nitrogen
4. 55 lbs. metals
5. 100% bacteria removal

PROJECT COST: \$ 254,732

FUNDING: \$ 152,780 by the U.S. EPA  
\$ 101,952 by the Town of Kingston

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-08/319**

PROJECT TITLE: Children's Wharf Project: Growing the Next Generation of Environmental Stewards  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Boston Children's Museum  
LOCATION: Boston Harbor

**DESCRIPTION:**

Since 2000, the Fort Point Channel has been the focus of significant attention within the City of Boston. As part of the Municipal Harbor Plan for the South Boston area, the Fort Point Channel was specifically called out as an area with great potential, launching an intensive and inclusive activation planning effort through the Boston Redevelopment Authority. During the planning of the Channel vision, it was quickly acknowledged that water quality is a key to realizing the potential of the Fort Point. Currently, the Fort Point Channel is listed as a Category 5 waterbody, impaired by priority organics and pathogens due to stormwater runoff and combined sewer overflows. With this project, the Boston Children's Museum will mitigate pollutants from stormwater runoff by incorporating Best Management Practices into the design and construction of a facility expansion and renovation project.

Project tasks will include construction of a green roof, stormwater reclamation system, rainwater harvesting, and other low-impact development practices to encourage infiltration and reuse of stormwater. An extensive public outreach and education task will include hands-on interactive displays, interpretive signage, and special programs to educate children, educators, and other adult caregivers about the new onsite stormwater management practices and the importance of individual actions and activities to improve water quality.

Pollutants of concern are total suspended solids, phosphorus, and pathogens. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

PROJECT COST: \$ 833,334

FUNDING: \$ 500,000 by the U.S. EPA  
\$ 333,334 by the Boston Children's Museum

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-09/319**

PROJECT TITLE: Old Oaken Bucket Pond Watershed NPS Improvements  
NPS CATEGORY: Urban Runoff, Water Supply Protection  
INVESTIGATOR: Town of Scituate  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

Old Oaken Bucket Pond, located in Scituate, MA is an Outstanding Resource Water and serves as the Town's primary drinking water supply. It is listed on the MA 303d List of Impaired Waters as Category 5 for noxious aquatic plants and turbidity. Old Oaken Bucket Pond serves as a source for the Herring River and ultimately the North River, both listed as impaired on the 303d list for pathogens. The majority of land within the watershed is zoned as residential with several areas zoned for commercial and industrial. Current imperviousness and increasing development pressures have become a threat to water quality, causing excessive sedimentation, nuisance aquatic plants and an increase in nutrient levels.

The goal of the project is to improve the water quality of Old Oaken Bucket Pond through the implementation of LID based BMPs within the watershed. BMPs will be used to improve the water quality flowing directly into Old Oaken Bucket Pond as well as help improve the quality of water feeding the Herring River and ultimately the North River.

Five locations have been selected within the Old Oaken Bucket watershed with LID elements/BMPs, focusing around the installation of multiple raingardens for stormwater control, treatment and infiltration of roadway runoff. Additional elements include an infiltration trench and the installation of several leaching catch basins. The proposed BMPs are expected to reduce nonpoint source pollutants currently entering Old Oaken Bucket Pond, its tributaries and ultimately the Herring River and North River. The proposed BMPs were also selected to showcase how LID elements can be incorporated to help improve a water supply source as well as treat municipal roadway runoff. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

Based on land use factors, typical stormwater concentrations of pollutants, design characteristics and system removal efficiencies, the following estimated quantities of targeted pollutants can be removed:

- 82,128 lbs. of Total Suspended Solids per year
- 15 lbs. of Total Phosphorus per year
- 94 lbs. of Nitrogen per year
- 100% bacterial removal per year

PROJECT COST: \$ 250,128

FUNDING: \$ 148,778 by the U.S. EPA  
\$ 101,350 by the Town of Scituate

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-10/319**

PROJECT TITLE: Lake Shirley Low Impact Development Stormwater Improvement Project  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Lunenburg  
LOCATION: Nashua Watershed

**DESCRIPTION:**

Lake Shirley is a 354-acre great pond located within the Nashua River watershed in Lunenburg and Shirley, MA. Lake Shirley is an important ecological and recreational resource for the Town of Lunenburg and surrounding communities. The lake is on the Massachusetts Year 2002 Integrated List of Waters for impairments by noxious aquatic plants, turbidity, and exotic species. The Lake Shirley Improvement Corporation (LSIC) and the Town of Lunenburg have led an ongoing effort to assess and provide long-term solutions to the water quality and nuisance plant problems in the Lake.

Each element of this project has been designed to mitigate the identified impairments in Lake Shirley. The four major project goals are as follows:

- Reduce sediment and nutrient loading to Lake Shirley by installing a variety of Low Impact Development stormwater management controls throughout the watershed.
- Conduct a lake-level drawdown for nuisance plant control
- Develop a Lunenburg Best Development Practices Guidebook
- Provide public education outreach to watershed residents.

Tasks include

1. Development of a MassDEP and EPA Approved Quality Assurance Project Plan;
2. Implementation of LID BMPs at twelve sites;
3. Development of an Operations and Maintenance Plan;
4. Development of a Town of Lunenburg Best Development Practices Guidebook;
5. Continuation of a lake-level drawdown program;
6. A public Education and Outreach program; and
7. An aquatic vegetation survey program.

Targeted pollutants include sediments, nutrients, and nuisance aquatic plants. The project will be evaluated through development and implementation of a MassDEP- and EPA-approved QAPP.

PROJECT COST: \$ 148,030

FUNDING: \$ 87,370 by the U.S. EPA  
\$ 27,500 by the Lake Shirley Improvement Committee  
\$ 23,300 by private contractors  
\$ 9,960 by the Town of Lunenburg

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-11/319**

PROJECT TITLE: Congamond Lakes FY 06  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Pioneer Valley Planning Commission  
LOCATION: Westfield Watershed

**DESCRIPTION:**

The Congamond Lakes are comprised of three interconnected ponds: North Pond, Middle Pond, and South Pond. The lakes are located in the Westfield river watershed in Southwick, Massachusetts, with the eastern shores of Middle and South Ponds forming the Connecticut state border. Southwick has evolved from a rural farming community to a bedroom community over the past twenty years, and the shoreline of the Ponds has become densely developed. The Ponds are listed in the Massachusetts Integrated List of Waters under Category 4c, impaired by nuisance aquatic weeds.

With this project, Southwick will continue its ongoing efforts to address the water quality problems in the Lakes. A previous 319 project (02-03/319) implemented recommendations of a 1983 Diagnostic Feasibility Study to reduce phosphorus loading in the Middle Pond. The current project will undertake similar work on four additional subwatersheds on Middle Pond, with a goal of reducing sediment loading and associated pollutants as well as invasive weed populations.

Tasks include

1. Development of a MassDEP and EPA Approved Quality Assurance Project Plan;
2. Implementation of BMPs in four subwatersheds;
3. Development of an Operations and Maintenance Plan;
4. A public Education and Outreach program; and
5. An aquatic weed management program.

PROJECT COST: \$ 354,480

FUNDING: \$ 212,500 by the U.S. EPA  
\$ 139,400 by the town of Southwick  
\$ 2,580 by the Lake Management Committee

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 05-12/319**

PROJECT TITLE: Manchaug Pond NPS Improvement Project  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Manchaug Pond Association  
LOCATION: Blackstone Watershed

DESCRIPTION:

Manchaug Pond is a 344-acre Great Pond located in Sutton and Douglas. The Pond is 303d listed, impaired by organic enrichment, low dissolved oxygen, and noxious aquatic plants and exotic species. Manchaug Pond directly feeds the Mumford River, which leads to the Blackstone River; both rivers are also 303d waterbodies. The Manchaug Pond watershed is dominated by shoreline residential homes and camps, with a large amount of privately owned open space and agricultural land in the upper watershed.

Sediment and erosion are targeted as primary causes of water quality problems in the Pond. The project will implement Best Management Practices to control roadway runoff at five prioritized sites identified in a recent watershed survey. The Manchaug Pond Association will also undertake a substantial outreach and education program to encourage homeowner and agricultural Best Management Practices.

Project tasks include:

1. Design and construction of roadway Best Management Practices;
2. Outreach to homeowners to encourage septic maintenance;
3. Outreach to horse owners within the watershed to encourage good horsekeeping practices; and
4. An educational display about the benefits of Low Impact Development;

PROJECT COST: \$ 219,370

FUNDING: \$ 129,250 by the U.S. EPA  
\$ 90,120 by the Towns of Sutton and Douglas

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 06-01/319**

**PROJECT TITLE:** Orange Riverfront Park: Using Low Impact Development Techniques to Manage Stormwater Runoff  
**NPS CATEGORY:** Urban Runoff  
**INVESTIGATOR:** Town of Orange  
**LOCATION:** Millers Watershed

**DESCRIPTION:**

Urban Runoff discharges from stormwater outfalls are the single largest source of pollution responsible for water quality problems in many of the rivers, streams, and lakes in the state. Recent assessment projects conducted for the Millers River watershed have identified stormwater as a major contributor of nonpoint source pollution.

The purpose of this project is to introduce local officials in the Town of Orange to an alternative to the conventional ‘pipe and pond’ approach to stormwater management – Low Impact Development (LID). LID is an ecologically-based approach to stormwater management that creates a hydrologically functional landscape, which generates less surface runoff and less nonpoint source pollution. This is especially important for development projects that are adjacent to sensitive resource areas. The project will create an outdoor LID classroom, showcasing several different LID techniques including porous pavement, rain barrels, bioretention cells, and rain gardens. Stormwater will infiltrate back into the ground, removing pollutants and recharging groundwater.

The site is a .72-acre former brownfields parcel adjacent to the Millers River that is being developed into a Riverfront Park. Interpretive signs will be installed to inform visitors about the LID features and functions, and will be used as a demonstration site to encourage others to implement similar LID practices in other areas.

**Project tasks include**

1. Development of a MassDEP and EPA Approved Quality Assurance Project Plan (QAPP);
2. Installation of LID BMPs;
3. Development of an Operation and Maintenance Plan; and
4. A public outreach and education program

**PROJECT COST:** \$ 376,388

**FUNDING:** \$ 224,600 by the U.S. EPA  
\$ 151,788 by the Town of Orange (anticipated Urban Self-Help funds)

**DURATION:** 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 06-04/319**

PROJECT TITLE: Oak Hill Tributary Improvement Project  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: City of Pittsfield  
LOCATION: Housatonic Watershed

**DESCRIPTION:**

Unkamet Brook is a tributary to the East Branch of the Housatonic River. The stream channel is choked with sediment that impedes the flow of water, resulting in stagnant pools that increase water temperature, facilitate algae blooms, and decrease water clarity and quality. During storm events, the build up sediment impedes flow, causing channel erosion, damage to roads and property, and localized flooding.

Using a watershed-wide approach, the project will install Best Management Practices throughout the Unkamet Brook watershed to mitigate the impacts of stormwater runoff that are causing the serious flooding and erosion problems with accompanying downstream buildup of sediment throughout the adjacent residential neighborhoods. An outreach program will focus on protection and preservation of riparian zones on adjacent properties, to help stabilize the stream channel and address water quality issues.

Project tasks include:

1. Final design, engineering, and implementation of Best Management Practices;
2. Securing legal easements from affected abutters; and
3. Outreach and education to watersheds residents to encourage good homeowner practices, riparian buffers, and Low Impact Development Best Management Practices.

PROJECT COST: \$474,600

FUNDING: \$ 207,000 by the U.S. EPA  
\$ 267,600 by the City of Pittsfield

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 06-05/319**

PROJECT TITLE: First Herring Brook Low Impact Development Stormwater Enhancements  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of Scituate  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

Old Oaken Bucket, the Town of Scituate's main drinking water supply, lies within the First Herring Brook watershed and is listed on the Final Massachusetts 2002 Integrated List of Waters as a Category 5 waterbody, impaired by noxious aquatic plants, turbidity, and nutrients. Also in the First Herring Brook watershed, the Herring and North Rivers are listed for pathogens, and Tack Factory Pond is Category 3 listed for exotic species. The watershed has been a MassDEP priority since the 1996 South Coastal Watershed Resource Restoration Report. Since that time, several implementation projects, including several funded by MassDEP's Source Water Assessment Program and the 319 program, have been undertaken by the Town to address surface water quality problems in the watershed.

This is one of two recommended FFY 07 projects submitted by the town of Scituate for work that will improve water quality in the First Herring Brook watershed. This project will reduce urban stormwater runoff through the installation of stormwater devices and Low Impact Development Best Management Practices at eight locations around Tack Factory Pond. The work will expand upon previous and ongoing work by supplementing the existing stormwater drainage with Low Impact Development retrofits in the upper reaches of the watershed.

Project tasks include:

1. Design and installation of Low Impact Development Best Management Practices at priority outfalls;
2. Infiltrate stormwater in the upper reaches of the watershed; and
3. Provide education and outreach to residents and stakeholders in the First Herring Brook watershed.

PROJECT COST: \$ 429,700

FUNDING: \$ 256,500 by the U.S. EPA  
\$ 173,200 by the Town of Scituate

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 06-06/319**

PROJECT TITLE: Herring River Coastal Low Impact Development Project  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Town of Scituate  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

The Old Oaken Bucket Reservoir is impaired by noxious aquatic plants. Together with the Tack Factory Pond and surrounding watersheds, the Reservoir is a drinking water supply protected under the Town's Water Resources Protection District. This project builds upon two previous 319 projects (98-08/319 and 05-09/319) as part of an overall strategy to improve water quality in the First Herring Brook watershed, and is synergistic with the First Herring Brook Low Impact Development Stormwater Enhancement Project, also funded in FFY 2007.

The goal of the project is to reduce NPS pollution in the Herring and North Rivers. Two Best Management Practices will be installed to aid in the treatment of stormwater, reduce runoff, promote infiltration and enhance groundwater recharge near Driftway Park. Pet waste from the dog park will be targeted through an outreach and education program, and the Greenscapes and Think Blue programs will be presented to watershed stakeholders.

Project tasks include:

1. Design and implementation of Best Management Practices including pervious pavement, outlet stabilization, and rain gardens;
2. A Greenscapes demonstration garden;
3. Installation of Think Blue signage throughout Driftway Park; and
4. Outreach and education to encourage proper pet waste disposal.

PROJECT COST: \$183,274

FUNDING: \$ 108,760 by the U.S. EPA  
\$ 74,514 by the Town of Scituate

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 06-07/319**

PROJECT TITLE: Reducing NPS from Equine Facilities  
NPS CATEGORY: Agriculture  
INVESTIGATOR: UMass Amherst  
LOCATION: Statewide

**DESCRIPTION:**

Agricultural activities are generally recognized as one major cause of nonpoint source pollution, and horse owners represent an important component of commercial and recreational animal agriculture in Massachusetts.

The goal of this project is to reduce the risk of nonpoint source pollution from equine facilities through education and demonstration of best management practices for nutrient management. The project follows on several previous and ongoing grants to UMass that have developed and facilitated nutrient best management practices for a variety of agricultural activities to address TMDL recommendations and issues. This project targets equine operations, a new area of endeavor for UMass Extension and one that has traditionally fallen outside the scope of agricultural technical providers.

Project tasks include:

- Establishment of an equine advisory committee;
- Implementation of demonstration Best Management Practices at three or more equine facilities;
- Workshops and on-farm demonstrations; and
- Development and distribution of educational materials and tools.

PROJECT COST: \$ 256,480

FUNDING: \$ 149,736 by the U.S. EPA  
\$ 106,744 by UMass Amherst

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 06-08/319**

PROJECT TITLE: Bedford NPS Project  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Bedford  
LOCATION: Shawsheen Watershed

**DESCRIPTION:**

The Shawsheen River is an important recreational and natural resource, although most reaches of the River are 303d listed as impaired by a multiplicity of causes including pathogens, nutrients, metals, and toxicity. The Bedford Engineering Department has identified and prioritized 18 subdivision cul-de-sacs that directly contribute untreated stormwater to the Shawsheen River. This project proposes to design and install raingardens at several cul-de-sacs to provide pollutant removal and infiltration at priority sites, and to serve as demonstration projects to facilitate rain garden installation at the remaining sites.

This proposal incorporates recommendations of the Shawsheen Bacteria TMDL. The goal of the project is to improve water quality in the Shawsheen River, and to improve local capacity to implement effective Low Impact Development Best Management Practices throughout a large area by encouraging technology transfer focused on rain gardens.

Project tasks include:

1. Design and implementation of rain gardens in priority cul-de-sacs;
2. Development and distribution of a design document to encourage the use of Low Impact Development Best Management Practices;
3. A storm drain marking program; and
4. Additional outreach and education aimed at good homeowner practices, especially pet waste management.

PROJECT COST: \$159,653

FUNDING: \$ 95,775 by the U.S. EPA  
\$ 63,878 by the Town of Bedford

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 06-09/319**

PROJECT TITLE: River Street Best Management Practice Implementation  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Ludlow  
LOCATION: Chicopee Watershed

**DESCRIPTION:**

Ludlow is located on the north side of the Chicopee River, with several areas of dense development adjacent to the River. The Chicopee River is 303d listed for pathogens in several of its segments in Ludlow. The Ludlow DPW has identified priority areas that are contributing untreated stormwater to the River. For this project, the Town of Ludlow will treat discharges originating from the priority River Street area that are impacting the Chicopee River. Structural Best Management Practices will be installed to treat all discharges in the target area near Town Hall and the Library. An infiltration bed and offline leaching structures will infiltrate runoff, and low-impact landscaping will be showcased as an outreach and educational task of the project.

The goal of the project is to improve the water quality of the Chicopee River by treating all stormwater generated from the subwatershed/catchment area.

Project tasks include:

1. Implement source reduction Best Management Practices in the River Street area;
2. Install and educate about Low Impact Development landscaping at the Town Hall; and
3. Present a permanent display at the Town Hall and Library on the topic of stormwater and nonpoint source pollution.

PROJECT COST: \$ 131,792

FUNDING: \$ 77,768 by the U.S. EPA  
\$ 54,024 by the Town of Ludlow

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 06-10/319**

**PROJECT TITLE:** Operation and Maintenance of the Massachusetts Alternative Septic System Test Center  
**NPS CATEGORY:** Land Disposal  
**INVESTIGATOR:** Barnstable County Dept. of Health and the Environment  
**LOCATION:** Statewide

**DESCRIPTION:**

The Massachusetts Septic System Test Center serves as a resource for quality third-party performance information regarding advanced onsite septic system technologies. In addition, the existence of the Test Center promotes the trial of new technologies to reduce nitrogen and phosphorus from wastewater.

This continuing project supports the state's TMDL program by providing environmental decision makers with the tools with which the goals of the TMDL and the Massachusetts Estuaries programs can be achieved, especially where wastewater is a major source of pollutant loading. This project will continue the ongoing work of the MASSTC. Tasks include conducting facility operations, synthesizing data derived from testing of new systems, reporting on test results, and providing outreach and education at the test center through published reports and articles, and with the development and maintenance of a web site. The project will also develop a testing protocol for alternative soil absorption technologies (e.g., gravelless chambers, pipe-media matrices) to support MassDEP by providing a rational basis for approving various sizing or vertical setback credits.

**PROJECT COST:** \$ 210,531

**FUNDING:** \$ 105,871 by the U.S. EPA  
\$ 104,750 by onsite system vendors

**DURATION:** 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-01/319**

PROJECT TITLE: Stormwater and Low Impact Development Technology Transfer  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: UMass Amherst  
LOCATION: Statewide

**DESCRIPTION:**

MassDEP and other state and local officials need verified information about the performance of stormwater treatment devices and techniques on which to base their permitting, regulatory, and resource protection activities. Information that is independent of manufacturers' literature is necessary in order for stakeholders and regulators to make informed decisions about optimal resource protection strategies.

This project follows on a current project, 04-02/319, which is developing a web-based technology transfer clearinghouse to help municipal officials and others gain access to current, credible information about stormwater technologies. This project will continue that work, and will add information about Low Impact Development Best Management Practices, including decision-making tools and guidance materials. The clearinghouse, which can be seen at [www.mastep.com](http://www.mastep.com), has proven to be a valuable tool in providing an objective assessment of the capabilities of many of the stormwater devices currently on the market.

**Project tasks include:**

1. Maintain and enhance the current database and web site;
2. Assess and respond to user needs;
3. Expand the database to include low-impact development Best Management Practices; and
4. Perform outreach to the public through an organized distribution plan.

PROJECT COST: \$375,006

FUNDING: \$ 225,000 by the U.S. EPA  
\$ 150,006 by UMass Amherst

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-02/319**

PROJECT TITLE: Operation and Maintenance of the Massachusetts Alternative Septic System Test Center  
NPS CATEGORY: Land Disposal  
INVESTIGATOR: Barnstable County Dept. of Health and the Environment  
LOCATION: Statewide

**DESCRIPTION:**

The Massachusetts Septic System Test Center serves as a resource for quality third-party performance information regarding advanced onsite septic system technologies. In addition, the existence of the Test Center promotes the trial of new technologies to reduce nitrogen and phosphorus from wastewater.

This continuing project supports the state's TMDL program by providing environmental decision makers with the tools with which the goals of the TMDL and the Massachusetts Estuaries programs can be achieved, especially where wastewater is a major source of pollutant loading. This project will continue the ongoing work of the MASSTC. Tasks include conducting facility operations, synthesizing data derived from testing of new systems, reporting on test results, and providing outreach and education at the test center through published reports and articles, and with the development and maintenance of a web site.

PROJECT COST: \$213,441

FUNDING: \$ 121,611 by the U.S. EPA  
\$ 91,830 by onsite system vendors

DURATION: 2006 – 2009

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-03/319**

PROJECT TITLE: Rockwell Pond Source Reduction Pilot Project  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Massachusetts Watershed Coalition  
LOCATION: Nashua Watershed

**DESCRIPTION:**

The goal of this project is to reduce sources of sediment, phosphorus and bacteria which studies have identified as the pollutants that impair Rockwell Pond, Monoosnoc Brook, and the North Nashua River. The watershed remediation strategy will include: (1) installation of bioretention areas and source reduction practices; (2) installation of structural BMPs to treat storm drainage systems; (3) community education to enable source reduction and pollution prevention by homeowners, homebuilders, businesses, and municipal officials; and (4) preparation of an Operations and Maintenance Plan, including agreements by private and municipal owners to ensure the effective operation of all installed BMPs.

Project activities during the first year will install at least 5 demonstration rain gardens in visible locations; at least 8 bioretention areas in road right-of-ways; and at least 7 home rain gardens. Field inspections of first year practices will provide guidance for the siting and design of at least 20 additional bioretention areas, rain gardens, and storm drain system treatment BMPs to be installed in the second year. All proposed structural and non-structural BMPs are recommended by the MassDEP *Clean Water Toolkit* and *Massachusetts Watershed Based Plan*, as well as reports by consultants, community organizations, and the federal Natural Resources Conservation Service

PROJECT COST: \$ 429,250

FUNDING: \$ 205,050 by the U.S. EPA  
\$ 220,950 by the City of Leominster  
\$ 3,250 by the Massachusetts Watershed Coalition

DURATION: 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-04/319**

PROJECT TITLE: Improving Water Quality in the Hamilton Reservoir Watershed  
NPS CATEGORY: Urban runoff  
INVESTIGATOR: Pioneer Valley Planning Commission  
LOCATION: French & Quinebaug Watershed

**DESCRIPTION:**

Hamilton Reservoir is a 413-acre recreational impoundment forming the headwaters of the Quinebaug River located in Holland, Massachusetts and Union, Connecticut. Hamilton Reservoir is listed as a Category 4c Waters for exotic species on the Integrated List of Impaired Waters. Sediment infilling and nuisance aquatic plants (*Myriophyllum heterophyllum*) are impeding the ecological function of the reservoir and its recreational value. This situation has worsened dramatically since the problems were first documented in the 1983 Diagnostic Feasibility Study (D/F) performed by Cullinan Engineering Company.

This project will reduce sediment loading and associated pollutants to Hamilton Reservoir in the town of Holland, Massachusetts by implementing four structural BMPs in three subwatersheds documented for contributing excessive amounts of sediment loading; and, engage in extensive public outreach for the implementation of both structural and non-structural BMPs on residential properties. The proposed BMPs are at Steven's Brook, May Brook (#2 and #3), and Brandon Street.

The project goals are: 1) sediment loading and associated pollutants are reduced, 2) invasive aquatic weed populations continue to decrease, 3) sediment loading is reduced from targeted subwatersheds, 4) watershed residents are knowledgeable about residential landscaping techniques and maintenance protocols for a healthy lake and, 5) the Holland Highway Department implements an effective maintenance program for stormwater facilities.

PROJECT COST: \$380,380

FUNDING: \$ 228,450 by the U.S. EPA  
\$ 139,050 by the Town of Holland  
\$ 12,880 by the Hamilton Reservoir Association

DURATION: 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-05/319**

PROJECT TITLE: Franklin Stormwater Retrofit Improvement Project  
NPS CATEGORY: Urban runoff  
INVESTIGATOR: Town of Franklin  
LOCATION: Charles Watershed

**DESCRIPTION:**

Like many communities throughout the Commonwealth, the Town of Franklin is experiencing development pressures and an increased level of imperviousness in many areas. Contaminated stormwater is a recurring issue. The Town has a number of waterbodies affected by contaminated stormwater, resulting in several of these waterbodies being listed on the 303(d) list of impaired water because they do not meet designated uses. Several of these resources are located within the watershed of the Charles River, which is also on the 303(d) list with draft phosphorous and pathogen TMDLs associated with it.

The goal of this program is to improve the water quality to impaired waters while developing typical or template BMPs for future projects that have been identified with similar needs. Tasks include

- Design and construct retrofits to existing drainage features and BMPs to enhance water quality with lower capital costs than new BMPs;
- Develop a variety of BMP retrofits for use with similar projects in the future; and
- Increase public awareness of non-point source pollution and stormwater management needs through classroom education and informational newsletters by DPW discussing the project and water quality benefits.

PROJECT COST: \$229,762

FUNDING: \$ 131,000 by the U.S. EPA  
\$ 98,762 by the Town of Franklin

DURATION: 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-06/319**

PROJECT TITLE: Stormwater BMP Implementation for Little Harbor  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Town of Cohasset  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

This Project will improve the water quality and protection of Little Harbor through the design, environmental permitting, and construction of stormwater control and treatment systems within the Little Harbor watershed in the Town of Cohasset. These designs will utilize structural best management practice (BMP) solutions and will incorporate low impact development (LID) strategies to contain and minimize runoff flows and nonpoint source pollution loading into Little Harbor. Structural BMP improvement options to be considered will include hooded catch basins, bioretention facilities (a.k.a. rain gardens), roadside swales with biofilters, and spill containment facilities. This Project includes on-going operation and maintenance and a public outreach and education component that will explain the Project and the effectiveness of stormwater BMPs to residents and encourage participation in reducing nonpoint source pollution.

This Project will also complement an on-going sewer construction project initiated by the Town of Cohasset and supported by the Commonwealth through a loan from the State's Revolving Fund (SRF) for wastewater infrastructure and water quality protection. By coordinating these projects, the reduction of onsite sewage disposal system source pollution and stormwater runoff nonpoint source pollution will result in a more effective "total solution".

The BMP controls will be sited in areas of concentrated stormwater runoff and will be designed to treat runoff prior to discharge into Little Harbor. The BMP controls will include low impact development (LID) techniques such as bioretention rain gardens and vegetated swales to be sited within public rights-of-way. A secondary goal of this Project is to implement a public outreach and education program for Cohasset residents. This program will inform residents of the proposed stormwater BMPs and of project progress. This program will also educate and encourage residents to participate in the reduction of NPS pollution by using innovative LID treatment systems

PROJECT COST: \$ 250,000  
FUNDING: \$ 150,000 by the U.S. EPA  
\$ 100,000 by the Town of Cohasset  
DURATION: 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-07/319**

PROJECT TITLE: Jackson Square LID Program  
NPS CATEGORY: Urban Runoff  
INVESTIGATOR: Jackson Square Partners LLC  
LOCATION: Charles Watershed

**DESCRIPTION:**

The Stony Brook, a Charles River tributary, does not meet water quality standards for organics, metals, nutrients, pathogens and other pollutants. Overflow of the Stony Brook Culvert is also a significant contributor to this water quality degradation in the Muddy River as well as the Lower Charles River Basin. Non-point source pollution from urban runoff is the primary source of pollution to the Stony Brook Culvert.

The Jackson Square Low Impact Development (LID) Program (the “Project”) will dramatically reduce non-point source pollution from an 11-acre site in Roxbury/Jamaica Plain by using low impact stormwater management techniques in the redevelopment of this area, including green roofs on 75% of roof surfaces, bioswales and rain gardens. This Project is part of a larger effort to convert an underutilized brownfield site in one of Boston’s poorest neighborhoods into a model of vibrant, ‘super green’, mixed-use, transit-oriented development that will include housing (50%+ affordable), retail and office space, and new community facilities – all adjacent to an MBTA station.

Low impact stormwater management is a key piece of the project’s aggressive green development agenda, which also includes on-site renewable energy generation, green buildings, better access to alternative transportation, and extensive outreach and education about the projects green design elements to local residents and the development community.

PROJECT COST: \$350,000  
FUNDING: \$ 200,000 by the U.S. EPA  
\$ 150,000 by Jackson Square Partners  
DURATION: 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-08/319**

PROJECT TITLE: Onota Lake Preservation Project  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: City of Pittsfield  
LOCATION: Housatonic Watershed

**DESCRIPTION:**

Onota Lake is classified as mesotrophic and suffers from accelerated eutrophication. Onota Lake is listed as impaired by exotic species within the Final Massachusetts 2004 Integrated List of Waters under Category 4c. According to the Diagnostic / Feasibility Study for Onota Lake (IT Corp. 1991), the most pervasive cause of Onota Lake's problems stem from excessive sediment and nutrient loading. Watershed urbanization, agricultural practices and stormwater runoff have contributed to increased nutrient and sediment loading resulting in a decline in water quality, loss of fish habitat, and impaired use of the lake.

The goal of this project is to implement the recommendations of the *Onota Lake Long-Range Management Plan* by addressing the highest priority water quality impairments and the major sources of NPS within a Category 4c water body. Tasks include

- Increase the Capacity of Drawdown through Structural Modifications to the Onota Lake Dam: The Onota Lake dam is owned and operated by the City of Pittsfield. The City of Pittsfield has been authorized to conduct drawdowns up to 6 ft to improve the effectiveness of the weed control. The project will complete the construction of an additional low-level outlet pipe dam to augment existing drawdown capabilities.
- Install Stormwater BMPs at Burbank Park: Priority sites for stormwater management at Burbank Park were identified through prior projects conducted in partnership between the City, LOPA and BRPC. Stormwater best management practices were successfully installed at the top priority sites under the s.319 grant 00-01/319. The project will build on that prior effort by improving the quality of the existing drainage system at Burbank Park and will further reduce pollutants, sedimentation, and erosion at the lake.
- Monitoring & Project Evaluation: LOPA volunteers will continue to conduct water quality monitoring pursuant to the QAPP approved by EPA/MassDEP under 00-01/319.
- Education & Outreach: The City will partner with LOPA and BRPC to conduct a three pronged outreach and education approach aimed at homeowners, visitors and boaters. The project partners will utilize the principles of social marketing through a variety of different media including newsletters, websites, signs and television/radio.

PROJECT COST: \$456,200

FUNDING: \$ 268,700 by the U.S. EPA  
\$ 187,500 by the City of Pittsfield

DURATION: 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 07-09/319**

PROJECT TITLE: James Brook Urban Stormwater Improvements  
NPS CATEGORY: Urban runoff  
INVESTIGATOR: Town of Groton  
LOCATION: Nashua Watershed

**DESCRIPTION:**

The Town of Groton recently undertook a multi-phased effort to comprehensively revitalize and improve a dense mixed-use development area of Town called Station Avenue. Just outside of the center of town and within the James Brook Subwatershed of the Nashua River Basin, this area houses several high impervious industrial businesses. The Town has established a new Low Impact Development (LID) zoning overlay district and is in the process of establishing a LID bylaw specific to this section of town to encourage recharge and innovative stormwater management.

The proposed project will complement the above efforts already implemented by the Town by addressing nonpoint source issues within already developed areas of this priority subwatershed. Individual elements include:

- Addition of off-line leaching/deep sump catch basins along Main Street (Route 119 – maintained by the Town of Groton Highway Department), retaining sediment and significantly reducing storm surges to James Brook.
- Culvert improvement and stream channel restoration to the downtown outlet of James Brook, reducing total suspended solids and nutrient runoff downstream.
- Court Street pervious paver interceptor reducing nutrient, pathogen and sediment laden roadway runoff.
- Develop an updateable stormwater display with a schedule of monthly subtopics to be exhibited at the Groton Town Hall and Library.
- Implementation of various outreach efforts including construction of several residential LID elements along Court Street, installation of pet waste bag dispensers along the rail trail and updating of the rail trail kiosk also visible from Court Street and Station Avenue.

PROJECT COST: \$ 223,910

FUNDING: \$ 134,350 by the U.S. EPA  
\$ 89,560 by the Town of Groton

DURATION: 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 08-01/319**

PROJECT TITLE: Eel River Headwaters Restoration  
NPS CATEGORY: Resource Restoration  
INVESTIGATOR: Plymouth DPW  
LOCATION: South Coastal Watershed

**DESCRIPTION:**

The Eel River Headwaters Restoration project will convert abandoned cranberry bogs to wetland habitat, removing flow structures to restore the river channel thereby creating coldwater stream habitat and reducing nutrients in both freshwater and coastal systems. The restoration site is located within the Eel River Watershed, a sub-basin of the South Coastal Watershed. In 2005, the Town of Plymouth purchased 34 acres of bogs and 40 acres of upland at the headwaters of the Eel River south of Long Pond Road. The Town also owns an additional 100+ acres north of Long Pond Road connecting to Russell Mill Pond.

The abandoned bog system will be restored to a complex of natural wetlands including riparian wetlands, red maple swamp, Atlantic white cedar swamp and scrub-shrub wetlands. Approximately 1.25 miles of river channel will be restored by removing the Sawmill Pond Dam and earthen dams and dikes within the bog system. The removal of the earthen dams and the Sawmill Pond Dam will result in the restoration of fish passage and the restoration of 1,100ft of cobble-boulder stream as well as coldwater habitat restoration. The project will also result in an increased diversity of species (fish, mussels, macroinvertebrates) and will aid in the removal of excess nutrients from the Eel River system and ultimately Plymouth Harbor. This is a large project with several components and partners. 319 funding will implement the portion of the project that will remove of flow alterations (culverts, ditches, small dams) and restore of the river channel.

PROJECT COST: \$ 666,666

FUNDING: \$ 400,000 by the U.S. EPA  
\$ 266,666 by the MassDEP Wetland Mitigation Fund

DURATION: 2007 – 2010

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**SECTION 319 NPS PROJECT 08-02/319**

PROJECT TITLE: Lake Waushakum LID BMP Implementation Project  
NPS CATEGORY: Urban runoff  
INVESTIGATOR: Town of Ashland  
LOCATION: Concord (SuAsCo) Watershed

**DESCRIPTION:**

Waushakum Pond is located on the border of the towns of Ashland and Framingham. The pond is located in the headwaters of the Concord River Watershed (Major Basin SuAsCo – Concord) and is tributary to the Sudbury River. It is also one of Massachusetts’ *Great Ponds*. The area around the pond is highly developed and receives stormwater discharge from a roadway collection system that currently provides little or no treatment. Waushakum Pond is currently listed on Massachusetts Department of Environmental Protection (MassDEP) Proposed Year 2006 Integrated Lists of Waters as Category 4c for “Impairment not Caused by a Pollutant.” Two pond assessments and MassDEPs *SuAsCo Watershed 2001 Water Quality Assessment Report* have identified non-point source pollutants (TSS and phosphorous) as the major causes of impairment.

This project will utilize the information developed in these previous assessments, and will implement three priority Best Management Practices (BMPs) in the Pond’s watershed. The proposed Low Impact Development (LID) BMPs include several tree bioretention facilities (raingardens), and the installation of permeable paving with the major project goals of reducing phosphorous, suspended solids and other non-point source pollutants, promoting recharge through infiltration, and replicating the area’s natural hydrology. This project is the first phase of a multi phase project.

A decision matrix was used to evaluate potential BMP locations. Ten (10) locations were evaluated and the three (3) most promising were chosen. Once locations were determined, a second matrix was used to identify the best BMP per site. The selected BMPs are:

1. Site #1 - Installation of permeable paving at the boat launching area in Ashland to prevent significant sedimentation of the pond from ongoing erosion and untreated discharge of stormwater, and promotes stormwater recharge.
2. Site #2 and Site #10 - Installation of bioretention cells to capture, treat and infiltrate storm water. Bioretention has been shown to be extremely effective in reducing nutrient levels and sediment loading associated nonpoint source pollution. The bioretention cells will take the form of tree filters/rain gardens located near catch basins. Street trees will be planted in the tree filter along with perennials. Street trees will also help reduce thermal pollution associated with hot summer weather.

PROJECT COST: \$163,890

FUNDING: \$ 98,500 by the U.S. EPA  
\$ 38,990 by the Town of Ashland  
\$ 20,000 by the Town of Framingham  
\$ 6,400 by volunteers

DURATION: 2007 – 2010

**APPENDIX**  
**319 NONPOINT SOURCE PROGRAM PROJECTS 1990-2003**

- 90-01/319 Avon Industrial Park Storm Water Management**  
by Old Colony Planning Council
- 90-02/319 Milkroom Wastewater Treatment Demonstration**  
by Northwest Worcester Co. Conservation Dist.
- 90-03/319 Pesticide Handling Demonstration**  
by Franklin, Hampden & Hampshire Co. Conservation Districts
- 90-04/319 Development of Pesticide Data and Support System for Risk Assessment**  
by Worcester County Conservation District
- 90-05/319 North and South Rivers Storm Water Mitigation**  
by North & South Rivers Watershed Assoc.
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- 91-01/319 Soil Morphology as an Indicator for Maximum Groundwater Elevation Levels in MA**  
by UMass, Amherst, Department of Plan and Soil Sciences
- 91-02/319 Rehabilitation and Evaluation of the Sterling Filter Beds at Wachusett Reservoir**  
by MDC, Division of Watershed Management
- 91-03/319 Soil Bioengineering Streambank Protection Measures on the Blackstone and North Rivers**  
by Franklin, Hampden & Hampshire Co. Conservation Districts
- 91-04/319 Investigation of Low-Input Cranberry Production**  
by UMass, Amherst, Entomology Dept.
- 91-05/319 Hydrogeologic Evaluation of the Waquoit Bay Land Margin Ecosystem**  
by Cape Cod Commission
- 
- 92-01/319 Spragues Cove Storm Water Remediation**  
by Town of Marion
- 92-02/319 Control of Urban Runoff in the Connecticut, Merrimack and Sudbury River Basins**  
by Metropolitan Area Planning Council
- 92-03/319 Ipswich River Nonpoint Source Prevention Program**  
by MDFWELE, Riverways
- 92-04/319 Technical Support for Developing and Implementing Urban Runoff Nonpoint Source Control Strategies in the Merrimack River Basin**  
by MassDEP, Division of Water Supply
- 
- 93-01/319 Storm Water Remediation for the Broad Marsh River**  
by Town of Wareham
- 93-02/319 Sediment and Erosion Control in the Taunton River Basin Program**  
by MDFWELE, Riverways
- 93-03/319 Artificial Recharge Evaluation and Guidance to Municipalities**  
by Pioneer Valley Planning Commission
- 93-04/319 H<sub>2</sub>Ome Check Pilot Project**  
by Nashua River Watershed Association
- 93-05/319 Commercial Underground Storage Tank Compliance**  
by Barnstable County Department of Health and the Environment
- 93-10/319 Cape Cod Coastal Nonpoint Source Management Plan**  
by Cape Cod Commission
- 93-11/319 Wachusett Septic System Management System**  
by UMass Cooperative Extension, Amherst
- 93-12/319 Nitrogen Loading Model Computer Program Development**

- by Horsley & Witten, Inc.
- 93-13/319 Development and Outreach of an Erosion and Sedimentation Control Guide for Massachusetts**  
by Franklin, Hampden & Hampshire County Conservation Districts
- 94-01/319 Best Management Practices to Control Nonpoint Source Pollution from Forestry Operations**  
by Berkshire-Pioneer Resource Conservation and Development Area
- 94-03/319 Green River Soil Bioengineering Demonstration Project**  
by Berkshire Conservation District
- 94-05/319 Alternative Onsite Septic Systems – Encouraging Their Use in Environmentally Sensitive Areas of Barnstable County**  
by Barnstable County Dept. of Health and the Environment
- 94-06/319 Orleans Storm Water Remediation Project**  
by Cape Cod Conservation District
- 94-07/319 Mill River Nonpoint Source Management Project**  
by Mass Audubon Society, North Shore
- 94-08/319 Lake Tashmoo Storm Water Remediation Project**  
by Tisbury Waterways, Inc.
- 94-09/319 Jones River/Billington Sea Nonpoint Source Pollution Control Project**  
by Pilgrim Resource Conservation & Development Area Council, Inc.
- 95-01/319 Lake Lorraine and Fivemile Pond Nonpoint Source Project**  
by Pioneer Valley Planning Commission
- 95-02/319 A Demonstration Program to Mitigate Storm Drain Pollution Impacting Shellfish Beds**  
by MA Coastal Zone Management
- 95-03/319 Buttermilk Bay Storm Water Remediation Project**  
by Town of Bourne
- 95-04/319 Demonstration of Urban Pollution Control in the Green River Watershed**  
by Franklin, Hampden and Hampshire Conservation District
- 95-05/319 Demonstration of an Alternative Onsite Wastewater Disposal System at Allen’s Pond Wildlife Sanctuary** by Buzzards Bay Project
- 95-06/319 Comprehensive Nonpoint Source Management in the Mill River Subwatershed, Hatfield, MA**  
by Pioneer Valley Planning Commission
- 95-07/319 Title 5 Training for Boards of Health in Five Towns in Barnstable County**  
by Barnstable County Department of Health and the Environment
- 95-08/319 Swan Pond River Storm Water Remediation Project**  
by Town of Dennis
- 95-09/319 Buzzards Bay Action Committee-Holmes Brook Restoration**  
by Buzzards Bay Action Committee
- 95-10/319 Developing and Conducting Training Workshops for the Revised Regulations for MGL C 132, Forest Cutting Practices Act**  
by Berkshire-Pioneer Resource Conservation and Dev. Area Council
- 95-11/319 Neponset River Fishway Project**  
by MassDEP
- 96-01/319 Septic System Management 2000 Project**  
by Cooperative Extension System, UMass, Amherst
- 96-02/319 Monitoring Strategies for Innovative Onsite Sewage Disposal Technologies**  
by UMass, Amherst and Lowell
- 96-03/319 Connecticut River Watershed Restoration Project**  
by Franklin County Commission
- 96-04/319 Demonstration of Urban Streambed Stabilization and Wetlands Function and Wildlife Habitat Improvement Using Soil Bioengineering Treatments at Hearthstone Quarry Brook, Chicopee**  
by City of Chicopee
- 96-05/319 Spicket River Watershed Revitalization**

- by Merrimack River Watershed Council
- 96-08/319 Statewide Outreach Course and Tool Kit and Central Massachusetts Partnership Pilot**  
by Worcester County Conservation Districts
- 96-09/319 Sub-Basin Assistance for the SuAsCo and Charles River Watersheds**  
DFWELE, Riverways Program
- 96-10/319 Watershed Display on NPS Information, Basin Team Newsletter and Resident Survey**  
by Berkshire Conservation District
- 96-11/319 Watershed Education Teaching (WET) Program**  
by UMass Cooperative Extension System, Amherst
- 97-01/319 Development of Stormwater Utilities in Two Demonstration Communities: Chicopee & South Hadley**  
by Pioneer Valley Planning Commission
- 97-02/319 Red Lily Pond Rejuvenation**  
by Town of Barnstable
- 97-03/319 Technical Outreach to Communities Regarding Alternative Onsite Septic Systems**  
by Barnstable County Dept. of Health and the Environment
- 97-04/319 Alternative Septic Systems Technologies Workshop Program**  
by Berkshire Regional Planning Commission
- 97-05/319 Leak Prevention for Heating Oil Storage Systems**  
by Barnstable County Dept. of Health and the Environment
- 97-07/319 Protecting Nitrogen Sensitive Coastal Embayments Through Land Conservation**  
by Buzzards Bay Project
- 97-08/319 Hall's Pond Wetlands Restoration Project**  
by Town of Brookline
- 97-09/319 Three Bay Area - Ropes Beach Subwatershed**  
by Town of Barnstable
- 98-01/319 Determining the Effectiveness of Onsite Septic Systems for the Removal of Viruses**  
by Barnstable County Dept. of Health and the Environment
- 98-03/319 Coastal Embayment/Title 5 Training Video**  
by Cape Cod Commission
- 98-05/319 Nashawannuck Pond Watershed Restoration Project, Easthampton, MA**  
by Pioneer Valley Planning Commission
- 98-06/319 NPS Pollution Correction in the Farmington River Watershed – Dirt Roads BMP Handbook**  
by Berkshire Regional Planning Commission
- 98-08/319 Protection of First Herring Brook**  
by Town of Scituate
- 98-09/319 Manual of Innovative/Alternative Onsite Wastewater Treatment Technologies**  
by UMass Amherst
- 98-11/319 Development and Demonstration of Protocols for Evaluating Greywater Disposal Systems**  
by Massachusetts Department of Environmental Protection
- 98-12/319 Demonstrating the Use of Eelgrass Monitoring to Assess Coastal Nonpoint Source Pollution**  
by Massachusetts Department of Environmental Protection
- 98-07/319 Reducing Stormwater in an Ultra-Urban Watershed**  
by City of Somerville
- 99-01/319 Alternative Septic System Test Center Project Monitoring**  
by Buzzards Bay Project
- 99-03/319 Pontoosuc Lake Watershed Resource Restoration Project**  
by Berkshire Regional Planning Commission
- 99-04/319 Winsegansett Salt Marsh Restoration Project**  
by Town of Fairhaven
- 99-05/319 Telecom City: Malden, Medford, Everett**  
by Mystic Valley Development Commission

- 99-06/319 Development of Recharging Stormwater Control Structures and Flow and Volume Design Criteria**  
by UMass/Amherst
- 99-07/319 Design and Guidance for Shallow Trench Low Pressure Pipe Distribution Systems for the Massachusetts Title 5 Innovative/Alternative Septic System Program**  
by UMass/Amherst
- 99-08/319 Mill River Watershed Restoration Project**  
by Franklin Regional Council of Governments
- 99-09/319 Demonstration of Best Management Practices to Control Agricultural NPS Pollution**  
by Massachusetts Department of Food and Agriculture
- 99-11/319 Coastal Zone Management Stormwater BMP Monitoring Project**  
by Massachusetts Department of Environmental Protection and Office of Coastal Zone Management
- 00-01/319 Implementing the Diagnostic/Feasibility Study Recommendations for Onota Lake**  
by the Berkshire Regional Planning Commission
- 00-02/319 Alternative Septic System Test Center Project Monitoring**  
by the Barnstable County Department of Health and the Environment
- 00-03/319 Development of a Rapid Field Test for the Quality of Stone Aggregate in Onsite Septic Systems**  
by the Barnstable County Department of Health and the Environment
- 00-04/319 Connecticut River Watershed Restoration Phase II**  
by the Franklin Regional Council of Governments
- 00-05/319 Atlas of Stormwater Discharges**  
by the CZM Buzzards Bay Project
- 00-06/319 Management Strategies for MA Dairy Farms to Reduce the Risk of Nonpoint Source Pollution**  
by UMass Amherst
- 00-07/319 Town of Acton Nonpoint Source Control Program**  
by the Town of Acton
- 00-08/319 Long Pond Restoration Project**  
by the Town of Littleton
- 00-09/319 Onset Bay, Wareham, MA, Nonpoint Source Pollution Remediation Project**  
by the Town of Wareham
- 00-10/319 Shaw's Plaza Drainage NPS Management**  
by the Town of Sharon
- 00-12/319 Salisbury Pond Resource Restoration**  
by the City of Worcester
- 00-13/319 Implementation of Nutrient Management Standards on Massachusetts Crop/Livestock Farms to Reduce the Risk of Nonpoint Source Pollution**  
by UMass/Amherst
- 00-14/319 Forestry Best Management Practices (BMP) Implementation and Monitoring Protocol Project**  
by the Massachusetts Department of Conservation and Recreation
- 00-15/319 Revision of the Massachusetts Nonpoint Source Management Manual**  
by GeoSyntec Consultants
- 01-01/319 Lake Cochituate, Snake Brook NPS Remediation, Phase I**  
by the Department of Environmental Management
- 01-02/319 Boat Waste Oil Recovery Program for New Bedford Harbor**  
by the Massachusetts Coastal Zone Management Buzzards Bay Project
- 01-03/319 Parker Pond Restoration, Gardner**  
by the City of Gardner
- 01-04/319 Massachusetts Buffer Manual and Demonstration Projects**  
by the Berkshire Regional Planning Commission
- 01-05/319 Evaluation of Phosphorus Removal in Onsite Septic Systems**  
by the Barnstable County Department of Health and the Environment
- 01-06/319 Memorial Pond Restoration, Phase I**  
by the Town of Walpole

- 01-07/319 Wareham NPS Remediation Program: East River, Broad Cove, Muddy Cove**  
by the Town of Wareham
- 01-08/319 Gray's Beach Park Restoration, Kingston**  
by the Town of Kingston
- 01-09/319 Nashawannuck Pond Restoration, Phase II**  
by the City of Easthampton
- 01-10/319 Development and Demonstration of a Lake Watershed Survey Program**  
by the Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement/Riverways Program
- 01-12/319 Cranberry Bog Phosphorus Dynamics for TMDL Development**  
by the University of Massachusetts Cranberry Experiment Station
- 01-13/319 Lake Buel Implementation and Demonstration Project**  
by the Berkshire Regional Planning Commission
- 01-14/319 Pontoosuc Lake Watershed Resource Restoration Project**  
by the Town of Lanesborough
- 01-15/319 Implementing a Stormwater Remediation Strategy at Ashmere Lake**  
by the Town of Hinsdale
- 01-16/319 Plymouth Road Stormwater Treatment System**  
by the Town of Bellingham
- 01-17/319 North Green Stormwater Management Project**  
by the Town of Ipswich
- 01-18/319 Lagoon Pond Runoff Renovation Project**  
by the Town of Oak Bluffs
- 01-19/319 Oldham and Furnace Pond Stormwater Treatment**  
by the Town of Pembroke
- 01-20/319 Lake Attitash Stormwater Treatment Program**  
by the Town of Amesbury
- 01-21/319 Lake Quinsigamond and Lake Ripple Restoration Project**  
by the Town of Brookfield
- 01-22/319 Stormwater Management Plan at the Millyard Marketplace**  
by the Town of Sturbridge
- 01-23/319 Demonstration of Innovative Stormwater Management Retrofit Systems**  
by the Center for Urban Watershed Restoration
- 01-24/319 Storm Water System Maintenance and Residuals Waste Handling**  
by the City of Quincy
- 01-25/319 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center**  
by the Barnstable County Dept. of Health and the Environment
- 01-26/319 Massachusetts Estuaries Project**  
by UMass Dartmouth
- 02-01/319 Indian Lake Watershed Resource Restoration**  
by the City of Worcester
- 02-02/319 Wall Street Highway Yard Stormwater Improvements Project**  
by the City of Attleboro
- 02-03/319 Stormwater Management on the Middle Pond of the Congamond Lakes**  
by the Pioneer Valley Planning Commission
- 02-04/319 NPS BMPs at Richmond Pond**  
by the Town of Richmond
- 02-05/319 Neponset River Watershed Bacteria TMDL Implementation Project**  
by the Neponset River Watershed Association
- 02-06/319 Head of Westport Stormwater Project**  
by the Town of Westport
- 02-07/319 Lake Singletary Storm Drain Retrofit Program**  
by the Town of Millbury

- 02-08/319 Hammond Pond Stormwater Management Plan Implementation Phase I**  
by the City of Newton
- 02-09/319 Stormwater Remediation for Plymouth Harbor and Plymouth Bay**  
by the Town of Plymouth
- 02-10/319 Implementation of TMDL Recommendations at Lake Boon**  
by the Town of Stow
- 03-01/319 Operation of the Massachusetts Alternative Septic System Test Center**  
by the Barnstable County Department of Health and the Environment
- 03-02/319 Comparison Of Virus Removal In Aggregate Free Chamber Leaching Systems vs. Aggregate Laden Trenches**  
by the Barnstable County Department of Health and the Environment
- 03-03/319 South Coastal Inter-Municipal Water Quality Improvement Project**  
by the Town of Pembroke
- 03-04/319 Dorothy Pond Perimeter and Local Watershed Stormwater Management/Remediation**  
by the Town of Millbury