



Massachusetts
Department
of
ENVIRONMENTAL
PROTECTION

INDICATIVE PROJECT SUMMARIES

SECTION 319 NONPOINT SOURCE COMPETITIVE GRANTS PROGRAM

FFY 2008 - 2014

**Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Bethany A. Card, Assistant Commissioner**

2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

FFY 2008 – 2014

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2014

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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) 2008 through 2014. Projects funded from the inception of the program in 1990 through 2007 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., Sec. 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. Recommended proposals are approved by the Department to be 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. An Operation and Maintenance Plan is required for each implementation project.

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.

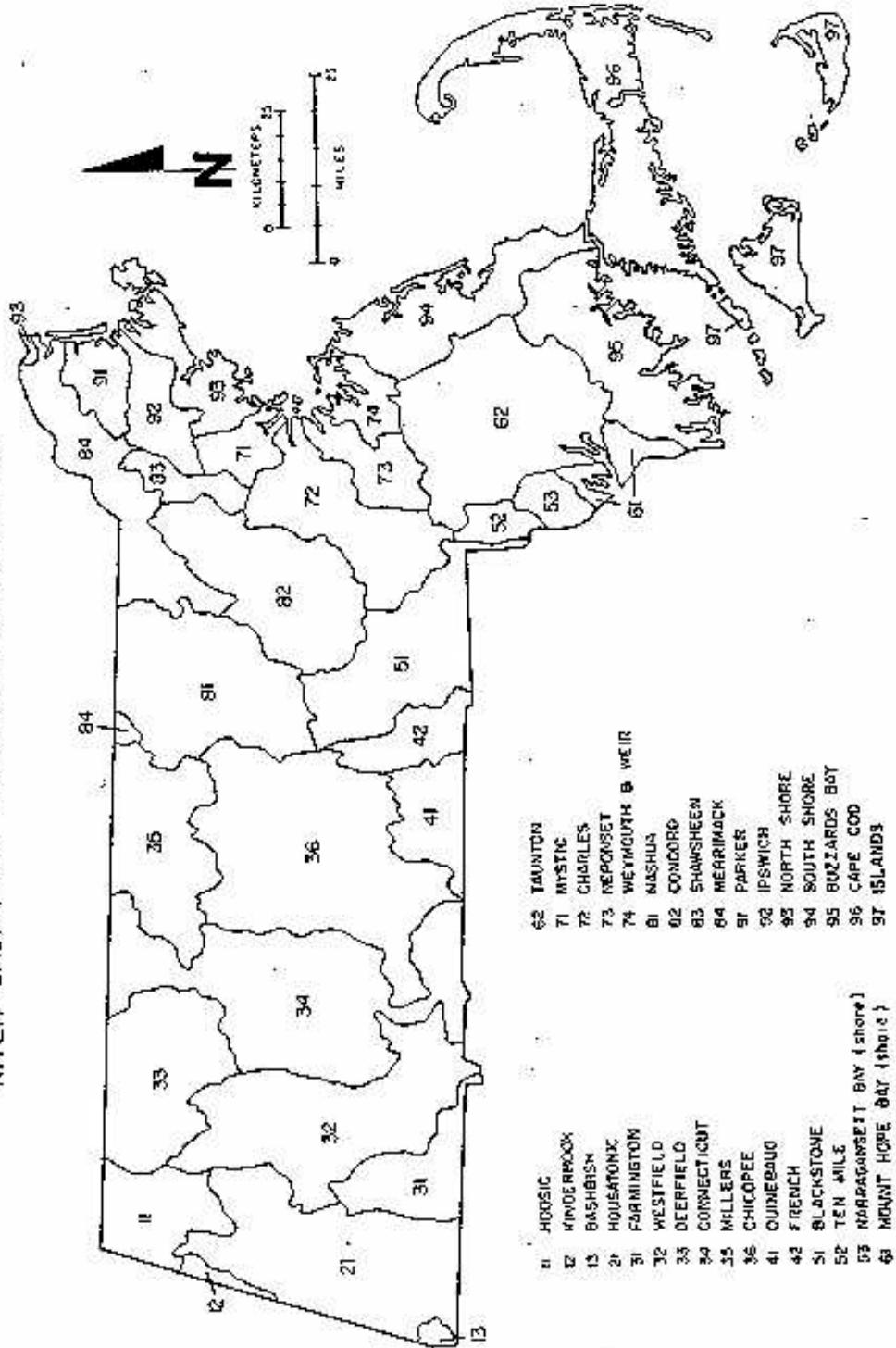
These Indicative Summaries serve as examples of projects that have been competitively selected for funding, based on the priorities and guidelines that are in effect for the year that the project is selected. Program guidelines and priorities may change from year to year. Therefore, potential applicants are strongly encouraged to contact MassDEP program staff to discuss their ideas prior to proposal development, to ensure eligibility and competitiveness. Indicative summaries are presented in numerical order rather than by the fiscal year in which the project was selected.

In particular, please note that 319 guidelines prohibit the use of 319 funds to address the requirements of draft or final NPDES permits. Although much of the state is regulated under MS4 and other NPDES stormwater permits, the 2003 permits were general in nature, and few if any potential 319 projects were screened out because the work was required under the permits. Therefore, older projects may describe work that is no longer eligible, as they were selected prior to 2010 draft NPDES stormwater permits.

New 2010 draft NPDES stormwater permits are very prescriptive, effectively appearing to require that all stormwater impacts are addressed by the permit holder in the regulated areas. As of September 24, 2014, the Massachusetts permits are still in draft form. Until EPA finalizes the NPDES stormwater permits and provides specific definition of the nature and extent of nonpoint source pollution in regulated areas, the Department makes the conservative assumption that all stormwater work in regulated areas is required under the permits, and that little if any 319-eligible nonpoint source pollution remains there. The projects selected and listed here for FFY 2011-2014 reflect that policy.

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.

COMMONWEALTH of MASSACHUSETTS
RIVER BASINS and COASTAL DRAINAGE AREAS



**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
Number of 319 Projects and Allocation of Funds by Basin (1990-2014)**

Table I

<u>Basin Name</u>	<u>Number of Projects</u>	<u>Dollars Allocated</u> <u>(match plus 319 funds)</u>
Hudson	0	0
Housatonic	16	\$3,299,980
Deerfield	4	\$1,012,270
Westfield	4	\$998,170
Farmington	4	\$173,200
Connecticut	13	\$2,972,310
Millers	4	\$908,910
Chicopee	8	\$1,618,520
Quinebaug	2	\$467,080
French	0	\$0
Nashua	12	\$3,350,230
Blackstone	10	\$2,465,540
Merrimack	7	\$1,125,690
Concord (SuAsCo)	9	\$1,274,450
Shawsheen	3	\$1,108,230
Parker	1	\$88,300
Ipswich	5	\$1,601,200
North Coastal	4	\$453,600
Boston Harbor	13	\$3,234,550
Charles	13	\$2,842,800
South Coastal	21	\$5,391,890
Cape Cod	18	\$4,152,550
Islands	2	\$218,600
Buzzards Bay	25	\$4,909,250
Taunton	3	\$146,800
Narr Bay & Mt Hope	0	\$0
Ten Mile	1	\$260,800
Statewide	56	\$7,053,110
TOTAL	258	\$51,280,030

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 02-13/319

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

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 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 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 project 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 CCB37). 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 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

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 04-18/319

PROJECT TITLE: Bare Hill Pond III
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Harvard
LOCATION: Nashua Basin

DESCRIPTION:

Bare Hill Pond in Harvard, Massachusetts is a 321-acre, municipally managed pond in the Nashua Watershed. The watershed is moderately developed, although it maintains the rural nature of the community due to largely forested environs. The pond was originally 200 acres surrounded by pasturelands. In 1838, the pond was dammed, bringing it to its present size. The damming of the pond, the prior surrounding agricultural land uses and more recent residential development have brought the pond to its present day condition.

The pond suffers from extensive growths of invasive plants such as variable milfoil, water chestnuts, water lilies, fanwort, smartweed, and pondweed. The pond has elevated phosphorous levels which exacerbate the macrophyte growth, and a TMDL for phosphorus has been developed. Accelerated eutrophication and extensive prevalence of invasive aquatic plants seriously interfere with recreational uses and wildlife habitats. Two previous 319 projects, 03-05/319 and 08-04/319, have begun to implement BMPs to address water quality impairments in Bare Hill Pond.

The goal of this project is to continue implementing the TDML by: (1) reducing the current levels of NPS phosphorus pollution; and (2) reducing the existing biomass of noxious aquatic plants. Phosphorus reduction will be accomplished through (1a) implementation of six watershed BMPs to provide LID treatment of stormwater inflows and (1b) excavation of phosphorus-enriched sediments. Invasive weed reduction will be accomplished through (2a) monitored winter drawdowns and (2b) harvesting. This project also includes an extensive outreach and education component to engage watershed abutters and encourage adoption of BMPs to reduce nutrient loading from their properties into the Pond.

PROJECT COST: \$497,463

FUNDING: \$294,000 by the US EPA
\$203,463 by the Town of Harvard

DURATION: 2010 – 2013

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 06-11/319

PROJECT TITLE: Operation and Maintenance of the Massachusetts Alternative Septic System Test Center
NPS CATEGORY: Outreach and Education
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 also investigates the claims of selected soil absorption system products to verify that their treatment for pathogens is commensurate with requested reductions in size and vertical separations. A standardized protocol for tests of this type will also be created for future use.

Finally, the project endeavors to add to the knowledge regarding emerging contaminants such as pharmaceuticals and personal care products by testing at least three removal strategies. Outreach components include publications, workshops, and conference presentations for individuals involved in wastewater planning and watershed protection.

PROJECT COST: \$210,581

FUNDING: \$101,243 by the US EPA
\$109,338 by various onsite system vendors

DURATION: 2009 – 2012

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 Basin

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 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. The grantee will also engage in extensive public outreach about the implementation of both structural and non-structural BMPs on residential properties. The BMPs are at Steven's Brook, May Brook (#2 and #3), and Brandon Street.

The project goals are:

1. Reduction in sediment loading and associated pollutants,
2. Decrease in invasive aquatic weed populations,
3. Reduction of sediment loading from targeted subwatersheds,
4. Watershed residents become 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 Basin

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:

1. Design and construct retrofits to existing drainage features and BMPs to enhance water
2. quality with lower capital costs than new BMPs;
3. Develop a variety of BMP retrofits for use with similar projects in the future; and
4. 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 Basin

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 will include hooded catch basins, bioretention facilities, 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 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 Basin

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 will 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, 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.

Note: This project was not completed.

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 Basin

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

1. 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.
2. 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.
3. Monitoring & Project Evaluation: LOPA volunteers will continue to conduct water quality monitoring pursuant to the QAPP approved by EPA/MassDEP under 00-01/319.
4. 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 Basin

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 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:

1. 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.
2. Culvert improvement and stream channel restoration to the downtown outlet of James Brook, reducing total suspended solids and nutrient runoff downstream.
3. Court Street pervious paver interceptor reducing nutrient, pathogen and sediment laden roadway runoff.
4. Develop an updateable stormwater display with a schedule of monthly subtopics to be exhibited at the Groton Town Hall and Library.
5. 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 Basin

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) Basin

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 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 locations were evaluated and the three most promising sites 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

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 08-03/319

PROJECT TITLE: Brewster Stony Brook Road Stormwater Improvements
NPS CATEGORY: Implementation
INVESTIGATOR: Town of Brewster
LOCATION: Cape Cod Basin

DESCRIPTION:

The Stony Brook subwatershed in Brewster extends from headwaters in Walkers Pond and Slough Pond down through Upper Mill Pond, Lower Mill Pond, along Stony Brook, and then into Paines Creek, the tidal estuary of Stony Brook that discharges into Cape Cod Bay. There is a public swimming beach at Paines Creek Beach, and recreational swimming and boating are allowed in the four Great Ponds. The Stony Brook subwatershed and its tidal estuary contain regionally important shellfish and anadromous fish resources as well as rare species habitat. Existing impacts on this watershed include degraded water quality, untreated stormwater runoff, tidal restrictions and invasive plant species. Walkers Pond, Upper Mill Pond and Lower Mill Pond are currently listed on the Massachusetts Year 2006 Integrated List of Waters as Category 5 waters.

The Town's overall goal is to improve water quality in the Stony Brook subwatershed in order to open up closed shellfish areas in Paines Creek; protect open shellfish areas in the Brewster North Coastal shellfish growing area; improve anadromous fish, rare species and salt marsh habitat; improve water quality at public bathing beaches; and improve water quality in the impacted headwaters of Stony Brook. A stormwater mitigation assessment project for Paines Creek and the Stony Brook Watershed was completed during fiscal year 2007 as part of the Massachusetts Office of Coastal Zone Management (CZM) Coastal Nonpoint Source Pollution (NPS) grant program. Four focus areas were identified during this assessment, with the Mill Site being assessed as one of the highest priority areas based on the water quality characteristics evident at the site, specifically elevated levels of fecal coliform during first flush conditions. BMPs will be implemented following recommendations from that study.

The structures for the lower elevations where groundwater will be shallower are strictly containment and settling structures not designed to leach runoff, but designed to accumulate solids and bacteria that would otherwise be deposited into receiving water bodies. The intent in this area is to capture the majority of the surface runoff incrementally so the runoff generated at the lower elevations is far less in volume than in the existing conditions. The BMPs specifically selected for this project are a series of leaching pits, settling tanks, catch basins and infiltrator units designed within six significant leaching areas.

Project tasks include

1. Estimation of pollutant load reduction accomplished by the project;
2. Final design, permits, and implementation of BMPs at two locations;
3. Outreach and education for watershed stakeholders; and
4. Reporting.

PROJECT COST: \$578,000

FUNDING: \$346,800 by the US EPA
\$231,200 by the Town of Brewster

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 08-04/319

PROJECT TITLE: Bare Hill Pond Noxious Aquatic Plant Reduction
NPS CATEGORY: Implementation
INVESTIGATOR: Town of Harvard
LOCATION: Nashua Basin

DESCRIPTION:

Bare Hill Pond in Harvard, Massachusetts is a 321-acre, municipally managed pond in the Nashua Basin. The pond is moderately developed although it maintains the rural nature of the community due to largely forested environs. As described in the TMDL (DEP DWM TMDL Report MA81007-1999-001), the pond was originally 200 acres surrounded by pasturelands. In 1838, the pond was dammed bringing it to its present size. The damming of the pond, the prior surrounding agriculture uses and more recent residential development has brought it to its present day condition.

The water quality of the pond and the data on the invasiveness of the plants has been well documented for over 20 years. The TMDL, as well as the attached 2002 ENSR assessment on the quality of the water and aquatic plant growth in the pond, reported that the pond suffers from extensive growths of invasive plants such as variable milfoil, water chestnuts, water lilies, fanwort, smartweed, and pondweed. The pond has elevated nutrient levels, particularly in terms of phosphorous concentrations and macrophyte growth. The excessive growth of invasive species has been due to shallow water depths, bottom sediment rich in nutrients from macrophyte growth and historical uses, and sustained nutrient enrichment from the pond's watershed. Accelerated eutrophication and extensive prevalence of invasive aquatic plants seriously interfere with recreational uses and wildlife habitats.

Project goals include

- 1 – Reduce the level of phosphorous in the pond from 0.044 mg/l to the TDML-recommended goal of 0.030 mg/l
- 2 – Reduce the level of invasive plant growth in the pond so that total plant coverage is limited to the recommended level of 30% sediment coverage, as measured along existing transect points.

This will be accomplished by constructing an integrated series of LID (Low Impact Design) structures to reduce the sediment, nutrient, and bacterial inflows. A more detailed stormwater assessment of the remainder of the watershed will be developed, and a plan for removing as much accumulated road sediment as possible will be developed and implemented.

Project tasks include

1. Design, permitting, and implementation of BMPs,
2. Development and implementation of an Operation and Maintenance Plan,
3. Deep drawdown for aquatic invasive control,
4. Public outreach and education, and
5. Reporting.

PROJECT COST: \$493,345

FUNDING: \$290,950 by the US EPA
\$202,395 by the Town of Harvard

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 08-05/319

PROJECT TITLE: Restoration of Lake Wickaboag at Wickaboag Valley Road
NPS CATEGORY: Implementation
INVESTIGATOR: Town of West Brookfield Storm Water Authority
LOCATION: Chicopee Basin

DESCRIPTION:

Lake Wickaboag is impaired by metals, noxious aquatic plants, and turbidity. The goal of this project is to improve water quality in Lake Wickaboag by constructing a Best Management Practice at Wickaboag Valley Road that will reduce the phosphorus and sediment load to the pond from one of the major sources identified in the Wickaboag watershed. The path for achieving this goal has been clearly laid out in the recommendations made by MassDEP in the TMDL for Selected Lakes in the Chicopee Basin and in a 2005 Diagnostic/Feasibility study of the lake and its watershed. The TMDL recommended that phosphorus loads to the lake be reduced as a way to address the impairments. The Town's Storm Water Authority has been working to address stormwater which transports phosphorus into the Lake. The D/F study and subsequent work identified ten locations where mitigation work is required to address phosphorus.

This project will implement an infiltration system and upgraded catch basins at a priority location, and will further address the impairments through outreach and education to help watershed stakeholders understand how they can help mitigate the problem.

Project tasks include

1. Design, permit and construct a comprehensive BMP structural solution
2. Develop and implement an operation and maintenance plan
3. Conduct public outreach and education to stakeholders, and
4. Reporting.

PROJECT COST: \$104,000

FUNDING: \$ 62,400 by the US EPA
\$ 41,600 by the Town of West Brookfield

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 08-06/319

PROJECT TITLE: Stormwater BMPs: Implementation for Straits Pond at Richards Road and Pond Street
NPS CATEGORY: Implementation
INVESTIGATOR: Town of Hull
LOCATION: South Coastal Basin

DESCRIPTION:

Straits Pond covers approximately 92 acres and varies in depth from three to five feet, and is listed as part of the Weir River Area of Critical Environmental Concern (ACEC). Straits Pond has a history of water quality problems resulting in the growth of algae blooms, fish kills, dense swarms of midges and foul odors. The Pond is listed in the Massachusetts Year 2006 Integrated List of Waters as a Category 5 Water “Waters Requiring a TMDL” for Pathogens as part of the Weir River watershed from Rockland Street to the mouth of Straits Pond at Worlds End. As such, the maintenance and protection of Straits Pond is mandated by Massachusetts Law. The water quality within Straits Pond is exacerbated through continued stormwater pollution, sedimentation, and the spread of invasive species. Each spring, water temperatures increase, triggering a drop of Dissolved Oxygen, and then the emergence of nonbiting adult midges. During the summer, the Pond’s surface becomes covered in thick blanket of algae and the bottom is covered by widgeongrass (*Ruppia maritima*) and pondweed (*Potamogeton pectinatus*). These rooted plants feed on nutrients in pond sediments, returning these nutrients to the pond bottom as they die and decompose in late summer/early fall.

The primary objective of this Project is to design and construct stormwater Best Management Practice (BMP) controls to address and alleviate problems associated with nonpoint source (NPS) pollution within the Straits Pond watershed. The BMP controls will be sited in areas of concentrated stormwater runoff and will be designed to treat runoff prior to discharge into Straits Pond. 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. The project will intercept, treat, and recharge the first 1” of rainfall through a combination of structural and non-structural BMP’s in the study area of Richards Road and Pond Street. A secondary goal of this Project is to implement a public outreach and education program for Hull residents. This program will inform residents of the 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 tasks include

1. Design, permitting, and implementation of stormwater management BMPs
2. Development and implementation of an Operation and Maintenance (O & M) Plan
3. Outreach and Education for Stormwater Management BMPs, and
4. Reporting.

PROJECT COST: \$ 86,000

FUNDING: \$ 51,600 by the US EPA
\$ 34,400 by the Town of Hull

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 08-07/319

PROJECT TITLE: Boston Architectural College Green Alley & Roof Project
NPS CATEGORY: Implementation
INVESTIGATOR: Boston Architectural College
LOCATION: Charles Basin

DESCRIPTION:

This project addresses stormwater runoff in the Charles River watershed. The site is within the Category 5 listed Cheese Cake Brook to Boston Harbor sub-watershed. The water quality of the river is impaired after a rainstorm because of stormwater discharges carrying pollutants, such as pathogens from untreated combined sewage, waterfowl feces, wildlife feces, and domestic pet waste, that have collected on parking lots, streets, driveways and other impervious surfaces. The Charles River Watershed Association recommends that innovative stormwater management techniques be employed – reducing runoff at the source by decreasing impervious surface areas and promoting infiltration, storage and detention of runoff on site.

The project has three goals: (1) Reduce stormwater runoff into the Charles River Basin in one of its most polluted sections. (2) Demonstrate and evaluate the use of sustainable design in existing structures and densely built urban neighborhoods. (3) Use the green roof and green alley as teaching tools for students, faculty, the design profession and the larger community, encourage the use of sustainable design to reduce stormwater runoff and achieve other environmental goals. Grant funds will be directed toward construction of the green alley, while the green roof construction is offered as match.

Project tasks include

1. Final design, permitting, and construction of the green alley and green roof;
2. Outreach and education using the green roof and green alley as teaching tools;
3. Operation and Maintenance plans for green alley and green roof;
4. Evaluation and reporting of results; and
5. Reporting.

PROJECT COST: \$1,420,000

FUNDING: \$250,000 by the US EPA
\$1,170,000 by the Boston Architectural College

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 08-08/319

PROJECT TITLE: PCSWMM Evaluation
NPS CATEGORY: Urban Runoff
INVESTIGATOR: UMass Amherst
LOCATION: Statewide

DESCRIPTION:

The purpose of this project is to evaluate a PC version of EPA's Stormwater Management Model (PCSWMM, Version 1.0, Build 5.0.144) to determine whether it accurately converts the Water Quality Volume MassDEP requires for sizing of stormwater treatment practices to an equivalent flow rate.

The model will be evaluated using default parameters and assumptions to provide information and a recommendation to MassDEP on the relative accuracy of the model to conform to the MassDEP's required Water Quality Volume based standard. Third party studies that were used to calibrate the PCSWMM Model will also be evaluated as to their robustness. Project results will help inform MassDEP about the appropriate use of, and reliance upon, PCSWMM model results.

Project tasks include

1. Development of a Quality Assurance Project Plan;
2. An evaluation report on the adequacy of the PCSWMM model to convert the 1-inch and ½ inch Water Quality Volume to a flow rate;
3. Evaluate the adequacy of three additional methods identified as the Ahlfeld, Bryant, and Claytor methods to convert the 1-inch and ½ inch Water Quality Volume to a flow rate;
4. Comparison of PCSWMM analysis to that from other models; and
5. Reporting

PROJECT COST: \$ 23,450

FUNDING: \$ 15,450 by the US EPA
\$ 7,700 by MassDEP

DURATION: 2009 – 2010

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 08-09/319

PROJECT TITLE: Onsite Septic System Investigations at the Massachusetts Alternative Septic System Test Center in Support of Comprehensive Wastewater Management Planning Efforts
NPS CATEGORY: Groundwater Disposal
INVESTIGATOR: Barnstable County Department 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 to achieve the goals of the TMDL and the Massachusetts Estuaries programs, especially where wastewater is a major source of pollutant loading. This project will continue the ongoing work of the MASSTC.

This project endeavors to investigate three areas of concern identified by Massachusetts DEP personnel and wastewater planners: pharmaceutical and personal care product (PPCP) treatment in onsite septic systems, the effects of septic system remediation technologies on the overall treatment ability of septic systems, and a continued assessment of nutrient removal technologies and their applicability in comprehensive wastewater/nutrient management plans. The project integrates existing resources of the Massachusetts Alternative Septic System Test Center to advance the understanding of these three issues and provides valuable information to wastewater planning efforts statewide.

PROJECT COST: \$157,225

FUNDING: \$ 94,045 by the US EPA
\$ 63,180 by Barnstable County and project participants

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 09-01/319

PROJECT TITLE: Congamond Lakes FFY 09
NPS CATEGORY: Implementation
INVESTIGATOR: Pioneer Valley Planning Commission
LOCATION: Westfield Basin

DESCRIPTION:

The Congamond Lakes are comprised of three interconnected ponds: North Pond, Middle Pond, and South Pond. The Town of Southwick has been working diligently to improve the conditions of the Congamond Lakes, a Category 4c Waters on the Massachusetts List of Impaired Waters for nuisance aquatic weeds. The two primary invasive species are Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaved pondweed (*Potamogeton crispus*).

Southwick has undertaken great investment in improving the municipal infrastructure that exists within this watershed in an attempt to reduce the phosphorus loading to the Congamond Lakes, which was identified in the 1983 Diagnostic Feasibility Study as the leading source of impairment. To date, the Town of Southwick has: 1) sewered the Middle and South Pond subwatersheds; 2) mapped all outfalls and catchbasins in Southwick with GIS, including the lake watershed, and created a GIS database about the depth of the sumps, construction materials, and maintenance history; 3) installed three Baysavers and replaced numerous shallow basins with deep sump catchbasins in the lake watershed; 4) installed a detention basin and water quality swale at a major outfall on Middle Pond of the Congamond Lakes (FY03 s.319 project) and in-lake dredging at this location; 5) performs annual street sweeping and catchbasin cleanout; and, 6) developed an Illicit Discharge Elimination Bylaw and Erosion and Sedimentation Bylaw (scheduled to be voted on at Town meeting in October). Phase II of the sanitary sewer is underway including design of the interceptor to expand flows to the Westfield Wastewater Treatment Plant.

The project goals are: 1) sediment loading and associated pollutants are reduced, 2) invasive aquatic weed populations continue to decrease, 3) targeted outfalls are free of stormwater debris and erosion, and 4) watershed residents are knowledgeable about residential landscaping techniques and maintenance protocols for a healthy lake.

Project tasks include

1. BMP Design, Permitting, and implementation,
2. Development and implementation of an operation and maintenance plan,
3. Public education and outreach,
4. An aquatic weed management program, and
5. Reporting.

PROJECT COST: \$505,100

FUNDING: \$257,700 by the US EPA
\$247,400 by the Town of Southwick

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 09-02/319

PROJECT TITLE: Stockbridge Bowl Management Project Phase I
NPS CATEGORY: Implementation
INVESTIGATOR: Town of Stockbridge
LOCATION: Housatonic Basin

DESCRIPTION:

Stockbridge Bowl is a Great Pond with a surface area of 366 acres. The lake is located in the Hop Brook to Williams River subwatershed, HUC 12 #011000050107. The lake is an important water resource in the region. It is one of the few lakes in the state with a coldwater fisheries habitat during the summer months. It also serves as the backup water supply for the neighboring town of Lenox, and it provides public recreation via the boat ramp located on Lenox Road and the Stockbridge Town Beach via Mahkeenac Road. Stockbridge Bowl is listed as a 4c water body on the 303(d) 2006 Integrated List of Waters, impaired by Exotic Species

The first objective of this project is to install a diversion pipe under the gas pipelines which currently obstruct the channel and inhibit lake drawdown. The second objective of the s.319 project is to identify sites that are potential sediment-contributors and implement remediation at priority locations. The third goal of this project is to increase local stakeholders' understanding and involvement in exotic aquatic species management and nonpoint source pollution mitigation. The Town of Stockbridge and the Stockbridge Bowl Association (SBA) will build on previous work to continue to implement several recommendations to control macrophyte growth within Stockbridge Bowl. Matching funds for the project will be drawn from a mix of sources, including funds from the Town, SBA, and the Tennessee Gas Pipeline. The Town and SBA are jointly responsible for implementation of this project and will share fiscal and reporting responsibilities.

Project tasks include:

1. Final permits for the diversion pipe;
2. Installation of the diversion pipe to gain an additional 1-1.5' of drawdown;
3. Develop and implement an O&M Plan;
4. Continue the harvesting program;
5. Identify and remediate NPS contributions within the watershed;
6. Evaluate project results; and
7. Quarterly reporting and final report.

PROJECT COST: \$706,000

FUNDING: \$245,500 by the US EPA
\$460,500 by Stockbridge Bowl Association and the Town of Stockbridge

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 09-03/319

PROJECT TITLE: Stormwater BMPs in the Provincetown Harbor Watershed
NPS CATEGORY: Implementation
INVESTIGATOR: Town of Provincetown
LOCATION: Cape Cod Basin

DESCRIPTION:

Provincetown Harbor is currently listed on the 2006 Integrated List of Waters as a Category 5 water requiring a TMDL for pathogens. Provincetown harbor is a fragile resource that accommodates a multitude of recreational and commercial activities and uses. The importance of the Harbor to ecological systems, recreational uses, and the local economy demands appropriate planning and assessment of external impacts that may degrade it. Currently, dense development and large amounts of impervious areas immediately adjacent to the Harbor result in significant stormwater runoff reaching the Harbor waters. Beach closures after rain events are a frequent occurrence at the Harbor beaches.

The primary pollutants of concern in stormwater runoff to Provincetown Harbor are bacteria and sediments. The Massachusetts Office of Coastal Zone Management (CZM) provided funding during fiscal year 2003 to perform a stormwater assessment and develop a comprehensive stormwater management plan. Consistent with recommendations made in that plan, the goal of this project is to significantly reduce the quantity of pollutants generated by stormwater runoff through installation of structural BMPs at two locations, Court Street and Bradford Street. It is anticipated that this project will result in fewer beach closures caused by high bacteria counts.

Project tasks include

1. Estimation of pollutant load reduction accomplished by the project;
2. Final design, permits, and implementation of BMPs at two locations;
3. Outreach and education for watershed stakeholders; and
4. Reporting.

PROJECT COST: \$512,333

FUNDING: \$307,400 by the US EPA
\$204,933 by the Town of Provincetown

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 09-04/319

PROJECT TITLE: Northern Fairhaven New Bedford Inner Harbor Drainage Area LID Stormwater Enhancements
NPS CATEGORY: Implementation
INVESTIGATOR: Town of Fairhaven
LOCATION: Buzzards Bay Basin

DESCRIPTION:

Water quality impairment in Buzzards Bay, and specifically New Bedford Inner Harbor, has been documented in detail through the Commonwealth's Final Massachusetts Year 2006 Integrated List of Waters list of impaired waters as a Class 5 Water for priority organics, metals, nutrients, organic enrichment/low dissolved oxygen, pathogens, oil and grease, taste, odor, color and objectionable deposits. Numerous other documents produced by EOEEA, MassDEP, Office of Coastal Zone Management, Buzzards Bay National Estuary Program (BBNEP), and USEPA have also documented the impaired water quality of the New Bedford Inner Harbor.

The goal of this project is to improve the water quality in the New Bedford Inner Harbor by improving the treatment of direct nonpoint source pollutants from roadway runoff and fertilizers and allow storm water recharge within the upper watershed. These improvements in treatment and recharge will expand upon previous projects and will help in decreasing the nutrient and bacteria loading to the New Bedford Inner Harbor. This will be accomplished by retrofitting the existing conventional stormwater drainage system through a series of Low Impact Development (LID) BMP upgrades in the upper reaches of the New Bedford Inner Harbor watershed within Northern Fairhaven. BMPs retrofits will be installed within the watershed to the various existing direct discharge points and by installing additional drainage system controls further reducing the loading of sediment, nutrients, bacteria, and other contaminants from entering the water bodies.

Through this grant the Town will implement the following specific tasks to significantly reduce the contaminant loading to the New Bedford Inner Harbor:

1. Design and install Low Impact Development Stormwater Treatment BMPs at the storm water outfalls and/or improve storm water treatment and recharge on Pilgrim Avenue, Livesy Parkway, Main Street, Magnolia Avenue, Harding Road, Elm Avenue, Glenhaven Avenue, Parker Street, Cherry Street, and Hedge Street,
2. Monitor and maintain BMPs for the contract period and for the life of the BMPs,
3. Provide educational outreach to the residents and businesses within the New Bedford Inner Harbor Watershed, and,
4. Reporting.

PROJECT COST: \$463,500

FUNDING: \$278,100 by the US EPA
\$185,400 by the Town of Fairhaven

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 09-05/319

PROJECT TITLE: Phosphorus Mitigation Program for Cranberry Bogs on White Island Pond
NPS CATEGORY: Implementation
INVESTIGATOR: Cape Cod Cranberry Growers' Association
LOCATION: Buzzards Bay Basin

DESCRIPTION:

This project is specifically targeted to cranberry growers located on White Island Pond in Plymouth. The Pond is a 294-acre Great Pond and is listed as a Category 5 on the 2006 Integrated List of Waters due to nutrients, organic enrichment/low dissolved oxygen, turbidity, and noxious aquatic plants.

Cranberry production is currently one of the largest components of the Massachusetts agricultural economy. An abundant freshwater supply, mainly surface water from ponds, rivers, and reservoirs, is required for standard cultural practices, and most acreage exists in wetland settings.

Conducting cranberry farming in ways that minimize negative impacts to surface waters is obviously in the interests of the farmer and a benefit to ecosystem sustainability. It is also a community concern, since cranberry farming may contribute to nutrient loading and subsequent water quality degradation in ponds and other surface waters. While implementation of existing BMPs for cranberry production can help to protect water resources, recent research, funded by an EPA/DEP 319 Grant (Project 01-12/319), has shown that some standard practices, in particular flood use and discharge and up-welling groundwater flowing through beds, may be a source of water quality degradation even when nutrient use is limited. Discharge of nutrients in stream-flow from bogs and during flood cycles remains of concern.

The long term goal of this project is to reduce phosphorous to .2 mg/l or less from the bog outflows. During the term of this grant, the goal is to determine the remediation methods that will reduce phosphorous from the bog outflow water (.2 mg P/l or less) while maintaining plant vigor and berry production. This requires phosphorous remediation expertise, knowledge of cranberry production practices, engineering, and scientific analysis.

Project tasks include

1. Collection and analysis of water samples,
2. Determining effective ways to remove or mitigate phosphorus from bog discharge,
3. Produce soil/tissue test results on plant health,
4. Updating of the White Island Pond Conservation Alliance throughout the project,
5. Dedicated location on web site for data reports and ongoing activities, and
6. Reporting

PROJECT COST: \$ 49,576

FUNDING: \$ 29,716 by the US EPA
\$ 19,860 by the Cape Cod Cranberry Growers' Association

DURATION: 2009 – 2012

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 09-06/319

PROJECT TITLE: Massachusetts Regional Stormwater Management Training Seminar Series
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Vanasse Hangen Brustlin Inc. (VHB)
LOCATION: Statewide

DESCRIPTION:

The need for proper stormwater management is well known across the nation. Municipalities, citizens groups, and watershed associations often find it difficult to get the resources to make the leap from understanding the need for better stormwater management to developing realistic, effective strategies to start improving water quality on the ground. In Massachusetts, the organizations called on to implement the Commonwealth's stormwater management and non-point source programs have varying degrees of training, knowledge, and resources, and achieve varying degrees of success. Most of the responsibility for education and outreach—as well as the technical transfer of proper stormwater management techniques—falls on municipalities through the State Stormwater Standards/Regulations, which are implemented under the Wetlands Protection Act at the local level by Conservation Commissions; and via the EPA NPDES MS4 Permit program. While municipal programs enjoy some support from the state and EPA Region 1, the quality and effectiveness of implementation programs can vary.

The goals of this seminar series are:

1. To enhance the training opportunities and increase the awareness and knowledge base among municipal officials, state and regional planning agency personnel, other nonprofit organization members involved water resource protection
2. To help residents of the Commonwealth gain a better understanding of the latest regulatory changes, proposals, and techniques for stormwater management
3. To provide a regional and topic-specific approach geared toward improving water quality

Multiple statewide training sessions will be conducted, tailored to the needs of the specific audience and designed to meet identified deficiencies in stormwater awareness or need for additional training. The ultimate goal of this training series is to provide training and guidance for residents and decision-makers to implement proper stormwater management programs and practices that over time will lead to improved water quality conditions for the water bodies of the Commonwealth. The training will build on existing programs and will fulfill a growing need to address and understand the multiple layers of regulatory control and the latest technologies that have been developed in recent years.

Topics will potentially cover issues such as stormwater funding and specifically how to complete a stormwater utility feasibility study and set up stormwater utilities, prioritizing the stormwater requirement language in new ordinances/bylaws, design concepts for stormwater LID systems, executing proper stormwater management practices, and how to access and use free existing educational and reference materials.

PROJECT COST: \$338,431

FUNDING: \$203,941 by the US EPA
\$134,490 by multiple project partners, including watershed groups and regional planning agencies

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 10-01/319

PROJECT TITLE: MaSTEP 2010
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 continues the effort to develop and refine a web-based technology transfer clearinghouse to help municipal officials and others gain access to current, credible information about stormwater technologies. The continued operation of the MASTEP web site (www.mastep.net) and database of performance studies is important to inform stormwater management policy and practices in the Commonwealth.

The science of stormwater management is still evolving. Current stormwater provisions in the Massachusetts Wetland regulations, which emphasize control of Total Suspended Solids (TSS), leave ecosystems vulnerable to nutrient enrichment. Systems that are designed to remove suspended particles from the waste stream may or may not be effective at removing TP and other nutrients. A better understanding of the nutrient removal capabilities of different environmentally sensitive site design, low impact development practices, and structural stormwater BMP designs will help conservation commissions and other environmental decision makers select practices that are most effective in those situations where nutrient control is a high priority.

MASTEP will augment the existing database, which was created to assess the scientific veracity of studies examining TSS removal in stormwater BMPs, to examine Total Phosphorus (TP) removal. As MassDEP begins to regulate TP in stormwater runoff, tools will be required to assist conservation commissions in evaluating which environmentally sensitive site design, low impact development, and structural BMPs are best suited to remove TP in addition to TSS.

The goal of this project is to achieve a reduction in non-point source pollution, specifically TSS and TP, through continued creation and refinement of web based materials providing validated performance information on a variety of stormwater treatment practices, with a particular emphasis on TSS and TP control. The web-based tool is targeted primarily to Massachusetts conservation commissions and secondarily toward other municipal officials and professionals who deal with stormwater issues, including regulators at the state and local levels as well as those who design and propose projects requiring stormwater management.

PROJECT COST: \$ 83,333

FUNDING: \$ 50,001 by the US EPA
\$ 33,333 by UMass Amherst

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 10-02/319

PROJECT TITLE: Investigation of Blackwater Disposal as a Means of Nutrient Management in Watersheds of Nitrogen Sensitive Marine Embayments
NPS CATEGORY: Groundwater Disposal
INVESTIGATOR: Barnstable County Department of Health and the Environment.
LOCATION: Statewide - Coastal

DESCRIPTION:

The costs of municipal sewer to address nutrient issues in nitrogen sensitive areas often compel communities to investigate alternative means of nutrient management. The option of employing alternative onsite septic systems that treat all of the wastewater from a residence has been investigated and the advantages and limitations of this strategy are well known. Information on technologies that separate blackwater (toilet wastes) and greywater, however, is not available. Since a high percentage of nutrients present in wastewater are derived from toilet wastes, separation of these waste products may offer an economical alternative to municipal sewers in some situations. Therefore, the efficacy of diverting toilet wastes from the wastewater stream in reducing the overall nutrient load calls for investigation. In addition, information on the economics, practicality and acceptance of this strategy will be valuable to communities involved in comprehensive wastewater management planning.

This project will install at least ten blackwater-diverting technologies (composting toilets or urine diverting toilets) at residences to document the efficiency of this technology in addressing the nutrient loading from onsite septic systems. Measurements of the remaining nutrient loads in greywater, as well as a documentation of all attendant issues such as costs of operation maintenance and the disposal of residual byproducts, will enable the first cost-benefit analysis of this strategy for the use in comprehensive wastewater planning. The project will also investigate means by which residuals might be reprocessed for beneficial use such as fertilizer.

PROJECT COST: \$236,025

FUNDING: \$ 39,175 by the US EPA
\$ 54,350 by Barnstable County
\$150,000 by participating homeowners

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 10-03/319

PROJECT TITLE: Lower Monoosnoc Brook Remediation Project
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Massachusetts Watershed Coalition
LOCATION: Nashua Basin

DESCRIPTION:

Monoosnoc Brook and its watershed are well-used for outdoor recreation activities. The Brook flows out of the Monoosnoc Hills on the west side of Leominster, connecting six impoundments, Leominster's busy downtown area, and a variety of industrial facilities. Densely developed areas in the lower watershed are major sources of nonpoint source pollution, and the lower two thirds of the Brook are increasingly impaired for contact recreation and aquatic life uses. The pollutants are transported downstream into the North Nashua River, which is listed as Category 5 on the 2006 Integrated List of Waters for multiple impairments.

This project follows Project 07-03/319, which has begun to implement water quality remediation BMPs in the watershed. This project will install many additional source reduction practices in very densely developed areas of the lower two thirds of Monoosnoc Brook watershed. Improved stream health will also increase riparian property values, foster reuse of abandoned buildings next to the Brook, and provide a stimulus for small business creation in downtown.

Activities include the installation of rain gardens, tree box filters, porous sidewalk, tandem catch basins, a two-chambered underground tank to remove TSS, and other infiltration practices to reduce the amount of pollutants being discharged to the Brook. The project will promote Low Impact Development and will assist businesses, schools, churches and homeowners to utilize source reduction techniques that can supplement the project activities.

PROJECT COST: \$394,600

FUNDING: \$221,900 by the US EPA
\$ 3,750 by MWC
\$ 4,500 by Leominster Land Trust & Nashua River Watershed Association
\$ 7,000 by Leominster Credit Union (rain garden)
\$ 5,000 by Parker Realty Trust (Engineering Design)
\$ 88,450 by the City of Leominster

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 10-04/319

PROJECT TITLE: Stormwater Best Management Practices: Little Harbor, Cohasset Cove, and Cohasset Harbor
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Cohasset
LOCATION: South Coastal Basin

DESCRIPTION:

This project will continue to improve the water quality and protection of Little Harbor, Cohasset Cove and Cohasset Harbor through the design, environmental permitting, and construction of stormwater control and treatment systems within these watersheds. Cohasset Harbor is Category 5 listed for pathogens. The subwatersheds are in the Town of Cohasset, and are part of the South Coastal Watershed. The project complements 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 in addition to the previous remedial steps. The project will also complement previously completed stormwater projects in the James Brook and Little Harbor watersheds. 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 primary objective of this Project is to design and construct stormwater Best Management Practice (BMP) controls to address and alleviate problems associated with nonpoint source (NPS) pollution within the Little Harbor, Cohasset Harbor, Cohasset Cove and James Brook watersheds. 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, as well as James Brook, Stuart Brook, Elms Meadow Wellfield (Zone II), Cohasset Cove, Cohasset Harbor, and Jacobs Meadow salt marsh, which ultimately discharges to Cohasset Cove. The BMP controls will include low impact development (LID) techniques such as bioretention, permeable pavement, vegetated swales, and infiltration (with pre-treatment) to be sited on public lands and/or within public rights-of-way. The scope of work also 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 target fecal coliform bacteria, nitrogen, phosphorus, suspended solids, and hydrocarbons derived from stormwater runoff. The Project will construct stormwater BMPs designed to capture and treat at least the first one inch of rainfall, which carries the majority of NPS pollutants and is known as the “first flush”.

PROJECT COST: \$300,000

FUNDING: \$180,000 by the US EPA
\$120,000 by the Town of Cohasset

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 10-05/319

PROJECT TITLE: North Reading Stormwater Infiltration Project: Reaching Out to Address Runoff (ROAR)
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of North Reading
LOCATION: Ipswich Basin

DESCRIPTION:

The Town of North Reading is entirely located within the Upper Ipswich Basin. In the past three decades, urbanization and suburbanization, and the subsequent land use changes and stormwater infrastructure associated with them, have strongly impacted the hydrological patterns in the basin. The river chronically suffers from low flows, and multiple Category 5 impairments are found within the subwatershed. The focus of this project is infiltration and source reduction to capture and treat stormwater and to promote the minimum level of flow and groundwater recharge. The project follows Project 02-12/319, implementing LID BMPs at Martins Pond.

The overall goal of this project is to promote infiltration of runoff closer to its source. Implementation tasks will disconnect impervious surfaces, mitigate first flush pollutant loads, allow for natural filtration and groundwater recharge, reduce the amount of runoff reaching the outfall and more closely mimic pre-development hydrology. This project also addresses the immediate need for outreach and education about the linkages between water quality, water quantity, and stormwater issues in the upper basin.

Specific tasks include

1. Infiltration of roadway runoff and sediment reduction on North Street through the installation of deep sump catch basins and infiltration chambers;
2. A bioswale, infiltration enhancement, rain gardens and outfall rehabilitation at J. T. Hood Elementary School to capture roof and parking lot runoff;
3. Rain Garden project, including a Town Common installation and a town-wide participatory program centered on planning and implementing parcel-based rain gardens to promote infiltration; and
4. Outreach and education via an Elementary School education program and contest, newspaper advertising campaign, Town Hall Low Impact Development (LID) kiosk, Town Library display, Town event outreach and signage. In addition, each project will act as a potential demonstration project increasing the visibility and transferability of each individual project.

PROJECT COST: \$328,335

FUNDING: \$190,500 by the US EPA
\$ 30,000 by Merrimack College
\$ 60,000 by Town of North Reading
\$ 8,800 by J. Turner Elementary School
\$ 39,035 by in-kind services

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 10-06/319

PROJECT TITLE: Northern Fairhaven New Bedford Inner Harbor Drainage Area Phase II LID Stormwater Enhancements
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Fairhaven
LOCATION: Buzzards Bay Basin

DESCRIPTION:

The Town of Fairhaven is one of eleven communities that share Buzzards Bay, a highly ecologically significant large estuary connected to Cape Cod Bay via the Cape Cod Canal. Water quality impairment in Buzzards Bay and specifically New Bedford Inner Harbor has been documented in detail through the Commonwealth's Final Massachusetts Year 2006 Integrated List of Waters. These marine embayments are classified as a category 5 Water for priority organics, metals, nutrients, organic enrichment/low dissolved oxygen, pathogens, oil and grease, taste, odor, color and objectionable deposits. The Town of Fairhaven has established a comprehensive stormwater system capital improvement program within the Northern Fairhaven New Bedford Inner Harbor Drainage Area and is well underway with implementing this plan. Phase I of this capital plan is currently being implemented through a FY09 MassDEP 319 grant (09-04/319) and several other state and federal sources.

The goal of this phase of the project is further improvement of the water quality in the New Bedford Inner Harbor by additional treatment of direct NPS pollutants from roadway runoff and fertilizers and stormwater recharge within the upper watershed. These improvements in treatment and recharge will expand upon previous projects and will decrease the nutrient and bacteria loading to the New Bedford Inner Harbor. This will be accomplished by additional retrofitting of the existing conventional stormwater drainage system through a series of Low Impact Development (LID) BMP upgrades in the upper reaches of the New Bedford Inner Harbor watershed within Northern Fairhaven.

Through this grant the Town will implement the following specific tasks to significantly reduce the contaminant loading to the New Bedford Inner Harbor:

1. Design and install Stormwater Treatment BMPs at the stormwater outfalls and/or improve stormwater treatment and recharge on Harding Road, River Avenue, and Sycamore Street, and will install 20 tree box filters in locations throughout the New Bedford Inner Harbor watershed.
2. Monitor and maintain BMPs for the contract period and for the life of the BMPs
3. Provide educational outreach to the residents and businesses within the New Bedford Inner Harbor watershed

PROJECT COST: \$430,000

FUNDING: \$258,400 by the US EPA
\$171,600 by the Town of Fairhaven

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 10-07/319

PROJECT TITLE: Stormwater Management BMPs for Unpaved Roads: Four Mile Brook Road in Northfield, Massachusetts
NPS CATEGORY: Resource Restoration
INVESTIGATOR: Town of Northfield
LOCATION: Connecticut Basin

DESCRIPTION:

Four Mile Brook is a coldwater stream that drains a 4.8 mi² watershed, most of which is located in Northfield, Massachusetts. The brook is one of two major tributaries that comprise the HUC 12 subwatershed *Connecticut River-Dry Brook to Deerfield River*. Total suspended solids (TSS) is listed as a pollutant needing a TMDL (Category 5 Waters) in Segment MA 34-03_2008, which is within this HUC 12 subwatershed. Sediment-laden runoff is flowing into the Four Mile Brook from Four Mile Brook Road, which is a gravel road along all of its 2.75 mile length, except for an approximately 1,000 foot section in the lower part of the watershed. Much of the road lies within the Rivers Protection Act 200-foot riparian buffer of the brook. Significant amounts of sediment are delivered to the brook during storm events, and sediments entering Four Mile Brook are being deposited in the lowest reaches of the brook and into the Connecticut River.

The goal of this project is to implement priority projects identified in a previous 604b funded (05-02/604) Watershed Management and Restoration Plan, which contains recommendations for restoration and mitigation projects in the watershed. Six priority locations were identified in the Plan, and conceptual stormwater Best Management Practices (BMPs) were developed for these priority sites. The assessment also provided a list of locations along the road where minor to moderate erosion and sedimentation is occurring. Accordingly, improvements will be implemented at numerous other sites along Four Mile Brook Road. BMPs will be employed at 16 culvert crossings, 10 plow pull-offs and 2,000 linear feet of windrow removals to improve the management and quality of stormwater runoff.

PROJECT COST: \$394,987

FUNDING: \$225,613 by the US EPA
\$169,374 by the Town of Northfield

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 10-08/319

PROJECT TITLE: Sawmill River Implementation Project: An Ecosystem Approach to Restoration
NPS CATEGORY: Resource Restoration
INVESTIGATOR: Franklin Conservation District
LOCATION: Connecticut Basin

DESCRIPTION:

The Sawmill River watershed encompasses 32 square miles in the western Massachusetts towns of Montague, Shutesbury, Leverett and Wendell. The river flows westerly for fourteen miles through mostly forested and steep terrain to its confluence with the Connecticut River in Montague. This segment of the Connecticut is Category 5 listed as impaired by flow and habitat alterations. Watershed land uses include cropland, pasture, forest, and residential and commercial areas. Over the past thirty years, towns in the Sawmill River watershed have been plagued by numerous river-related problems including flooding, sediment accumulation, and damage to property and infrastructure. Water quality, fisheries, and wildlife habitat have been adversely impacted by sediment load transport and bank scouring.

For several decades, watershed communities have attempted to apply "quick fixes" to these problems. Numerous stream bank stabilization and dredging projects have been undertaken to address catastrophic damage to roads, bridges and agricultural areas. Bank erosion along the Sawmill River is accelerating, contributing to more substantial sediment loads, which in turn further impacts ecosystem health and public safety. Each time towns and residents have attempted to fix one problem, other problems have emerged.

The goal of this project is to implement a 2005 restoration plan that was developed through the funding of a 604(b) EPA/DEP project entitled "An Ecosystem Approach to the Restoration of the Sawmill River Watershed". This plan provided a three-phase geomorphic assessment using an innovative ecosystem approach. Findings were used to develop conceptual solutions for flooding, erosion and sedimentation problems using natural stream channel principles.

Engineering plans for the river restoration project, developed pursuant to the Vermont Stream Geomorphic Assessment protocols, will be finalized; related state, federal and local permits will be secured; restoration of 2,500 linear feet of straightened channel, including application of bioengineering techniques, will be accomplished; and outreach and technology transfer regarding the project will be conducted.

PROJECT COST: \$513,287

FUNDING: \$318,772 by the US EPA
\$152,945 by the Town of Shutesbury
\$ 2,050 by the Franklin Conservation District
\$ 18,200 by Northeast Networks
\$ 4,350 by the Sawmill River Steering Committee
\$ 35,000 by the Mass. Division of Fisheries and Wildlife

DURATION: 2010 – 2013

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-01/319

PROJECT TITLE: Investigating Means Of Enhancing Onsite Septic System Attenuation For Emerging Contaminants (ECs)
NPS CATEGORY: Groundwater Disposal
INVESTIGATOR: Barnstable County Department 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 to achieve the goals of the TMDL and the Massachusetts Estuaries programs, especially where wastewater is a major source of pollutant loading. This project will continue the ongoing work of the MASSTC.

The presence of selected pharmaceuticals and personal care products (PPCPs) beneath septic systems and in surface waters downgradient of septic systems on Cape Cod has been documented by USGS and others. The Barnstable County Department of Health and Environment, in cooperation with USGS, investigated selected advanced onsite wastewater treatment systems and found that standard onsite systems removed more contaminants than the advanced treatment units without soil treatment. This project will investigate at least two low-technology modifications to standard onsite septic systems (low pressure distribution and shallow-narrow drainfields) and document their efficacy in removing selected PPCPs compared with standard gravity feed systems. A white paper that summarizes the state of knowledge regarding EC removal from onsite septic systems will be produced. This report will also propose best management practices to minimize ECs from onsite septic systems based on this study and other related studies.

PROJECT COST: \$111,164

FUNDING: \$ 66,000 by the US EPA
\$ 45,164 by Barnstable County and project participants

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-02/319

PROJECT TITLE: Westport Middle School Stormwater BMP Implementation Project
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town Of Westport
LOCATION: Buzzards Bay Basin

DESCRIPTION:

The Westport River is considered to be one of the most significant natural features in the Town of Westport. The River provides 35 miles of shoreline and drains approximately 85% the town's land area. The watershed to the River is the second largest within Buzzards Bay and contributes the largest amount of surface water to the bay. The Westport River is also known as one of the Commonwealth's greatest coastal assets, diverse in both scenic landscape and habitat quality. The Town of Westport has long recognized that stormwater discharges and other pollution sources are important contributors to closed shellfish areas in the town, and has been working diligently with its citizens and property owners to remediate this pollution in a systematic way.

The primary objective of this Project is to design and construct stormwater Best Management Practice (BMP) controls to address and alleviate problems associated with nonpoint source (NPS) pollution at the head Westport, the top of the East Branch of the Westport River. The BMP controls will be sited in areas of concentrated stormwater runoff and will be designed to treat runoff prior to discharge into the River at the Head of Westport. The BMP controls will include low impact development (LID) techniques such as bioretention, vegetated swales, and infiltration (with pre-treatment) to be sited on the Middle School property, which is owned by the Town of Westport. This site contributes nearly 66 percent of the stormwater that flows unchecked from a pipe on the west side of the River at the Head of Westport.

A secondary goal of this Project is to implement a public outreach and education program for Westport residents, and particularly the students at the Middle School. This program will inform residents of the 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: \$389,994

FUNDING: \$233,930 by the US EPA
\$156,064 by the Town of Westport

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-03/319

PROJECT TITLE: Long Pond Watershed Non-Point Pollution Abatement, Phase 1 BMP Implementation
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Tewksbury
LOCATION: Shawsheen Basin

DESCRIPTION:

Long Pond is located in the Town of Tewksbury, MA and is part of the Shawsheen River Watershed. Long Pond is a Massachusetts Great Pond and is a Category 5 impaired water for noxious plants, nutrients, organic enrichment, low dissolved oxygen, and turbidity. Additionally, Long Pond has some aesthetic attributes that are relatively poor such as suspended solids, water color, and floating and rooted aquatic vegetation. The pond is well on its way to becoming a wetland or wet meadow. This project will help to begin the process of addressing the causes of these impairments (non-point pollution) and start the pond on the road to water quality attainment and increased beneficial use. The Town has recently implemented a sewerage program in the watershed and now hopes to address the other nonpoint pollution sources within the watershed through implementation of Best Management Practices (BMP's).

The primary objective of this Project is to design and construct twenty-five stormwater Best Management Practice (BMP) controls to address and alleviate problems associated with nonpoint source (NPS) pollution within the Long Pond watershed. The BMP controls will be sited in areas of concentrated stormwater runoff and will be designed to treat runoff through collection, settling and bio-retention prior to discharge into Long Pond. The BMP controls will include low impact development bioretention rain gardens to be sited on Town lands and within public rights-of-way. Students of the Tewksbury High School System will participate in educational programs, water quality sampling and analysis, BMP design support and actual BMP construction. Additionally, the residents of the Town of Tewksbury will be educated on non-point pollution and the benefits of rain gardens through the public outreach and education aspects of this project utilizing direct distribution and mailing of information pamphlets.

The targeted pollutants are Total Suspended Solids (TSS), bacteria, nutrients, heavy metal, oil, and petroleum products. Many of the impairments of the Pond can be attributed to non-point nutrient pollution within the watershed. For this reason, bio-retention systems are the primary BMP process to be utilized. Solids settling, vegetative uptake, filtration and soil absorption and adsorption will be the primary treatment mechanisms utilized for nutrient removal.

PROJECT COST: \$450,000

FUNDING: \$269,147 by the US EPA
\$180,852 by the town of Tewksbury

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-04/319

PROJECT TITLE: Farm Pond Stormwater BMP Implementation Project
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town Of Sherborn
LOCATION: Charles Basin

DESCRIPTION:

Farm Pond has had historical problems with beach closings due to elevated bacterial counts in Farm Pond. Each of the past several summers, the Farm Pond recreation area has been shut down due to elevated levels of bacteria in the water. The bacteria appear to come from several sources, and the Town has been trying several approaches to deal with the matter.

The Town of Sherborn has long recognized that stormwater discharges and other pollution sources are important contributors to the beach closures for the main recreation area in the town, as well as an erosion source contributing to the degradation of the water quality in the Pond. The Town has been working diligently with its citizens and property owners to remediate this pollution in a systematic way. The Town of Sherborn has embarked on a project to control stormwater runoff and reduce the concentration of non-point source pollutants contained in stormwater runoff that are entering into Farm Pond, a Great Pond, 114 acres in size.

This Project implements BMPs to lessen water quality impacts from existing development. It includes an outreach and education component to encourage residents within the Charles River watershed to actively participate in reducing NPS pollution by using innovative LID techniques, and implements operation and maintenance activities for BMPs constructed.

The primary objective of this Project is to design and construct stormwater Best Management Practice (BMP) controls to address and alleviate problems associated with nonpoint source (NPS) pollution within the Farm Pond watershed. The BMP controls will be sited in areas of concentrated stormwater runoff and will be designed to treat runoff prior to discharge into the Pond. The BMP controls will include low impact development (LID) techniques such as bioretention, vegetated swales, permeable pavement and infiltration (with pre-treatment) to be sited on public lands and/or within public rights-of-way.

PROJECT COST: \$ 75,600

FUNDING: \$ 45,300 by the US EPA
\$ 30,300 by the Town of Sherborn

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-05/319

PROJECT TITLE: Castle Hill Avenue Storm Drainage Improvements
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Great Barrington
LOCATION: Housatonic Basin

DESCRIPTION:

Lake Mansfield is impaired and listed under category 4c due to invasive non-native plants. Biological control efforts and bottom barriers have mitigated this issue, but nonpoint source runoff, delivering sediment and nutrients to the lake, remains the major underlying cause of this impairment.

This project proposes to address one of the major sources of nonpoint source runoff, the storm drainage from Castle Hill Avenue. Currently, stormwater from the Castle Hill Avenue area is managed by a series of antiquated catch basins that are too small for the volume of water experienced in even a moderate storm. The basins are fully flushed with each storm event, thus sediment and pollutants are not effectively removed from the flow. Finally, this system discharges directly into the southern end of the lake, where a delta of sediment is evident.

Using a combination of 319 funds and Town funds, this project will remove the existing system of inadequate and failing catch basins from the portion of Castle Hill Avenue between approximately Fern Hill and Prospect Street, replace them with new, larger basins with deeper sumps. These larger-volume basins will allow sediment to settle out of the storm flow before the flow reaches the lake. In addition, a hydrodynamic water-oil-pollutant separator will be installed to further remove suspended sediments and pollutants. The Town will continue its maintenance program of routine cleaning of catch basins after the project is completed.

The project will include establishing and implementing the routine maintenance of the catch basins. Future phases of the Lake Mansfield Improvement Plan will address the other key nonpoint source pollution areas around the lake, including Knob Hill and the boat launch, and the beach area parking lot.

The project addresses the first and most critical of several nonpoint source pollution “hot spots” in the lake watershed. Future phases of the comprehensive effort to improve water quality will focus on the other areas.

PROJECT COST: \$448,330

FUNDING: \$266,500 by the US EPA
\$181,830 by the Town of Great Barrington

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-06/319

PROJECT TITLE: Stormwater Pollution Reduction Project in the Montachusett Region's Millers River Watershed
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Montachusett Regional Planning Agency
LOCATION: Millers Basin

DESCRIPTION:

38 impaired waterbodies are found within the 10 communities in the Montachusett Region of the Millers River Watershed (Athol, Gardner, Petersham, Phillipston, Winchendon, Templeton, Ashburnham, Hubbardston, Westminster, Royalston). Of the 38 waterbodies, 24 of the impairments are nutrients, turbidity, or related eutrophication problems that are attributable to stormwater runoff from land use development. A Low Impact Development approach to stormwater management encourages on-site infiltration and small-scale on-site BMPs, and is recognized to be an effective and sustainable way to manage stormwater runoff volume while also improving water quality and groundwater recharge. Encouraging LID practices allows the proactive reduction of nonpoint source pollution, eliminating the need for costly retrofits.

The goal of this project is to work with multiple towns on the Montachusett Region's Miller River Watershed to encourage adoption to LID-friendly bylaws and policies and to educate residents and developers about the benefits of LID. These efforts will lead to beneficial impacts on water quality for the impaired waterbodies in these communities by reducing the amount of nonpoint source pollution from stormwater.

Three workshops and multiple meetings with town officials will be held to provide outreach and education as well as community-specific support for the project. Participating communities will be encouraged to develop and enact local bylaws and policies to foster the implementation of LID practices for retrofits and new development.

PROJECT COST: \$146,250

FUNDING: \$ 87,750 by the US EPA
\$ 58,500 by the participating communities

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-07/319

PROJECT TITLE: Lake Attitash Watershed Restoration
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Amesbury
LOCATION: Merrimack Basin

DESCRIPTION:

Lake Attitash is a 360-acre natural lake located in the Towns of Amesbury and Merrimac, Massachusetts. With several public access points, parking and a number of sandy beaches along its shores, Lake Attitash is a popular recreational location for activities such as boating, fishing and swimming. Listed as Category 5 on the 303(d) list of impaired waterbodies, Lake Attitash is a Class A Outstanding Resource Water since it serves as the back-up water supply source for Amesbury, MA. A Watershed Management Plan was developed for Lake Attitash in 1999.

The Town of Amesbury, with the help of volunteers from the Lake Attitash Association, has addressed all of the specific recommendations in the Watershed management Plan, including the installation of several stormwater BMPs. Despite these efforts, water quality within the lake remains low, with significant nutrient issues resulting in algal blooms and season-wide beach closures due to cyanobacteria levels in 2009. This project focuses on installing additional stormwater BMPs, this time on the Merrimac side of the watershed.

The goal of the current project is to improve the water quality of Lake Attitash through the implementation of LID -based BMPs within the watershed. Structural BMPs will be used to treat and infiltrate urban stormwater directly discharging to Lake Attitash.

Tasks include

1. Implement source reduction of nonpoint source pollutants from pervious surfaces on the Merrimac side of the watershed using Low Impact Development (LID) techniques ;
2. Community-based Social Marketing information transfer to supplement/better implement existing education efforts. Subjects will include fertilizer use, pet waste and nuisance aquatic weeds; and
3. Reduction of nuisance aquatic weeds

PROJECT COST: \$234,990

FUNDING: \$136,040 by the US EPA
\$ 98,950 by the

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-08/319

PROJECT TITLE: Water Quality Improvements of Vine Brook and Old Reservoir Recreational Beach
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Lexington
LOCATION: Shawsheen River

DESCRIPTION:

The Old Reservoir is a manmade impoundment within the Vine Brook subwatershed. It has been serving as a public swimming beach during summer months for several decades. Bacteria levels in excess of the Commonwealth's standards are of particular concern, as they currently result in beach closures following rain storms. Vine Brook discharges to the Shawsheen River near the Bedford/Billerica town line, then flows into the Merrimack River in Lawrence, MA. A bacteria TMDL has been written for the Shawsheen Basin.

The goal of this project is to improve water quality of Vine Brook and the recreational beach at the Town of Lexington's Old Reservoir. The primary targeted pollutant is bacteria. Other nutrients to be removed include total suspended solids (TSS), phosphorous, and nitrogen. Any metals present in solid form as well as oil and grease from roadway runoff are also removed. The project will incorporate non-structural and structural approaches. Planned non-structural BMPs under this grant include pet waste collection and disposal and encouragement of homeowner LID BMPs such as rain gardens and porous surfaces.

Structural BMPs consist of enlargement of the existing detention area with added forebay and restrictive outlet control, and an infiltration basin with forebay. These structural BMPs will improve capture of sediments prior to entering the Old Reservoir, improve maintenance access to sediment collection points, and improve detention time to facilitate the decay of bacteria.

PROJECT COST: \$832,325

FUNDING: \$300,000 by the US EPA
\$499,395 by the Town of Lexington

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-09/319

PROJECT TITLE Online Phosphorus Trading System
NPS CATEGORY Urban Runoff
INVESTIGATOR: Charles River Watershed Association
LOCATION: Charles Basin

DESCRIPTION:

Stormwater pollution remains the most significant source of water pollution in urban, suburban, and ex-urban areas in the United States. Charles River Watershed Association's (CRWA's) long-term water quality monitoring and the recent Nutrient Total Maximum Daily Loads (TMDLs) for the Lower (US-EPA, 2007) and Upper/Middle Charles (CRWA, draft 2009) document that the river continues to suffer from pollutant-laden discharges, causing widespread violations of the Massachusetts surface water quality standards. Other Massachusetts urban watersheds have similar problems. Phosphorus is the cause of approximately 40 percent of the impairments to the Commonwealth's assessed lakes and streams. Due mainly to excessive phosphorus pollution, the Charles regularly experiences significant algae blooms throughout its length. Since the summer of 2006, toxin-producing cyanobacteria blooms, which are harmful to both humans and animals, have occurred regularly in the lower basin of the river.

The overall goal of this project is to facilitate the reduction of stormwater phosphorus loads and other pollution to the Upper Charles River through the development of an Online Phosphorus Trading (OPT) system that is easily transferable to the whole Charles Basin, and eventually, statewide. Development of this internet-based system will improve water quality and enhance implementation of stormwater regulatory programs. The OPT system will enable users to do a quick site assessment/screening, identify potential BMPs, and assign rough cost estimates to enable trading and tracking to go forward. The program's site assessment/screening, potential BMP identification, and cost estimates is not, and could not under the draft RDA permit, serve as a substitute for the permit requirements.

The broader objectives of the enhanced OPT program are to:

1. Enhance implementation of stormwater regulatory programs;
2. Support a market-based trading system for buying and selling phosphorus reduction credits;
3. Incentivize suitable sites to exceed compliance and non-regulated sites to participate;
4. Provide an easy-to-use online system that works for all potential stormwater sites; and
5. Improve the pilot system design and security so that it could be expanded to the entire Charles River watershed, or statewide.

PROJECT COST: \$180,614

FUNDING: \$107,614 by the US EPA
 \$ 73,000 by the Charles River Watershed Association

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-10/319

PROJECT TITLE: Sunset Lake Watershed Stormwater BMPs
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Braintree
LOCATION: Boston Harbor

DESCRIPTION:

Sunset Lake, a 57-acre lake in the center of Braintree with a town-owned swimming beach, a park and a parking lot on its eastern shore, suffers from bacterial contamination issues, eutrophication and nuisance aquatic weed growth. The beach is generally closed several times during each swimming season due to bacterial contamination. The town has also treated the lake with herbicide several times to manage nuisance aquatic plant growth to densities which allow for swimming and boating.

The goal of this project is to improve the water quality of Sunset Lake by reducing NPS pollution into the lake (particularly bacterial pollution). The environmental results of the project include: reduced frequency of beach closures, reducing sedimentation into the lake and an increased level of awareness among the public on NPS pollution and LID concepts. The MA Watershed Based Plan identifies the following causes that will need to be controlled to achieve the estimated load reductions: organic enrichment/low dissolved oxygen, pathogens, pesticides, priority organics, habitat, and fecal coliform.

Two untreated stormwater discharges at the beach will be retrofitted with infiltration BMPs, which are known for their effectiveness at treating bacteria. Deep sump catch basins will be constructed on the high school access road, to replace drop inlet basins which drop directly into the culvert connecting the marsh and the lake and which currently allow sediment and pollutants to discharge directly into the lake.

In addition, a kiosk will be installed in the beach parking lot to provide information on the pervious pavers and the other stormwater BMPs as well as the reasons for the restrictions against feeding waterfowl and the reasons why dogs are not permitted at the beach. Watershed property owners will be mailed a brochure on methods to discourage Canada Geese from their lawns, the importance of picking up pet waste and reducing or eliminating fertilizer use for lawns.

PROJECT COST: \$ 148,510

FUNDING: \$ 89,100 by the US EPA
\$ 59,410 by the Town of Braintree

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-11/319

PROJECT TITLE: Improvement to Lake Wickaboag Sediment BMPs at Lakeview Avenue
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of West Brookfield
LOCATION: Chicopee Basin

DESCRIPTION:

Lake Wickaboag is impaired by non-point source pollution, primarily in the form of excessive phosphorus loading. The lake is listed on the state's 2008 Integrated List of Impaired Waters as Category 4A. The MassDEP's TMDL for the lake (MassDEP, 2002) has shown that Wickaboag receives an estimated annual phosphorus load of 1,049 kg/yr and should receive no more than 729 kg/yr. Based on the state's TMDL and on recent watershed studies, it is apparent that the phosphorus load to the lake is attributable to phosphorus that is mobilized during rain events, since wet weather sampling has revealed substantial increases in phosphorus loading during and immediately following storms. The 2005 D/F study reported that nearly all of the phosphorus load reaching the lake was derived from surface water inputs (very little was found in studies of groundwater entering the lake) and nearly 72% of the phosphorus reaching the lake did so during wet weather events.

This implementation project represents a continuation of the ongoing effort to install and/or improve stormwater drainage systems within the Lake Wickaboag watershed in West Brookfield. Work under this project will reduce phosphorus and sediment loading to Lake Wickaboag by 24.9 kg/yr and 10,204 kg/yr, respectively, by dramatically redesigning and improving the sediment trapping capabilities of a major drainage system that enters the lake at its south western cove. The drainage area that will be treated by this project represents an area of just over 108 acres of land that includes a significant portion of the more heavily developed section of West Brookfield's downtown district.

The goals of the project are:

1. Design, permit, and construct improved wet detention basins with accessible sediment forebays and vegetation filtration within the drainage system at Lakeview Road for better pollutant trapping efficiency and improved maintenance capability;
2. Design, permit, and construct the vegetated swales along Lakeview Avenue to treat runoff prior to entering wet detention system; and
3. Conduct outreach and education for watershed residents and stakeholders.

PROJECT COST: \$674,700

FUNDING: \$350,000 by the US EPA
\$285,800 by the Town of West Brookfield

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-12/319

PROJECT TITLE: Water Quality Analysis Support for Massachusetts Volunteer Monitors
NPS CATEGORY: All Sources
INVESTIGATOR: UMass Water Resources Research Center
LOCATION: Statewide

DESCRIPTION:

In 1990, the Massachusetts Water Resources Research Center created a program called the Massachusetts Water Watch Partnership to assist volunteers in running credible monitoring projects for streams and lakes. This program was originally funded through grants from private foundations and then from state grants. The state also began funding lab assistance to volunteer groups, by subsidizing the cost of quality assurance samples and some analyses (Total Phosphorus and chlorophyll *a*) through the Water Resources Research Center's Environmental Analysis Laboratory (EAL).

EAL developed an analytical method for Total Phosphorus (TP) that allowed detection at very low levels (5 µg/L), which is of great importance to lake groups, as it allows them to determine whether their lakes are eutrophied or not. Some groups applied and received grants of their own to run monitoring programs on their water bodies, and used EAL for the analyses needed in their program.

Several years ago, the State discontinued the EAL subsidies to volunteer groups. EAL continued providing quality control samples and TP and chlorophyll *a* analyses, but at the full price of \$35/sample for TP and \$22 for chlorophyll *a*.

In 2010, the EAL spectrophotometer stopped working properly, and the lab did not have the funds to replace the instrument so it stopped offering TP and chlorophyll *a* analyses. Volunteer groups had to use other laboratories for their analyses, and found that none of the laboratories offer the low detection limit that EAL provided. This project will reinstate EAL analytical services to volunteer groups and others in the State by purchasing a new spectrophotometer and by providing a number of free analyses to citizen groups.

UMass WRC will purchase a Shimadzu UV-1800 Spectrometer, have it installed in the laboratory, and have staff take the training offered by the manufacturer for this instrument. WRC will also purchase some supplies necessary for the analysis of Total Phosphorus with that instrument (a 5cm cell), an electric autoclave sterilizer to digest TP samples, and replacement sample bottles that we supply to the volunteers to collect water samples in their water bodies. WRC will provide up to 100 free TP and chlorophyll *a* analyses for volunteer groups in 2011, up to ten samples for ten groups. As per DEP requirements, the groups must have a DEP-approved Quality Assurance Project Plan that includes TP and chlor *a* monitoring and analysis.

PROJECT COST: \$ 40,000

FUNDING: \$ 24,000 by the US EPA
\$ 16,000 by UMass Amherst

DURATION: 2011 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 12-01/319

PROJECT TITLE: Investigating Means Of Improving Onsite Septic Systems For Removal Of Contaminants Of Emerging Concern
NPS CATEGORY: Groundwater Disposal
INVESTIGATOR: Barnstable County Department 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 to achieve the goals of the TMDL and the Massachusetts Estuaries programs, especially where wastewater is a major source of pollutant loading. This project will continue the ongoing work of the MASSTC.

The project will investigate the effect of soil type in onsite septic system leachfields on the removal of pharmaceuticals, endocrine disrupting compounds and personal care products. The focus of the effort is to identify potential soil-layer placement and fill specification strategies that can be used to optimize the removal of selected contaminants of emerging concern (CEC). The information will be used to make recommendations for best management strategies to attenuate CEC inputs from septic systems. A second objective of the project is to facilitate the further development/testing of nutrient-removing onsite septic system technologies.

PROJECT COST: \$ 99,964

FUNDING: \$ 58,400 by the US EPA
\$ 41,564 by Barnstable County and project participants

DURATION: 2012 – 2015

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 12-02/319

PROJECT TITLE: Decreasing Phosphorus in Cranberry Waters by Implementation of Best Management Practices
NPS CATEGORY: Agriculture
INVESTIGATOR: UMass Amherst
LOCATION: Buzzards Bay

DESCRIPTION:

Many inland water bodies in Southeastern Massachusetts watersheds are impaired due to enrichment of nutrients, and specifically phosphorus (P). Many ponds in the region are in categories 4 and 5, some have TMDLs and others are scheduled. An examination of aerial photographs of Southeastern Massachusetts illustrates the apparent hydrologic connection of many cranberry bogs to inland ponds. Cranberry production is a significant agricultural land use and economic driver in Southeastern Massachusetts; and when cranberry growing is associated with these ponds, BMPs that reduce P export become even more critical.

The focus of this project will be the reduction of P output from cranberry lands in order to meet current and anticipated TMDLs and generally improve water quality.

This project will have both *implementation* and *demonstration* tasks. Implementation activities with structural BMPs (a filtration system using aluminum oxide) and a sand filter bed will be evaluated. P levels will be evaluated in White Island Pond during each summer of the project to determine effects of these implementations on the Pond. Implementation of non-structural BMPs will be evaluated at 10-12 cranberry bog sites (fertilizer reduction evaluation and evaluation of changes in flood management including characterization of volumes). The utility of several other experimental approaches will be investigated/evaluated in the lab and demonstrated in the field. Outreach activities will educate growers about their utility and show them how to implement BMPs on their farms, thus multiplying the impact of the work.

PROJECT COST: \$668,767

FUNDING: \$346,716 by the US EPA
\$322,051 by the University of Massachusetts

DURATION: 2012 – 2015

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 12-03/319

PROJECT TITLE: Minimizing Non-Point Source Pollution From Two Horse Facilities Through Installation And Demonstration Of Best Management Practices
NPS CATEGORY: Agriculture
INVESTIGATOR: UMass - Amherst
LOCATION: Statewide

DESCRIPTION:

The equine industry in Massachusetts, estimated to be over 50,000 animals, is of a size to make significant impact on non-point source pollution. An average horse generates about 45 lb. of manure per day, almost 10 tons per year as well as bedding. Thus, in Massachusetts approximately 500,000 tons of manure plus associated stall bedding are produced each year. Management of manure and mud on horse farms is a challenge for horse owners and equine facility managers. The growing number and size of unmanaged piles of manure seen on many properties is becoming an increasing concern due to greater public awareness and pressures in an increasingly urban society. Runoff from stables, manure piles and over grazed pastures has the potential to increase risks of non-point source pollution from nutrients, organic particles, fecal coliform bacteria, and other pathogens.

The goal of this project is to reduce the risk of nonpoint source pollution from equine facilities through installation and implementation of best management practices (BMPs) on two equine facilities. The project will also provide hands-on training to the Massachusetts equine community, including the general public, commercial equine stables, and riding facilities.

This project will focus on the equine industry with an emphasis on installing and implementing selected BMPs on the two pilot sites. BMPs include installation of three-bin composting systems, conversion of stable manure and bedding into biochar, improvement of exercise or sacrifice area footing using bark chips (hog's fuel) to prevent mud formation, use of various types of fencing to exclude horses from wetlands and water bodies, implementation of drainage swales, grass filter strips, gutters and downspouts for reducing mud formation and runoff, and creation of disposal areas for composting dead animals. The project will continue to support and reinforce USDA nutrient management programs and NRCS standards for nutrient management practices while reducing non-point source pollution.

PROJECT COST: \$338,415

FUNDING: \$198,500 by the US EPA
\$139,915 by UMass Amherst

DURATION: 2012 – 2015

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 12-04/319

PROJECT TITLE: Massachusetts Stormwater Outreach and Education Program 2012
NPS CATEGORY: Urban Runoff
INVESTIGATOR: UMass - Amherst
LOCATION: Statewide

DESCRIPTION:

The goal of this project is to achieve a reduction in non-point source pollution by providing technology transfer on conventional and innovative stormwater BMPs and LID practices to a broad range of constituents, including Conservation Commissions, local and state officials, and other stormwater professionals. The project will build on an already developed source of validated technical information on BMPs; will provide end users with qualified information to make appropriate technology implementation decisions; and will assist municipalities to maximize the environmental benefits of grant programs by focusing efforts on technologies that have the most promising potential to reach specific water quality objectives. As municipalities comprise the primary intended audience for the web site, efforts to increase outreach to municipal officials directly will be a high priority for the upcoming project phase. In addition, MADEP requires a compatible source of information to support recommended performance rates that may be provided for innovative technologies in the revised stormwater guidance document of agency policy decisions.

This project provides technology evaluation, outreach and education via Web based materials providing validated performance information on a variety of stormwater BMPs. It will do so by maintaining, updating and expanding the existing MASTEP web site; and by promoting the site through a series of workshops and presentations offered to Conservation Commissions, local and state officials, and other stormwater professionals.

PROJECT COST: \$ 92,956

FUNDING: \$ 49,994 by the US EPA
\$ 42,962 by UMass Amherst

DURATION: 2012 – 2015

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-01/319

PROJECT TITLE: Continued Investigation of Contaminants of Emerging Concern Discharged from Onsite Systems with Emphasis on Endocrine Disrupting Compounds
NPS CATEGORY: Groundwater Disposal
INVESTIGATOR: Barnstable County Department of Health and the Environment
LOCATION: Statewide

DESCRIPTION:

Investigations have identified endocrine disrupting compounds as the priority contaminant class among Contaminants of Emerging Concern in areas such as Cape Cod where septic systems discharges are hydraulically connected with water supplies and sensitive wildlife aquatic habitats. This project will focus on two classes of endocrine disruptors, hormones and phenolic surfactants.

The goal of this aspect of the project is to further investigate the performance of soils-based low-technology onsite septic system designs for the removal of selected endocrine-disrupting compounds. This project will focus on seven natural and synthetic hormones and selected nonylphenol-containing surfactants known to have endocrine disrupting characteristics. The influence of hydraulic loading rate on removal efficiencies will also be investigated.

Project tasks include

1. Sample and report on results for hormones and nonylphenol compounds.
2. Review all relevant literature relating to the use of Yeast Estrogen Screen (YES) tests and determine the feasibility of using this test to inform decisions on the extent and locations for the more expensive chemical analyses for estrogenic compounds. If the review indicates that the YES is a feasible option for determining estrogen influencing activity, conduct concurrent sampling of wastewater using YES and compare results with mass spectrometer findings.
3. Outreach

PROJECT COST: \$ 68,574

FUNDING: \$ 40,932 by the US EPA
\$ 27,642 by the Barnstable County Department of Health and the Environment

DURATION: 2013 – 2016

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-02/319

PROJECT TITLE: Stormwater BMPs in the Provincetown Watershed
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Town of Provincetown
LOCATION: Cape Cod

DESCRIPTION:

Provincetown Harbor, currently listed on the 2010 Integrated List of Waters as a Category 4a water with a TMDL for pathogens, accommodates a multitude of recreational and commercial activities. The importance of the harbor to ecological systems, recreational uses, and the local economy demands appropriate planning and assessment of external impacts that may degrade this important resource. Dense development and large amounts of impervious areas immediately adjacent to the harbor result in significant stormwater runoff reaching the Harbor waters.

The project goal is to construct new permeable paving along a 3,200 foot long portion of Commercial Street, from Atlantic Avenue to the West End Parking Lot. Due to space limitations that are present along portions of Commercial Street and the amount of utilities within the road layout, porous pavement installation is a viable alternative to other drainage options. A preliminary BMP design for this area was completed as funded under a 2009 ARRA assisted 604(b) grant as part of an effort to address primary pollutants of concern in stormwater runoff to Provincetown Harbor, bacteria and sediments.

Project Tasks include

1. Design and construct BMPs
2. BMP Operation and Maintenance plan
- 3: Public Education and Outreach

PROJECT COST: \$1,000,000

FUNDING: \$600,000 by the US EPA
\$400,000 by the Town of Provincetown

DURATION: 2013 – 2016

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-03/319

PROJECT TITLE: Sediment Management BMPs for the South River in Conway
NPS CATEGORY: Resource Restoration
INVESTIGATOR: Franklin Regional Council of Governments
LOCATION: Deerfield River

DESCRIPTION:

This project is a priority restoration project on the South River in Conway, MA. The site is downstream of the Route 116 Bridge and combines bank stabilization measures to address 1,400 feet of eroding river bank and a floodplain lowering component to provide the river access to its floodplain to increase sediment storage and reduce flood flow velocities.

Approximately 13 miles of the South River from Emmett Road in Ashfield to the confluence with the Deerfield River, is listed on the 2010 Integrated List of Waters as a Category 5 Waters “Waters requiring a TMDL” for fecal coliform. This reach is also listed as having physical substrate habitat alterations.

The project goals are to stabilize 1,400 feet of eroding bank, and floodplain lowering to increase sediment storage, and reduce flood flow velocities and sediment loading to the South River and downstream receiving waters.

Project tasks include

1. Design and construct BMPs
2. BMP Operation and Maintenance plan
- 3: Education and Outreach

PROJECT COST: \$354,166

FUNDING: \$212,500 by the US EPA
\$141,666 by the Franklin Regional County of Governments and participating communities.

DURATION: 2013 – 2016

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-04/319

PROJECT TITLE: Reducing Stormwater Pollution in the Western Millers River Watershed with Low Impact Development
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Franklin Regional County of Governments
LOCATION: Millers River

DESCRIPTION:

This project will implement a program in the western Millers River Watershed that is similar to the LID outreach and education project (11-06/319) undertaken by the Montachusett Regional Planning Commission (MRPC) in the eastern portion of the Millers River Watershed. Approximately 18.5 miles of the Millers River from South Royalston to Erving Center is listed as Category 5 Waters, waters requiring a TMDL for fecal coliform and total phosphorus, and most of the impervious surface area in the western portion of the Millers River Watershed in Franklin County is associated with Orange and Montague.

The project goal is to mitigate the impacts of stormwater runoff in Montague and Orange, and encourage development that incorporates LID to protect the sensitive areas in the more rural areas of the watershed. This project, combined with the work of MRPC in the eastern part of the watershed, will reduce the amount of nonpoint source pollution from stormwater and improve water quality for the impaired waterbodies in the Millers River Watershed.

Project tasks include

- Task 1. Updating Local Bylaws with LID requirements
- Task 2. Regional LID Outreach and Training Workshops
- Task 3. Project Evaluation

PROJECT COST: \$ 58,333

FUNDING: \$ 35,000 by the US EPA
\$ 23,333 by the participating communities

DURATION: 2013 – 2016

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-05/319

PROJECT TITLE: Manchaug Pond Water Quality Improvement - Phase 2
NPS CATEGORY: Resource Restoration
INVESTIGATOR: Manchaug Pond Foundation
LOCATION: Blackstone Basin

DESCRIPTION:

This project will implement Nonpoint Source Improvements in the form of structural stormwater BMPs in the Manchaug Pond Watershed to help improve the water quality of the pond (listed as Category 5 for low dissolved oxygen). The Manchaug Pond Foundation would also like to extend agricultural efforts beyond education and work directly with a large farm operation to provide technical services for the design and implementation of agricultural BMPs, and focus their educational efforts by providing NPS education and promoting watershed awareness to area children.

The project goals are: 1) sediment loading and associated pollutants are reduced, 2) invasive aquatic weed populations continue to decrease, 3) targeted outfalls are free of stormwater debris and erosion, and 4) watershed residents are knowledgeable about residential landscaping techniques and maintenance protocols for a healthy lake.

Project tasks include

1. Design and construct BMPs
2. BMP Operation and Maintenance plan
3. Public education and outreach,
4. An aquatic weed management program

PROJECT COST: \$208,525

FUNDING: \$119,865 by the US EPA
\$ 88,660 by the Manchaug Pond Foundation

DURATION: 2013 – 2016

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-06/319

PROJECT TITLE: Massachusetts Nonpoint Source Pollution Management Manual, Update, and Enhancement
NPS CATEGORY: Outreach and Education
INVESTIGATOR: Geosyntec Consultants Inc.
LOCATION: Statewide

DESCRIPTION:

This project will significantly improve the current (2006) version of the Massachusetts Nonpoint Source Pollution Management Manual (Manual), also known as the Clean Water Toolkit, with respect to content and accessibility by developing: 1) web format and feature upgrades that reflect current technology and usage of web-based educational materials; 2) content updates that reflect current regulations, BMP technologies and research; and, (3) additional interactive features that will provide more robust information, including linkage to past 319 grant project case studies.

The project goals are: 1) Improve functionality and content of the Manual through web format and feature upgrades that reflect current technology and usage of web-based educational materials, 2) Develop Manual content updates that reflect current regulations, BMP technologies, and research, 3) Develop new interactive features that will provide more robust information, including a collection of interactive site schematics and linkages to past 319 grant project case studies, and 4) Increase overall public education and outreach with regard to NPS pollution through improved NPS Manual accessibility and a better web user experience.

Project tasks include

1. Plan and Develop Working Group
2. Update NPS Manual Content
3. Re-Design and Upgrade the BMP selector Tool
4. Develop interactive BMP Site Schematics
5. Searchable Case Studies/319 Grant Project Summaries
6. Convert NPS Manual to HTML format and Host on Website

PROJECT COST: \$179,150

FUNDING: \$107,490 by the US EPA
\$ 71,660 by Geosyntec and project participants

DURATION: 2013 – 2016

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-07/319

PROJECT TITLE: City of Boston Porous Pavement Green Alley NPS Demonstration Project
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Charles River Watershed Association
LOCATION: Boston Harbor

DESCRIPTION:

This project will result in the design, construction, and monitoring of a permeable pavement retrofit in the City of Boston; outreach and education about the project; and a detailed analysis of the results of the project to enable replication of this technology, and to identify improvements or modifications that may be necessary. The permeable pavement will reduce stormwater volumes, reduce pollutant contributions to surface water bodies, increase the recharge of the City's groundwater, reduce existing flooding problems, and improve the aesthetics in the area. The result of this demonstration project will be to create design recommendations for the use of permeable pavements for retrofitting alleys in the City of Boston and the Region.

The project goals are: 1) Reduce nonpoint source pollutant (NPS) contributions to water bodies by decreasing the stormwater runoff volumes and treatment via permeable pavement and subgrade materials; 2) Increase the recharge of water in the City's Groundwater Conservation Overlay District; 3) Evaluate the potential for using permeable pavements in alleys as a standard practice for improving stormwater management in the City of Boston; 4) Quantify the benefits of the project with a monitoring program; 5) Develop design recommendations for the use of permeable pavements for retro-fitting alleys in the City of Boston; and 6) Identify areas for suggested additional research and investigation.

Project tasks include

1. Design and construct BMPs
2. BMP Operation and Maintenance plan
3. Education and Outreach

PROJECT COST: \$532,320

FUNDING: \$297,776 by the US EPA
\$234,544 by the City of Boston

DURATION: 2013 – 2016

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-08/319

PROJECT TITLE: ACPP Technical Providers for the Palmer River Watershed
NPS CATEGORY: Agriculture
INVESTIGATOR: Massachusetts Association of Conservation Districts (MACD)
LOCATION: Narragansett Basin/Palmer subwatershed

DESCRIPTION:

The Palmer River Watershed in the Narragansett Bay Basin has been selected by the USDA Natural Resources Conservation Service (NRCS) as the target of the National Water Quality Initiative (NWQI) in Massachusetts (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ma/programs/?cid=nrcs144p2_013949).

The Palmer River is impaired by pathogens and nutrients, some of which are related to agricultural activities. Pollutants from farms can effectively be mitigated through farm conservation practices and other nonpoint source BMPs. Under the NWQI, NRCS will dedicate additional technical and financial resources to address these impairments. MassDEP, through its 319 Nonpoint Source Program, can provide technical and financial resources. The Massachusetts Association of Conservation Districts (MACD), through its Accelerated Conservation Planning Program (ACPP), has field staff who can be engaged to work with Palmer River farmers to develop and implement conservation planning practices and nonpoint source BMPs to address NWQI goals.

The Grantee is MACD. Under this agreement, MACD will provide two FTEs to serve as field staff dedicated to undertake the tasks and produce the deliverables as outlined herein. The goals of the project include 1) complete as many farm conservation plans as possible and 2) fully implement as many of the completed plans as possible.

The primary pollutants of concern are nutrients and pathogens.
Project tasks include:

1. Develop and implement farm conservation plans
2. Provide technical and regulatory support
3. Outreach and education
4. Help farmers identify and access financial and technical resources for enhanced water quality protection
5. Evaluate program successes and challenges Evaluate program successes and challenges to determine how the project outcomes can be used in furtherance of a Regulatory Certainty initiative.

PROJECT COST: \$335,000

FUNDING: \$200,000 by the US EPA
\$ 25,000 by the Rehoboth Agricultural Commission
\$ 35,000 by the Bristol County Conservation District
\$75,000 by Participating Producers

DURATION: 2013 – 2016

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 13-09/319

PROJECT TITLE: Development of the 2014 Massachusetts Nonpoint Source Management Plan
NPS CATEGORY: Outreach and Education
INVESTIGATOR: Geosyntec Consultants Inc.
LOCATION: Statewide

DESCRIPTION:

The current version of the Massachusetts Nonpoint Source (NPS) Management Plan (<http://www.mass.gov/eea/agencies/massdep/water/watersheds/nonpoint-source-pollution.html#4>) was written in 1999. The plan outlined a strategy for addressing nonpoint source problems in accordance with EPA's then-current guidance. Over time, the 1999 plan was amended to reflect new initiatives and program changes. One amendment supports the use of SRF funds for green infrastructure and energy projects. Additional updates to the plan were also made to append the Nonpoint Source Action Strategies and the Massachusetts Watershed-based Plan. However, none of these amendments and appendixes has included a total revision of the 1999 plan.

MassDEP, in accordance with new EPA 319 Nonpoint Source guidelines ("Guidelines," April 2013, Nonpoint Source Program and Grants Guidelines for States and Territories, <http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf>), has selected Geosyntec Consultants, Inc. of Acton, MA to provide consulting services to revise and update the Massachusetts Nonpoint Source Management Plan to reflect current and future plans and priorities.

The 2014 Plan will cover a five-year timeline and will be organized to facilitate review and updating every five years. The 2014 Plan will revise and update the 1999 plan as needed, and will be consistent with April 2013 Guidelines. In particular, the 2014 NPS Management Plan should include activities that will:

- Instill, encourage, and nurture a passion for clean water and for the protection of water and related resources
- Increase awareness of NPS issues across agencies, stakeholders, and general public
- Establish and strengthen a watershed-based stakeholder network to support and carry out NPS monitoring, education and outreach, project development and implementation
- Support and promote local watershed planning and implementation of watershed-based plans
- Engage and strengthen local, state and federal partners to ensure coordinated and strategic program activities by all parties
- Based on the Recovery Potential Screening Tool, refine a strategy to prioritize watersheds for remediation
- Identify and prioritize high quality waters in need of protection
- Provide a basis for the allocation of resources to priority watersheds and activities
- Incorporate actions and strategies for adaptation to climate change
- Showcase and support program activities of all partners
- Identify and expand opportunities to accomplish and leverage NPS work through SRF, SWMI, CZM, NEP, EPA, and other state, federal, and non-governmental programs
- Encourage the use of green and sustainable technology for energy efficiency and associated mitigation of NPS air quality
- Emphasize coordination and strengthening of partnerships with agricultural community and agencies
- Identify needs and make recommendations for additional policies, regulations, and BMPs to enhance mitigation of NPS in the Commonwealth

PROJECT COST: \$207,400
FUNDING: \$203,348 by the US EPA
 \$ 4,052 by Geosyntec Consultants
DURATION: 2013 – 2014

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 14-01/319

PROJECT TITLE: Investigation of Passive Nitrogen Removal Strategies for Onsite Septic Systems at the Massachusetts Alternative Septic System Test Center
NPS CATEGORY: Groundwater Disposal
INVESTIGATOR: Barnstable County Department of Health and the Environment
LOCATION: Statewide

DESCRIPTION:

This project will take the findings from the publically-financed Florida Passive Nitrogen Removal Project and determine which elements from that study are successful, applicable, and transferable. This includes field testing of promising Florida designs at the Massachusetts Alternative Septic System Test Center (MASSTC). This investigation continues MASSTC's work to assure wastewater planners and managers that all decentralized options are properly evaluated and to provide tools for the management of wastewater nitrogen. This investigation will be conducted at MASSTC, which serves as a resource for quality third-party performance information regarding advanced onsite septic system technologies.

The project goals are to evaluate results from the Florida Passive Nitrogen Removal Project and determine whether elements from that study are successful, applicable, and transferable to the Massachusetts coastal area.

Project Tasks Include:

1. Determine whether the passive denitrification strategies investigated in Florida have relevance to the Massachusetts geographical area.
2. Conduct rigorous field testing of promising nitrogen removal technologies identified in the Florida study.
3. Determine what specific designs from that project hold the most promise for success in this geographical area, or what modifications may be required to compensate for differences in water chemistry, climate, or other factors.
4. If testing indicates promising results, then prepare a report describing design, expected nutrient removal, costs, life cycle, sustainability, etc.
5. Conduct this project concurrent to continued testing of additional proprietary technologies that purport to remove nitrogen.

PROJECT COST: \$146,184

FUNDING: \$ 85,725 by the US EPA
\$ 60,459 by Barnstable County and project participants

DURATION: 2014-2017

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 14-02/319

PROJECT TITLE: White Island Pond Phosphorus Inactivation Project
NPS CATEGORY: Resource Restoration
INVESTIGATOR: Town of Plymouth
LOCATION: Buzzards Bay

DESCRIPTION:

White Island Pond, located in the towns of Plymouth and Wareham, is a shallow lake with a TMDL for phosphorus. Previous rounds of 319 and 604b funding have supported a strategy to control watershed phosphorus inputs, most notably from cranberry bogs. High anthropogenic inputs of phosphorus have settled into the sediments over many years. The internal sediment is the remaining major contributor of the total phosphorus budget, and an alum treatment or similar phosphorus control is recommended by the TMDL to control the phosphorus in the water column and lake sediment.

The goal of this project is to apply alum that will sequester the phosphorus in the water column and bottom sediments that cause impairments to the White Island Pond. Ultimately the goal is to move White Island Pond from the 303d list of impaired waters by addressing a major contributor of total phosphorus, internal sediment.

Project Tasks Include:

1. Conduct three phased treatments to remove phosphorus from the water column.
2. Collect water quality and analyze for total phosphorus, and take secchi disk measurements.
3. Public outreach conducted through educational newsletters and website updates.

PROJECT COST: \$437,010.09

FUNDING: \$260,231.50 by the US EPA
\$176,778.59 by the Town of Plymouth and project participants

DURATION: 2014 – 2017

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 14-03/319

PROJECT TITLE: Monoosnoc Brook Renewal Project
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Massachusetts Watershed Coalition
LOCATION: Nashua Basin

DESCRIPTION:

Monoosnoc Brook flows out of the hills on the west side of Leominster. The brook connects six impoundments, the city's busy downtown area, and a variety of industrial facilities. Pollutants from urban runoff are transported downstream into the North Nashua River, which is listed in Category 5 on the 2006 *Integrated List of Waters* with a pathogen impairment. This project will design and install source reduction BMPs to reduce the amount of pollutants being discharged to the Brook. This project also will compile data on cost effective BMPs and LID techniques, and produce guidance, in the form of a BMP Cost Catalog to help local officials select practices that achieve the most pollutant removal for the least cost.

The project goals are to reduce sediment, phosphorus, and bacteria that impair Monoosnoc Brook and the North Nashua River through the installation of stormwater management BMPs, community outreach to assist source reduction, and the development and release of a BMP Cost Catalog.

Project Tasks Include:

1. Design and install BMPs, including three sediment vaults paired with infiltration trenches, seven bioswales, five treebox filters, four tandem leaching catch basins, porous paving, and rain gardens. All BMPs will be placed on municipal property.
2. Develop a BMP Cost Catalog to supply information for remediation projects and encourage more communities to revitalize streams impacted by urban runoff.
3. Provide community outreach and education through workshops, newspaper articles, cable TV programs, and working with the local conservation commission and planning board.

PROJECT COST: \$515,000

FUNDING: \$229,000 by the US EPA
\$286,000 by the Massachusetts Watershed Coalition and project participants

DURATION: 2014 – 2017

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 14-04/319

PROJECT TITLE: Using Low Impact Development Techniques to Manage Stormwater Runoff in Greenfield
INVESTIGATOR: Franklin Regional Council of Governments
NPS CATEGORY: Urban Runoff
LOCATION: Deerfield Basin

DESCRIPTION:

The Green River is an important tributary to the Deerfield River. The segment of the Green River that flows through downtown Greenfield is listed as a Category 5 impaired waterbody requiring a TMDL for fecal coliform. This project will design and install BMPs to reduce urban stormwater runoff, a major contributor of nonpoint source pollution in the Green River.

The project goals are to reduce nutrients, pathogens, and sediment that impair the Green River through the installation of stormwater management BMPs, community outreach including an outdoor ‘classroom’ facility, and a public awareness campaign.

Project Tasks Include:

1. Retrofit a two-acre parking lot with the addition of bioretention areas to treat runoff that flows without treatment to the Green River.
2. Create an outdoor classroom at a site behind the Greenfield Public Library to demonstrate rain gardens and lawn care practices.
3. Implement a campaign to raise public awareness of stormwater pollution and to encourage residents and public officials to take action to reduce stormwater pollution.
4. Conduct two workshops for area residents to help reduce runoff from residential lawns.
5. Introduce local officials to low impact development (LID) regulations.
6. Conduct regional educational outreach efforts.

PROJECT COST: \$595,600

FUNDING: \$218,600 by the US EPA
\$377,000 by the Town of Greenfield and project participants

DURATION: 2014 – 2017

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 14-05/319

PROJECT TITLE: Lake Gardner & Powow River Nonpoint Source Improvement Project
NPS CATEGORY: Resource Restoration
INVESTIGATOR: Town of Amesbury
LOCATION: Merrimack Basin

DESCRIPTION:

The Powow River is listed as a Category 5 impaired waterbody for pathogens (fecal coliform), total suspended solids, and turbidity. Lake Gardner is a 93-acre lake that lies between several reaches of the Powow River in the Merrimack River watershed.

This project will implement several prioritized BMPs to reduce pathogens, total suspended solids, and nutrients within the Lake Gardner and Powow River watersheds. The project goals are to reduce the amount of pollutants being discharged through the design and construction of stormwater BMPs at five prioritized locations within the watershed. This will help decrease the nonpoint source pollution impacts on water quality in Lake Gardner/Powow River and ultimately improve the water quality of the Merrimack River.

Project Tasks Include:

1. Design and install BMPs, including infiltration swales, deep sump catch basins with off-line leaching pipes/infiltration trench, and a subsurface interceptor trench to reduce erosion.
2. Install additional pet waste dispensers.
3. Provide community outreach and education through a new stormwater display for the DPW building and Lake Gardner Beach kiosk, an educational brochure, and material posted online.

PROJECT COST: \$278,360

FUNDING: \$166,960 by the US EPA
\$111,400 by Town of Amesbury and project participants

DURATION: 2014 – 2017

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 14-06/319

PROJECT TITLE: Ipswich River Watershed BMP Implementation at Farley Brook
INVESTIGATOR: Town of Ipswich
NPS CATEGORY: Resource Restoration
LOCATION: Ipswich Basin

DESCRIPTION:

Farley Brook, located in the Town of Ipswich, is a major contributor of contaminated stormwater runoff to the Ipswich River. The segment of the river that receives the discharge from the Brook is listed as a Category 5 waterbody for pathogens, impacting important shellfish beds. Reducing the loading from Farley Brook to the Ipswich River is anticipated to be a major step in improving the condition of the river by addressing the existing TMDL for pathogens.

The project goals are to reduce pathogens, phosphorus, and sediment that impair the Ipswich River through the design and installation of a structural BMP, and implementation of an outreach and training program. This will help decrease the nonpoint source pollution impacts on water quality in Farley Brook and ultimately improve the water quality of the Ipswich River.

Project Tasks Include:

1. Design and install engineered wetlands along the open section of Farley Brook to serve as pretreatment steps for the removal of the target pollutants.
2. Design and install a structural BMP downstream from the wetlands along the culverted section of Farley Brook to provide final treatment of the stream flow prior to it entering the Ipswich River. This BMP will be subsurface treatment systems located beneath the Hammatt Street parking lot. After treatment, the flow will reconnect with the Farley Brook culvert before discharging to the Ipswich River.
3. Outreach and educational presentations to the Ipswich Board of Selectmen and project updates on the Town's website.

PROJECT COST: \$438,782

FUNDING: \$261,600 by the US EPA
\$177,182 by the Town of Ipswich and project participants

DURATION: 2014 – 2017

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 14-07/319

PROJECT TITLE: Tree Canopy Stormwater Implementation & Outreach Program
NPS CATEGORY: Outreach and Education
INVESTIGATOR: Comprehensive Environmental, Inc.
LOCATION: Statewide

DESCRIPTION:

This project will develop and implement a program to preserve, replace, and enhance mature tree canopy, as an integrated component of stormwater management design in Massachusetts. The project will quantitatively characterize the potential role of canopy trees in achieving significant reductions in stormwater runoff; develop model regulatory language for use at both the municipal and state level for fostering the employment of tree canopy as a BMP; and compile guidelines for the use of trees for stormwater management in the urban landscape. These deliverables will be combined with a web-based technology clearinghouse to assist with distribution.

The project goal is to contribute to the suite of tools and resources available for remediation of stormwater impacts in urban and suburban areas. Trees are often overlooked as a natural BMP and it is hoped that these deliverables will advance the use of this natural and aesthetically pleasing option.

Project Tasks Include:

1. Develop a technical foundation upon which to base guidance materials and regulatory approaches for preserving and establishing tree canopy as an integral component of stormwater management practice. Develop and assess prototypical street and parking area tree planting scenarios, to quantitatively characterize the role tree canopies play in stormwater management.
2. Using this information, develop model regulatory language that can be adapted to municipal and state agency use.
3. Compile guidelines for the use of trees for stormwater management in the urban/suburban landscape. Guidelines will include resources for implementing public tree canopy programs as well as for private property owners.
4. Develop an online technology transfer clearinghouse to help in implementing the model regulation and guidelines.

PROJECT COST: \$ 79,960

FUNDING: \$ 47,976 by the US EPA
\$ 31,984 by Comprehensive Environmental, Inc. and project participants

DURATION: 2014 – 2017

APPENDIX
319 NONPOINT SOURCE PROGRAM PROJECTS 1990-2007

- 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.
-
- 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 H₂Ome 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
- 00-16/319 Lake Wyola TMDL Implementation**
by the Massachusetts Department of Conservation and Recreation
- 00-17/319 Stormwater BMPs on Residential Property**
by EOEEA: DFWELE/Riverways
- 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
- 01-27/319 Beaver Brook Culvert Rehabilitation and Improvements to Beaver Brook Park**
By City of Worcester
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- 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
- 02-11/319 Wachusett Mountain NPS**
by Wachusett Mountain Associates (WMA)
- 02-12/319 Martins Pond Shoreline Restoration and Sediment Reduction Project**
by the Town of North Reading
- 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
- 03-05/319 Bare Hill Pond Noxious Aquatic Plant Reduction**
by the Town of Harvard
- 03-06/319 Pittsfield Water Supply Stormwater Remediation Project**
by the City of Pittsfield
- 03-07/319 Connecticut River Phase III**
by the Franklin Regional Council of Governments
- 03-08/319 Powow River Stormwater Management**
by the City of Amesbury
- 03-09/319 Clark and Cobb's Pond Stormwater Management**
by the Town of Walpole
- 03-10/319 Spy Pond Stormwater Management**
by the Town of Arlington
- 03-11/319 Billington Sea Stormwater Remediation**
by the town of Plymouth
- 03-12/319 Stormwater BMPs at Peppermint Brook and Lily Pond**
by the Cohasset Water Department
- 04-01/319 Operation and Maintenance of MASSTC**
by the Barnstable County Dept. of Health and the Environment
- 04-02/319 UMass/EOEEA Innovative Stormwater Technology Transfer and Evaluation**
by the University of Massachusetts/Amherst
- 04-03/319 LID Training and Technical Assistance for Local Decision Makers**
by the North and South Rivers Watershed Association
- 04-04/319 Upper Charles River Watershed Total Maximum Daily Load and Watershed-Based Plan**
by the Charles River Watershed Association
- 04-05/319 Phosphorus and Sediment Load Reduction at Quaboag and Quacumquasit Ponds**
by the Town of Brookfield

- 04-06/319 Enhancing Implementation of Nutrient Management on Massachusetts Crop/Livestock Farms to Reduce the Risk of Nonpoint Source Pollution**
by the University of Massachusetts/Amherst
- 04-07/319 Stormwater BMP Implementation for Route 28 to Bass River Subwatershed**
by the Town of Yarmouth
- 04-09/319 Stormwater Management Retrofits for the Samoset Street Outfall to Plymouth Harbor**
by the Town of Plymouth
- 04-10/319 Pontoosuc Lake Watershed Planning Program**
by the Berkshire Regional Planning Association
- 04-11/319 Cold Spring Brook Watershed Remediation**
by the Town of Wellesley
- 04-12/319 Demonstration Boat Bottom Wash Water System**
by the Manchester Marina
- 04-14/319 Development of Watershed-Based Plans**
by BETA Group, Inc.
- 04-15/319 Dudley Pond Comprehensive Water Quality Improvement Project**
by the Town of Wayland
- 04-16/319 Tree Box Filters as a Tool for Implementing the Neponset Bacteria TMDL**
by the Neponset River Watershed Association
- 04-17/319 Erosion and Sediment Control and Stormwater Management at Construction Sites using Soils- and Compost-Based Best Management Practices**
by the Patriot RC&D
- 05-01/319 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center**
by the Barnstable County Dept. of Health and the Environment
- 05-03/319 Windsor Reservoir Restoration Project**
by the Dalton Fire District
- 05-04/319 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center and Investigation into Onsite Treatment of Endocrine-Disrupting Compounds**
by the Barnstable County Dept. of Health and the Environment
- 05-05/319 Drumlin Farm Nonpoint Source Stormwater Management Project**
By Massachusetts Audubon
- 05-06/319 Pembroke LID Retrofit Implementation Project**
by the North and South Rivers Watershed Association
- 05-07/319 Kingston Elementary School LID Retrofit Implementation Project**
by the North and South Rivers Watershed Association
- 05-08/319 Children's Wharf Project: Growing the Next Generation of Environmental Stewards**
by the Boston Children's Museum
- 05-09/319 Old Oaken Bucket Pond Watershed NPS Improvements**
by the Town of Scituate
- 05-10/319 Lake Shirley Low Impact Development Stormwater Improvement Project**
by the Town of Lunenburg
- 05-11/319 Congamond Lakes FY 06**
by the Pioneer Valley Planning Commission
- 05-12/319 Manchaug Pond NPS Improvement Project**
by the Manchaug Pond Association
- 06-01/319 Orange Riverfront Park: Using Low Impact Development Techniques to Manage Stormwater Runoff**
by the Town of Orange
- 06-04/319 Oak Hill Tributary Improvement Project**
by the City of Pittsfield
- 06-05/319 First Herring Brook Low Impact Development Stormwater Enhancements**

- by the Town of Town of Scituate
- 06-06/319 Herring River Coastal Low Impact Development Project**
by the Town of Scituate
- 06-07/319 Reducing NPS from Equine Facilities**
by UMass Amherst
- 06-08/319 Bedford NPS Project**
by the Town of Bedford
- 06-09/319 River Street Best Management Practice Implementation**
by the Town of Ludlow
- 07-01/319 Stormwater and Low Impact Development Technology Transfer**
by UMass Amherst
- 07-02/319 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center**
by the Barnstable County Department of Health and the Environment