Clean Water Act Section 319
Nonpoint Source Competitive Grant Program
Project Summaries: Federal Fiscal Years 1990 – 2022

Commonwealth of Massachusetts
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Division of Watershed Management, Bureau of Water Resources
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Cover Photo

A rain garden installed in downtown Leominster to slow and clean stormwater runoff before being released in the Monoosnoc Brook (Nashua River Watershed). Photo: Ed Himlan, Massachusetts Watershed Coalition.

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Massachusetts Department of Environmental Protection

MassDEP's mission is to protect and enhance the Commonwealth's natural resources – air, water, and land – to provide for the health, safety, and welfare of all people, and to ensure a clean and safe environment for future generations. In carrying out this mission MassDEP commits to address and advance environmental justice and equity for all people of the Commonwealth; provide meaningful, inclusive opportunities for people to participate in agency decisions that affect their lives; and ensure a diverse workforce that reflects the communities we serve.

Watershed Planning Program

The Watershed Planning Program is a statewide program in the Division of Watershed Management, Bureau of Water Resources, at MassDEP. We are stewards of the water resources of Massachusetts. Together with other state environmental agencies, we share in the duty and responsibility to protect, enhance, and restore the quality and value of the waters of the Commonwealth. We are guided by the federal Clean Water Act and work to secure the environmental, recreational, and public health benefits of clean water for the residents of Massachusetts. The Watershed Planning Program is organized into five Sections that each have a different technical focus under the Clean Water Act: (1) Surface Water Quality Standards; (2) Surface Water Quality Monitoring; (3) Data Management and Water Quality Assessment; (4) Total Maximum Daily Load; and (5) Nonpoint Source Pollution.

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References to trade names, commercial products, manufacturers, or distributors in this report constituted neither endorsement nor recommendation by MassDEP.

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INTRODUCTION

This report presents summaries of the projects partially financed by the Clean Water Act (CWA) Section 319 (§319) Massachusetts Nonpoint Source Competitive Grant Program during federal fiscal years (FFY) 1990 through 2022.

Congress annually appropriates funds under Section 319 of the Clean Water Act of 1987 (33 U.S.C.A., Sc. 1251 et. seq.) to assist states in implementing their approved nonpoint source (NPS) programs. Section 319 is administered by the US Environmental Protection Agency (EPA), which oversees the awards to individual states. The Massachusetts Department of Environmental Protection (Department), Bureau of Water Resources, 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 NPS 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 controlling the major statewide categories of NPS pollution or for protecting or improving NPS-impaired or threatened targeted water resources. The Massachusetts Nonpoint Source Management Program Plan (https://www.mass.gov/doc/final-2020-2024-massachusetts-nonpoint-source-management-program-plan/download) was revised and updated for 2020-2024 to outline goals and objectives that support program activities to address NPS pollution statewide.

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 nine-element Watershed-based Plan is required to support these implementation projects.

A Request for Responses (RFR) 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 2001, 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. In 2013, new EPA guidelines (April 2013, *Nonpoint Source Program and Grant Guidelines for States and Territories*) modified the program and expanded the eligibility of §319 funds to address the protection of unimpaired waters. The same revised Guidelines amended previous rules pertaining to the use of §319 funds for NPDES regulated areas. Since 2013, work that is required by Final NPDES Stormwater Permits is ineligible to receive §319 funds. However, development of stormwater utilities is §319-eligible in all watersheds, and MassDEP has particularly encouraged this type of

project in recent years. Three projects to evaluate the feasibility of the establishment of stormwater utilities have been funded to date.

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 workplan, which is submitted to EPA at the start of the federal fiscal year. Once the workplan has been approved, the Department enters into a contractual agreement with each 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 two years.

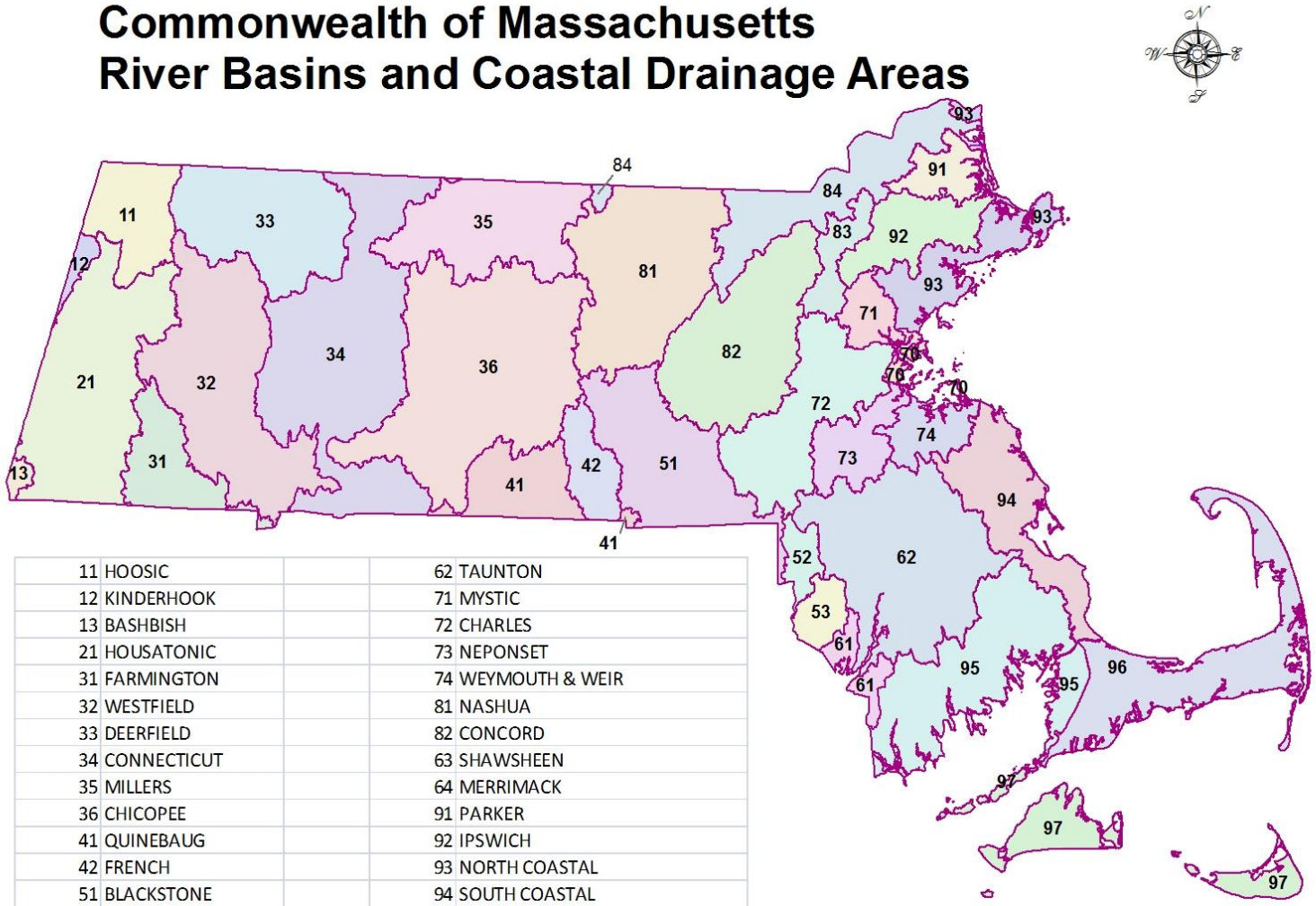
Activities funded by §319 are required to have a Quality Assurance Project Plan. MassDEP provides a Program Quality Assurance Project Plan that covers all §319-funded projects that do not have a sampling component. An Operation and Maintenance Plan is also required for each implementation project.

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 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 staff in the Watershed Planning Program to discuss their ideas prior to proposal development, to ensure eligibility and competitiveness. The summaries are presented in numerical order rather than by the fiscal year in which the project was selected.

Copies of the final reports for selected projects are available upon request.

Commonwealth of Massachusetts
River Basins and Coastal Drainage Areas



11	HOOSIC		62	TAUNTON
12	KINDERHOOK		71	MYSTIC
13	BASHBISH		72	CHARLES
21	HOUSATONIC		73	NEPONSET
31	FARMINGTON		74	WEYMOUTH & WEIR
32	WESTFIELD		81	NASHUA
33	DEERFIELD		82	CONCORD
34	CONNECTICUT		63	SHAWSHEEN
35	MILLERS		64	MERRIMACK
36	CHICOPEE		91	PARKER
41	QUINEBAUG		92	IPSWICH
42	FRENCH		93	NORTH COASTAL
51	BLACKSTONE		94	SOUTH COASTAL
52	TEN MILE		95	BUZZARDS BAY
53	NARRAGANSETT BAY		96	CAPE
61	MT HOPE BAY		97	ISLANDS

Number of §319 Projects and Allocation of Funds by Basin (FFY 1990-2022)
Table I

Basin Name	Number of Projects (§319 plus match funds)	Dollars Allocated
Hudson	2	$73,010
Housatonic	22	$7,121,600
Deerfield	11	$1,900,200
Westfield	8	$1,157,870
Farmington	5	$284,330
Connecticut	22	$4,507,550
Millers	6	$990,610
Chicopee	13	$2,157,590
Quinebaug	3	$595,520
French	1	$128,440
Nashua	12	$3,350,230
Blackstone	12	$2,840,730
Merrimack	10	$1,627,680
Concord (SuAsCo)	12	$1,884,420
Shawsheen	3	$1,108,230
Parker	1	$88,300
Ipswich	5	$1,601,200
North Coastal	4	$453,600
Boston Harbor	25	$5,925,040
Charles	20	$5,376,180
South Coastal	22	$5,782,090
Cape Cod	18	$4,152,550
Islands	2	$218,600
Buzzards Bay	27	$5,201,950
Taunton	6	$590,090
Narr. Bay & Mt Hope	2	$549,400
Ten Mile	1	$260,800
Statewide	68	$8,857,050
TOTAL	**340**	**$68,784,860**

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.

FEDERAL FISCAL YEAR 1990
SECTION 319 NPS PROJECT 90-01/319

90-01/319: Avon Industrial Park Storm Water Management Project

NPS Category: Urban Runoff
Investigator: Old Colony Planning Council
Location: Taunton River Basin

Description:
This project involves the implementation of a storm water treatment system in an industrial park in Brockton and Avon, Massachusetts. The goal of the project is to protect the water quality of Beaver Brook, a tributary to a water supply reservoir for the city of Brockton.

Tasks:

1. identify high priority subdrainage area(s) into Beaver Brook.
2. identify, design and install appropriate alternative storm water treatment structures such as first flow diversion/retention structures, or control structures with protective baffles for selected catch basins in high-risk areas.
3. develop agreements for implementing related non-structural BMPs that would control activities such as fertilizer/pesticide use when landscaping, ice and snow removal practices, salt storage or other outdoor storage activities.
4. determine responsible parties to maintain storm water treatment structures and develop agreements to assure compliance.
5. examine the effectiveness of protective actions on the water quality of Beaver Brook in the reach upstream of the reservoir, including review of baseline conditions and post construction water sampling results.

Cost: $60,000

Funding: $60,000 by the U.S. Environmental Protection Agency

Duration: 1991 -1993

FEDERAL FISCAL YEAR 1990
SECTION 319 NPS PROJECT 90-02/319

90-02/319: Milkroom Wastewater Treatment Demonstration Project

NPS Category: Agriculture
Investigator: Northwest Worcester County Conservation District
Location: Chicopee River Basin

Description:
This project will install and demonstrate an organic matter treatment bed to treat wastewater generated from a 60-ewe goat milk and cheese farm in Hubbardston, Massachusetts. The main objective is to reduce the amount of fats, bacteria and nitrates entering the groundwater and/or surface water.

Tasks:
1. Install an organic matter treatment bed to treat 225 gallons/day of process wastewater; the treatment system will also include a grease trap, distribution box, and delivery pipe system.
2. Install three monitoring wells and conduct monthly water quality sampling.

Cost: $7,000

Funding: $7,000 by the U.S. Environmental Protection Agency

Duration: 1991 – 1992

FEDERAL FISCAL YEAR 1990
SECTION 319 NPS PROJECT 90-03/319

90-03/319: Pesticide Handling Demonstration Project

NPS Category: Agriculture
Investigator: Franklin, Hampden, and Hampshire County Conservation Districts
Location: Chicopee River Basin

Description:
The goal of this project is to demonstrate cost-effective technology for pesticide storage, mixing and loading that will mitigate potential contamination of ground and surface water. The project will be conducted at the UMass Horticultural Research Center in Belchertown, MA. Safe use practices for storing, mixing and loading pesticides that conforms to proposed Massachusetts Department of Food and Agriculture regulations will also be demonstrated.

Tasks:
1. establish a permanent facility at the University of Massachusetts, Horticultural Research Center in Belchertown, Massachusetts to demonstrate up-to-date pesticide storage, mixing and loading technology and safe use practices;
2. perform regional training and demonstration sessions about pesticide handling; and
3. produce and distribute a publication summarizing current pesticide regulations, provide construction guidelines and specifications, and outline proper loading, mixing, handling, and storage procedures.

Cost: $21,000

Funding: $21,000 by the U.S. Environmental Protection Agency

Duration: 1992 - 1994

FEDERAL FISCAL YEAR 1990
SECTION 319 NPS PROJECT 90-04/319

90-04/319: Development of Pesticide Data and Support System for Risk Assessment

NPS Category: Agriculture
Investigator: Worcester County Conservation District
Location: Western and Central Massachusetts

Description:
A technology training program will be designed and conducted for farmers who use pesticides. The program will be based on NPURG - New England Pesticide Soils Data Base and User Decision Support System for Risk Assessment of Ground and Surface Water Contamination - and will offer practical techniques and advice that the farmer can begin to use immediately.

Tasks:

1. develop pesticide information packages for distribution via existing farm organization networks;
2. develop a soils/pesticide/groundwater handbook which will discuss the relationship between pesticides, soils and groundwater as well as explain basic integrated pest management, pesticide handling techniques and pesticide regulations; a coupon for a discount on a soils test will be included;
3. conduct five soils/pesticides/groundwater training Workshops for farmers in the five-county project area.

Cost: $32,000

Funding: $32,000 by the U.S. Environmental Protection Agency

Duration: 1991 - 1993

FEDERAL FISCAL YEAR 1990
SECTION 319 NPS PROJECT 90-05/319

90-05/319: North and South Rivers Storm Water Mitigation Project

NPS Category: Urban Runoff
Investigator: North and South Rivers Watershed Association
Location: South Shore coastal Drainage Area

Description:
Several tributaries/drainage systems to the· North and South Rivers will be chosen for possible further site investigation and mitigative action after reviewing existing historical data. A storm water sampling program will be developed and conducted at selected sites on the tributary/drainage systems. Based on these investigations, specific management alternatives for potential pollution sources within selected drainage systems will be recommended. Two of these sites on the North River will be selected for implementing the recommended mitigative actions.

Tasks:
1. investigate pollution sources into the North and South Rivers by examining historical data and selecting five tributaries or storm water drainage areas into each river on which to conduct further site investigations;
2. conduct detailed investigations at these sites, including site walks to identify specific sources of bacterial contamination and flow rates;
3. perform fecal coliform bacteria sampling and conduct flow measurements before, during and after a storm event at four sites on the North River (10 stations from each site) and five sites on the South River (3 stations from each site) and report results;
4. implement nonpoint source pollution controls at two sites on the North River. Actions will include development of final plans and specifications, permit applications, construction oversight, and baseline monitoring. A post implementation monitoring plan will also be developed.

Cost: $35,000

Funding: $35,000 by the U.S. Environmental Protection Agency

Duration: 1991 - 1993

FEDERAL FISCAL YEAR 1991
SECTION 319 NPS PROJECT 91-01/319

91-01/319: Soil Morphology as an Indicator for Maximum Groundwater Elevation Levels in Massachusetts

NPS Category: Land Disposal
Investigator: University of Massachusetts, Amherst, Department of Plant and Soil Sciences
Location: Statewide Massachusetts

Description:
This project will provide a better understanding of the relationship between soil morphology and maximum groundwater levels in order to improve the site suitability assessment procedure for on-site sewage treatment and disposal systems in Massachusetts. The results obtained from this study will assist the Massachusetts Department of Environmental Protection in updating and revising the Massachusetts Environmental Code (Title 5) specific to the minimum requirements for the subsurface disposal of sanitary sewage.

Tasks:
1. conduct mail and telephone surveys of all regulatory agencies in the United States that are involved with on-site sewage disposal to determine their current procedures of site suitability assessment.
2. evaluate the relationship between soil morphology (particularly the presence of low chroma colors) and seasonal water table fluctuations.
3. conduct an education and training program for state and local officials involved with the regulation and design of on-site sewage disposal systems.
4. conduct technology transfer presentations that describe the results of the project.

Cost: $29,520

Funding: $20,000 by the U.S. Environmental Protection Agency
$9,520 by the University of Massachusetts, Amherst

Duration: 1990 - 1994

FEDERAL FISCAL YEAR 1991
SECTION 319 NPS PROJECT 91-02/319

91-02/319: Rehabilitation and Evaluation of the Sterling Filter Beds at Wachusett Reservoir

NPS Category: Land Disposal
Investigator: Metropolitan District Commission, Division of Watershed Management
Location: Nashua River Basin

Description:
A demonstration study will be performed to rehabilitate the Sterling filter beds and evaluate the effectiveness of different operation modes for removal of pollutants from nonpoint sources. The filter beds were constructed in 1900 by the Metropolitan Water Board to treat a sewage-polluted (unnamed) tributary to Wachusett Reservoir. The Metropolitan District commission (MDC) has since provided minimal maintenance of these beds. This investigation intends to experiment with different filter bed schemes to determine which design provides greater pollutant removal.

Tasks:
1. evaluate the performance of the existing filter beds by collecting water quality data to assess current operating conditions.
2. develop engineering plans and specifications for the rehabilitation of the filter beds, and establish different operating modes using combinations of sand, gravel and wetland vegetation.
3. conduct dry and wet weather sampling to assess the treatment effectiveness of the different operating modes.
4. evaluate filter bed operation and develop capital and operation and maintenance costs.
5. identify and evaluate additional potential sites within the Wachusett Reservoir watershed to construct filter beds for nonpoint source pollution abatement; and
6. conduct technology transfer presentations that describe the results of the project.

Cost: $35,000

Funding: $20,000 by the U.S. Environmental Protection Agency
$15,000 by the Metropolitan District Commission

Duration: 1990 - 1993

FEDERAL FISCAL YEAR 1991
SECTION 319 NPS PROJECT 91-03/319

91-03/319: Demonstration of Soil Bioengineering Streambank Protection Measures on the Blackstone and North Rivers

NPS Category: Hydrologic Modification
Investigator: Franklin, Hampden & Hampshire Conservation Districts
Location: Blackstone River and Deerfield River Basins

Description:
A demonstration study will be conducted to repair several sites of streambank erosion along the Blackstone River (Worcester County) and North River (Franklin County) using a variety of bioengineering systems. It is anticipated that implementation of these techniques will reduce sedimentation and the release of erosion-induced pollutants into these rivers. The study sites will also serve a technology transfer function by providing demonstration areas to promote the use of bioengineering systems throughout Massachusetts.

Tasks:
1. compile and evaluate existing information available for selected sites on the Blackstone and North Rivers to determine their potential for demonstration;
2. design and install bioengineering systems for a selected number of demonstration sites; the variety of bioengineering systems that may be applied include live stakes, live fascines, branch packing, live soft gabions (vegetated geogrid), live cribwall, joint planting and brush mattress; and
3. conduct several workshops for engineers, agency personnel, contractors, and others to provide first-hand knowledge in the design and installation of the systems.

Cost: $93,311

Funding: $55,987 by the U.S. Environmental Protection Agency
$37,324 by the Franklin, Hampden, and Hampshire Conservation Districts

Duration 1990 - 1994

FEDERAL FISCAL YEAR 1991
SECTION 319 NPS PROJECT 91-04/319

91-04/319: Investigation of Low-Input Cranberry Production

NPS Category: Agriculture
Investigator: University of Massachusetts, Amherst, Entomology Department
Location: Buzzards Bay Coastal Drainage Area

Description:
Four cranberry bogs and a control bog will be monitored during at least two growing seasons for nutrients, disease, insect and weed pest populations as well as beneficial organism populations. The bogs will be managed using integrated pest management and natural nutrient sources which will be substituted for conventional pesticide and fertilizer management. The effect of low-input management techniques on cranberry bog productivity, ecosystem dynamics and environmental impacts will be evaluated. The results obtained from this study will provide cranberry farmers with information on alternative methods for pest and fertilizer management. The study will provide state and local officials with information on the reduction of agricultural nonpoint source pollution using low-input farming methods.

Tasks:
1. substitute conventional pest and fertilizer management with integrated pest management and natural sources of nutrients such as fish hydrolysate stabilized with phosphoric acid;
2. evaluate the impacts on the bog ecosystem by monitoring the disease, insect and weed pest populations, as well as beneficial organism populations;
3. assess the impacts on cranberry productivity by determining fruit counts, weight measurements, upright and flower counts as well as from commercial delivery figures;
4. evaluate the impact on the water quality by monitoring bog inlets and outlets before and after fertilizer applications of nitrogen and phosphorus; and
5. conduct technology transfer presentations that describe the results of the project.

Cost: $38,550

Funding: $21,700 by the U.S. Environmental Protection Agency
$10,100 by the University of Massachusetts, Amherst
$6,750 by the Cranberry Growers Association

Duration: 1990 - 1992

FEDERAL FISCAL YEAR 1991
SECTION 319 NPS PROJECT 91-05/319

91-05/319: Hydrogeologic Evaluation of the Waquoit Bay Land Margin Ecosystem

NPS Category: General
Investigator: Cape Cod Commission
Location: Buzzards Bay Coastal Drainage Area

Description:
A hydrogeologic study using both existing data and field data from new monitoring wells will be made to establish the groundwater flow patterns into Waquoit Bay. The results of this project will be incorporated into a larger study examining the effect of nonpoint pollution on the fauna and flora of Waquoit Bay, a threatened coastal estuary.

Tasks:
1. collect and field check existing groundwater data in the Waquoit Bay study area;
2. locate and install 10 - 20 shallow well points to determine water table elevation;
3. develop a field program and evaluate efficient instrumentation methods for measuring 3-dimensional groundwater flow data;
4. install 5 - 10 clustered observation or monitoring wells along an upgradient transect to the bay perpendicular to groundwater flow and at least 4 multi-level sites beneath the bed of the bay;
5. survey the well points for elevation and measure water levels;
6. digitize the results of the study area on Geographic Information System (GIS) maps; and
7. conduct technology transfer presentations that describe the results of the project.

Cost: $85,000

Funding: $45,000 by the U.S. Environmental Protection Agency
$40,000 by the Cape Cod Commission

Duration: 1990 - 1992

FEDERAL FISCAL YEAR 1992
SECTION 319 NPS PROJECT 92-01/319

92-01/319: Sprague's Cove Storm Water Remediation Project

NPS Category: Urban Runoff
Investigator: Town of Marion
Location: Buzzards Bay Coastal Drainage Area

Description:
This project will remediate the major storm water input to Spragues Cove in Buzzards Bay. BMPs employed to treat storm water from this 64-acre watershed include a settling basin and artificial wetland/wet pond. The goals of the project are to improve water quality to the extent that it will allow reopening of shellfish beds in the cove and protect the town's swimming beach.

Tasks:
1. construct a storm water remediation facility according to design specifications supplied by the U. S. Soil Conservation Service;
2. monitor the facility as directed by SCS and the Buzzards Bay Project; and
3. inspect and maintain facility.

Cost: $85,000

Funding: $25,000 by the U.S. Environmental Protection Agency
$19,000 by the town of Marion
$21,000 by the Buzzards Bay Project, SCS and the Office of Coastal Zone Management
$10,000 by a Private Grant
$10,000 by the U.S. Fish and Wildlife Service

Duration: 1992 - 1995

FEDERAL FISCAL YEAR 1992
SECTION 319 NPS PROJECT 92-02/319

92-02/319: Demonstration Project for Control of Urban Runoff in the Connecticut, Merrimack, and Sudbury River Basins

NPS Category: Urban Runoff
Investigator: Metropolitan Area Planning Council
Location: Connecticut, Merrimack, and Concord River Basins

Description:
This project will demonstrate the implementation of urban runoff BMPs in the Lower Connecticut River, Lake Cochichewick and Kenoza Reservoir, and in the Upper Sudbury River watershed area. Information and education activities, technical assistance, and training and technology transfer will be performed by the Metropolitan Area Planning Council (MAPC), Pioneer Valley Planning Commission (PVPC), and the Merrimack Valley Planning Commission (MVPC).

Tasks:
1. establish in each of the study watersheds a Municipal Urban Runoff Task Force/Advisory Committee comprised of municipal officials;
2. collect and analyze existing data on urban runoff pollution and identify urban runoff sources and problems in each study community; assess existing urban runoff controls; illustrate information on base maps and overlays using Geographic Information Systems (GIS);
3. develop recommended urban runoff control measures which can be implemented through local home-rule authority, including model bylaws and regulations; conduct meetings/hearings and prepare public information brochures; and
4. conduct a training program that will provide three regional workshops targeted to local officials in each of the watersheds to promote implementation of urban runoff BMPs. Conduct a one-year monitoring and evaluation program to track the progress of the recommended BMPs.

Cost: $113,000

Funding: $63,000 by the U.S. Environmental Protection Agency
$50,000 by the MAPC, PVPC, and MVPC

Duration: 1992 - 1994

FEDERAL FISCAL YEAR 1992
SECTION 319 NPS PROJECT 92-03/319

92-03/319: Ipswich River Nonpoint Source Prevention Project

NPS Category: General
Investigator: Massachusetts Department of Fisheries, Wildlife & Environmental Law Enforcement (MDFWELE) Riverways Program
Location: Ipswich River Basin

Description:
This project will help to protect the water of the Ipswich River from nonpoint sources of pollution through community education, local bylaws, land use restrictions and land acquisition. Nonpoint sources such as septic systems, surface runoff, erosion, landfill leachate, and road de-icing in the towns bordering the mainstem Ipswich River will be addressed.

Tasks:
1. develop a slide show to illustrate nonpoint sources of pollution in the watershed, and present show to the public in at least two locations within the watershed;
2. develop and distribute a guide to river-front buffer bylaws and a guide to mapping land ownership to local officials and citizens;
3. prepare and distribute educational materials about nonpoint sources of pollution in the watershed; develop fact sheets and GIS maps for communities in the watershed; update ownership and land use information for land along the mainstem and tributaries of the Ipswich River; evaluate the current status of nonpoint source pollution in each community using the Riverways Community Report Card;
4. provide technical support to communities for establishing protective buffer strips along waterways, and hold public meetings and training sessions in at least two locations; and
5. measure the effectiveness of the project.

Cost: $61,333

Funding: $36,800 by the U.S. Environmental Protection Agency
$24,533 by the MDFWELE - Riverways Program

Duration: 1992 - 1994

FEDERAL FISCAL YEAR 1992
SECTION 319 NPS PROJECT 92-04/319

92-04/319: Technical Support for Developing and Implementing Urban Runoff Nonpoint Source Control Strategies in the Merrimack River Basin

NPS Category: Urban Runoff
Investigator: Massachusetts Department of Environmental Protection (DEP) Division of Water Supply
Location: Merrimack River Basin

Description:
This project will involve a resource-based approach to protecting water supplies and associated water resources in the Stony Brook watershed of the Merrimack River. Technical assistance will be provided to the towns in the watershed to adopt and devise a system to implement local home-rule controls to mitigate impacts from storm water runoff generated from new development.

Tasks:
1. review and evaluate existing information to define problems associated with urban runoff in the basin; establish a system of setting load allocations for subdivision review;
2. evaluate specific BMPs for potential to address identified existing and future threats; develop subdivision regulations for guidance on storm water control; provide recommendations and assistance for adopting amendments to subdivision rules and regulations in the watershed communities;
3. work with local municipal boards to establish a process for evaluating storm water impacts and maximum load allocations and set forth enforceable provisions for implementation; recommend structural solutions to mitigate storm water pollutant loadings; and
4. develop public education and technical assistance strategy to promote implementation of BMPs and adoption and enforcement of subdivision regulations for watershed communities. Disseminate information to other communities.

Cost: $66,667

Funding: $40,000 by the U.S. Environmental Protection Agency
$26,667 by the DEP, Division of Water Supply

Duration: 1992 - 1993

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-01/319

93-01/319: Storm Water Remediation Project for the Broad Marsh River

NPS Category: Urban Runoff
Investigator: Town of Wareham
Location: Buzzards Bay Coastal Drainage Area

Description:
The goal of this project is to remediate all significant storm water discharges to the Broad Marsh River in Wareham, Massachusetts with expectations of reopening a shellfishing area. Demonstration of leaching catchment basins as an effective storm water remediation BMP to reduce coliform discharges to coastal waters will be performed.

Tasks:
1. perform site assessment, final design, satisfy permitting requirements and implement installation of approximately 22 leaching catch basins in the Wareham Neck and Swift Neck watersheds;
2. evaluate effectiveness of leaching catch basins installed including pre- and post-implementation by monitoring catch basins, groundwater and receiving waters; and
3. provide public education to local residents and Buzzards Bay community regarding storm water remediation projects.

Cost: $159,470

Funding: $88,450 by the U.S. Environmental Protection Agency
$71,020 by the town of Wareham

Duration: 1993 - 1995

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-02/319

93-02/319: Sediment and Erosion Control in the Taunton River Basin

NPS Category: Construction
Investigator: Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement (MDFWELE) - Riverways Program
Location: Taunton River Basin

Description:
The goal of this project is to minimize adverse impacts of sedimentation, surface runoff, and erosion from repair and reconstruction of bridges and adjacent roadways on surface water, groundwater supplies, wetlands and aquatic habitats. The project will be performed in the communities of Dighton, Berkley, Lakeville and Middleborough in the Taunton River Basin.

Tasks:
1. prepare and present maps, models and educational materials to town boards and the public regarding sedimentation, erosion, and runoff from bridge repair or reconstruction;
2. provide technical assistance to town boards and local groups to conduct lay water quality monitoring of selected bridge repair/reconstruction sites; and
3. provide support to communities to implement local bylaws to control sedimentation, erosion, and runoff from bridge repair/reconstruction sites.

Cost: $38,333

Funding: $23,000 by the U.S. Environmental Protection Agency
$15,333 by the MDFWELE - Riverways Program

Duration: 1993 - 1996

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-03/319

93-03/319: Artificial Recharge Evaluation and Guidance to Municipalities

NPS Category: Urban Runoff
Investigator: Pioneer Valley Planning Commission
Location: Statewide

Description:
This project will provide information and education to state agencies and municipal governments on the utility of various BMPs designed to recharge rainwater to aquifers used for public drinking water supplies. Information on the potential risks of groundwater contamination from artificial recharge from these BMPs will be presented. The project may include short term water quality monitoring of several sites where artificial recharge systems are being used. A guidance document will be prepared that discusses artificial recharge systems with a focus on Massachusetts' conditions, needs, and experiences and will be distributed to communities throughout Massachusetts that use local groundwater sources for drinking water supplies.

Tasks:
1. conduct a literature review of artificial recharge systems and issues and a review of existing bylaws and subdivision regulations relative to artificial recharge systems in Massachusetts;
2. provide technical assistance to two communities on regulating artificial recharge;
3. interview municipal officials and storm water management authorities regarding artificial recharge systems;
4. identify sites for monitoring of artificial recharge systems and conduct monitoring program;
5. produce a guidance document for municipal officials on artificial recharge systems; and
6. provide training sessions and technology transfer about artificial recharge issues to municipal officials in two selected communities.

Cost: $38,000

Funding: $22,800 by the U.S. Environmental Protection Agency
$15,200 by the Pioneer Valley Planning Commission

Duration: 1993 - 1996

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-04/319

93-04/319: H_2Ome Check Pilot Project

NPS Category: General
Investigator: Nashua River Watershed Association
Location: Nashua River Basin

Description:
This project will inform and educate homeowners in the Wachusett watershed area about household practices that may impact water quality. The 117 square-mile watershed is the largest sub-watershed in the Nashua River Basin, supplying 2.5 million Massachusetts Water Resources Authority (MWRA) water users with more than one third of their water needs. Additionally, water from the Quabbin Reservoir and the Ware River passes through Wachusett Reservoir on its way to MWRA water users. Because of this, the Massachusetts Department of Environmental Protection and the Nonpoint Source Advisory Committee have identified this watershed as high priority for protection from non-point source pollution.

Tasks:
1. conduct a Home Environmental Audit in households throughout the watershed consisting of a survey of the method of household wastewater treatment, household solid and hazardous waste practices, petroleum storage practices, lawn and garden management practices, and condition of ·private well or name of local water supplier;
2. summarize soil and geological features and prepare instructions for homeowners on using soil surveys and depth to groundwater measurements to determine potential pollution risks from household activities; and
3. produce and distribute 2,500 information packets to households within the Wachusett watershed communities that will assess water quality impacts of homeowner's practices; produce a public education awareness video that will instruct homeowners and students about how to conduct a home environmental audit. The techniques and results learned from this project will be applicable to other watersheds in Massachusetts.

Cost: $91,600

Funding: $49,900 by the U.S. Environmental Protection Agency
$41,700 by the Nashua River Watershed Association

Duration: 1993 - 1996

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-05/319

93-05/319: Commercial Underground Storage Tank Compliance Project

NPS Category: Other
Investigator: Barnstable County Department of Health and the Environment
Location: Cape Cod Coastal Drainage Area

Description:
The goal of this project is to protect the drinking water supplies in Barnstable County from commercial underground storage tank (USTs) releases. The Barnstable County Department of Health and the Environment will inspect commercial facilities with USTs within Barnstable County. The-purpose of this project is to educate both facility owners and regulators in the management of and legal requirements for USTs; update and/or correct the information on UST registration forms and verify compliance of these facilities with the Massachusetts regulations governing USTs.

Tasks:
1. develop and implement an inspection program for commercial UST facilities within Barnstable County;
2. develop and use a standard UST inspection form;
3. conduct at least one inspection of a commercial UST facility in Barnstable County; conduct enforcement actions against facilities out of compliance;
4. coordinate inspection/enforcement aspects of the program with local fire departments and develop a record keeping system; and
5. conduct a seminar to educate owners/operators of commercial facilities with USTs and fire department officials about UST issues.

Cost: $56,758

Funding: $33,100 by the U.S. Environmental Protection Agency
$23,658 by the Barnstable County Department of Health and the Environment

Duration: 1993 - 1995

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-10/319

93-10/319: Cape Cod Coastal Nonpoint Source Management Plan

NPS Category: General
Investigator: Cape Cod Commission
Location: Cape Cod Coastal Drainage Area

Description:
A Coastal Nonpoint Source Management plan will be developed and implemented for selected embayments on Cape Cod, including the Three Bay Area in Barnstable; Popponesset Bay in Barnstable and Mashpee; Allens Harbor, Saquatucket Harbor, Wychmere Harbor, and Round Cove in Harwich; Wellfleet Harbor in Wellfleet; and West Falmouth Harbor in Falmouth. Methodologies used to determine nitrogen sensitivity and loading capacity for these embayments will be described in detail so that this information can be transferred to develop nonpoint source management plans in other coastal areas of Massachusetts.:

Tasks:
1. determine the nitrogen sensitivity of these selected embayments and describe methodology;
2. determine the capacity of these embayments for nitrogen loading and calculate critical nitrogen loading rates for each embayment watershed;
3. develop implementation actions for protection and/or remediation efforts; and
4. conduct an information and education program on nonpoint source and nitrogen loading for public officials and others.

Cost: $131,389

Funding: $78,833 by the U.S. Environmental Protection Agency
$52,556 by the Cape Cod Commission

Duration: 1993 - 1996

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-11/319

93-11/319: Wachusett Septic System Management Project

NPS Category: Land Disposal
Investigator: University of Massachusetts Cooperative Extension System, Amherst
Location: Nashua River Basin

Description:
The Wachusett-Septic System Management Project will address water quality degradation problems from on-site septic systems in the communities of Boylston, Holden, Princeton, Rutland, Sterling and West Boylston in the Wachusett watershed. This will be accomplished by developing a comprehensive septic system management system in cooperation with the Boards of Health in the study towns. Specifically, this project will develop a septic system database and a septic system inspection and maintenance plan for the Boards of Health in at least four of the above-named communities. These products will enable the Boards of Health to move beyond the crisis response mode and to prevent failures and pollution by establishing routine procedures for ongoing septic system maintenance and monitoring.

Tasks:
1. develop and adopt a septic system database compatible with Boards of Health needs and computer hardware. Provide training to these boards in the use of the database;
2. develop and adopt a septic system inspection and maintenance plan in cooperation with Boards of Health and in · accordance with Title 5 regulations;
3. develop a manual describing procedures adopted by each Board of Health during this project; and
4. conduct information and education workshops throughout the project with Boards of Health and others in each of the six watershed towns.

Cost: $78,354

Funding: $43,300 by the U.S. Environmental Protection Agency
$35,054 by the University of Massachusetts Cooperative Extension System

Duration: 1993 - 1996

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-12/319

93-12/319: Nitrogen Loading Computer Model Development Project

NPS Category: Groundwater
Investigator: Horsely & Witten, Inc.
Location: Statewide Massachusetts

Description:
This project will develop a software package to be used in predicting water quality impacts of land development. Specifically, the program will allow users to compute nitrogen loading from existing or proposed land uses within a wellhead protection area. The target audience for this software package includes water suppliers, town planners, health agents, consultants, and government officials responsible for protecting drinking water supplies. The software developed by this project will allow planners to recommend appropriate zoning and density restrictions to towns in order to prevent nitrate contamination of their drinking water supplies.

Tasks:
1. develop a user-friendly nitrogen loading computer model and define needed parameters;
2. conduct the necessary town research and perform computer program development to incorporate Title 5 issues in the model;
3. test and refine the model; and
4. train town and Department of Environmental Protection staff on the use of the program.

Cost: $33,333

Funding: $20,000 by the U.S. Environmental Protection Agency
$13,333 by DEP and the Aquifer Land Acquisition Program

Duration: 1994 - 1996

FEDERAL FISCAL YEAR 1993
SECTION 319 NPS PROJECT 93-13/319

93-13/319: Development and Outreach of an Erosion and Sedimentation Control Guide for Massachusetts

NPS Category: Construction
Investigator: Franklin, Hampden, and Hampshire Conservation Districts
Location: Statewide Massachusetts

Description:
The Franklin, Hampden, Hampshire Conservation Districts will revise and update the Soil Conservation Service Conservation Guides. These 1983 Guides are based on the SCS's 1970's publication entitled Guidelines for Soil & Water Conservation in Urbanizing Areas of Massachusetts, now outdated and out of print. The revisions will incorporate changes in technology and methods and produce a one-volume Erosion and Sedimentation Control Guide for Urbanizing Areas in Massachusetts. The Guide will be distributed Statewide and training workshops will be held to provide guidance for using the Guide and selecting, designing, and implementing erosion and sediment control techniques.

Tasks:
1. revise and update the Guidelines for Soil and Water Conservation in Urbanizing Areas of Massachusetts;
2. print and distribute 1250 copies of the Guide;
3. conduct a publicity campaign to advertise the availability of the Guide; and
4. conduct six training workshops to outreach the Guide and explain erosion and sediment control techniques.

Cost: $38,000

Funding: $25,000 by the U.S. Environmental Protection Agency
$6,000 by the Franklin, Hampden, Hampshire Conservation Districts
$7,000 by the Massachusetts State Commission

Duration: 1994 - 1996

FEDERAL FISCAL YEAR 1994
SECTION 319 NPS PROJECT 94-01/319

94-01/319: Demonstration of Best Management Practices to Control Nonpoint Source Pollution from Forestry Operations

NPS Category: Forestry
Investigator: Berkshire-Pioneer Resource Conservation and Development Area
Location: Statewide

Description:
This project will conduct a comprehensive demonstration and education program which focuses on prevention of forestry-related nonpoint source pollution through the use of Best Management Practices (BMPs). The target group for this initiative is broad and includes timber harvesters, consultant foresters, agency staff, water purveyors, conservation commissions and members of other environmental organizations.

Tasks:
1. Revise the current edition of the Massachusetts Best Management Practices Handbook, to incorporate the latest BMP technology for protecting water quality and wetlands during timber harvesting operations;
2. Demonstrate the implementation of various timber harvesting BMP measures at selected municipally owned watersheds statewide; and
3. Produce a video tape of the implementation of BMPs employed. This VHS tape will include the planning, construction and maintenance of the timber harvesting BMP measures demonstrated.

Cost: $83,333

Funding: $50,000 by the U.S. Environmental Protection Agency
$33,333 by the University of Massachusetts and the Department of Environmental Management

Duration: 1994 - 1996

FEDERAL FISCAL YEAR 1994
SECTION 319 NPS PROJECT 94-03/319

94-03/319: Green River Soil Bioengineering Project

NPS Category: Hydrologic Modification
Investigator: Berkshire Conservation District
Location: Housatonic

Description:
This project involves the design, implementation, demonstration, and evaluation of soil bioengineering techniques to control streambank erosion at one or more sites on the Green River.

Tasks:
1. select appropriate sites on the Green River;
2. design, implement, demonstrate and evaluate soil bioengineering techniques;
3. perform outreach activities relative to the project, including the development of a high-quality brochure.

Cost: $126,320

Funding: $75,000 by the U.S. Environmental Protection Agency
$51,320 by the Berkshire Conservation District

Duration: 1995 - 1998

FEDERAL FISCAL YEAR 1994
SECTION 319 NPS PROJECT 94-05/319

94-05/319: Alternative On-Site Septic Systems - Encouraging Their Use in Environmentally Sensitive Areas of Barnstable County

NPS Category: Land Disposal
Investigator: Barnstable County Department of Health and the Environment
Location: Cape Cod Coastal Drainage Area

Description:
The purpose of this project is to install and assess three or more on-site septic systems (OSSS), utilizing at least two different alternative technologies, and to promote their use in Barnstable County through the use of a high-profile outreach and education program.

Tasks:
1. install at least three alternative OSSS, of at least two different alternative technology designs in one or more of the towns of Provincetown, Truro, Wellfleet, and Eastham;
2. develop operation and maintenance (O&M) guidance and provide to homeowners for their individual alternative technology on-site systems in order to ensure that these systems function as designed;
3. establish a monitoring program to assess the effectiveness of the alternative on-site septic systems;
4. conduct regional workshops to provide information on the siting, design, and installation of alternative on-site septic systems;
5. produce a reference manual on alternative OSSS technology and distribute to local boards of health throughout Barnstable County; and
6. hold at least one meeting with each board of health in Barnstable County to inform them of the project, and to distribute copies of the reference manual.

Cost: $55,062

Funding: $30,226 by the U.S. Environmental Protection Agency
$12,000 by the participating homeowners
$8,920 by the Barnstable County Department of Health and the Environment
$2,916 by the participating municipalities
$1,000 by the Cape Cod Cooperative Extension

Duration: 1995 - 1997

FEDERAL FISCAL YEAR 1994
SECTION 319 NPS PROJECT 94-06/319

94-06/319: Orleans Storm Water Remediation Project

NPS Category: Urban Runoff
Investigator: Cape Cod Conservation District
Location: Cape Cod Coastal Drainage Area

Description:
The Orleans Storm Water Remediation Project will address water quality degradation problems from residential land use in the community of Orleans. This will be accomplished by diverting storm water to infiltration basins or retention infiltration basins at five sites for the purpose of maintaining the productivity of shellfishing areas within the Nauset and Pleasant Bay estuaries.

Tasks:
1. prepare design and engineering drawings of storm water remediation systems;
2. perform site preparation, and purchase and install storm water remediation systems;
3. perform water quality monitoring efforts to obtain an accurate record of the water quality before remediation, and after construction is completed;
4. educate the general public and municipal officials about the necessity of storm water remediation for shellfish sanitation and maintenance of high-water quality; and
5. prepare a final report after one full year of operation summarizing water quality data, and information regarding workshops, technology transfer, or written educational materials resulting from the project.

Cost: $149,220

Funding: $89,000 by the U.S. Environmental Protection Agency
$60,220 by the town of Orleans and the Cape Cod Conservation District

Duration: 1995 - 1997

FEDERAL FISCAL YEAR 1994
SECTION 319 NPS PROJECT 94-07/319

94-07/319: Mill River Watershed Management Project

NPS Category: General, Land Disposal, Urban Runoff, Agriculture
Investigator: Massachusetts Audubon Society
Location: North Shore Parker River Basin

Description:
Storm water, septic system and agricultural nonpoint sources in the Mill River subwatershed will be remediated through Best Management Practice (BMP) implementation, education and changes in local bylaws and policies in the Town of Rowley.

Tasks:
1. implement a septic system management plan consisting of a maintenance program which would adopt regulatory controls, BMP procedures and a data base system for use by the Board of Health;
2. implement a storm water management plan to be demonstrated by a road runoff project and an agricultural runoff project; the storm water management will then be implemented through town bylaws and/or policies;
3. implement an educational/technical assistance program to address the concerns of local, governmental, and regional groups;
4. conduct a monitoring program to measure the success of the project; and
5. conduct technology transfer presentations.

Cost: $88,307

Funding: $49,063 by the U.S. Environmental Protection Agency
$39,244 by the town of Rowley and Massachusetts Audubon Society, North Shore

Duration: 1995 - 1997

FEDERAL FISCAL YEAR 1994
SECTION 319 NPS PROJECT 94-08/319

94-08/319: Lake Tashmoo Storm Water Remediation Project

NPS Category: Urban Runoff
Investigator: Tisbury Waterways, Inc.
Location: Islands Coastal Drainage Area

Description:
The purpose of this project is to capture and treat road runoff that is contributing to the contamination of Lake Tashmoo in Tisbury on Martha's Vineyard. Under this project a system of "first flush leaching basins" will be installed to treat storm water runoff.

Tasks:
1. prepare design and engineering drawings necessary to install the remediation system and secure appropriate permits;
2. perform site preparation, and purchase and install all components of the first flush basins;
3. conduct a maintenance program and perform inspections;
4. develop and conduct a monitoring program; and
5. perform a technology transfer presentation.

Cost: $95,872

Funding: $50,000 by the U.S. Environmental Protection Agency
$45,872 by the town of Tisbury and Tisbury Waterways, Inc.

Duration: 1994 - 1996

FEDERAL FISCAL YEAR 1994
SECTION 319 NPS PROJECT 94-09/319

94-09/319: Jones River/Billington Sea Nonpoint Source Pollution Control Project

NPS Category: Land Disposal
Investigator: The Pilgrim Resource Conservation & Development (RC&D) Area Council, Inc.
Location: South Shore Coastal Drainage Area

Description:
The purpose of this project is to reduce nutrient and pathogen loading from existing on-site septic systems (OSSS) and prevent pollution from new on-site systems. New management measures will be implemented to address the proper design, siting, and installation of new OSSS. Innovative practices will be demonstrated in problem areas such as Billington Sea, where conditions are not favorable for upgrading existing systems. Pollution prevention will be addressed through an education program designed to reduce pollutants from improperly operated and maintained OSSS.

Tasks:
1. provide training for town boards of health and selected OSSS professionals in field identification and interpretation of soil conditions for OSSS;
2. construct at least two innovative/alternative OSSS along the Billington Sea Shoreline; and
3. conduct a public participation program to foster project support and to provide public information and education in the project area.

Cost: $159,733

Funding: $95,840 by the U.S. Environmental Protection Agency
$63,893 by the Pilgrim RC & D Area Council, Inc.

Duration: 1995 - 1998

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-01/319

95-01/319: Lake Lorraine and Fivemile Pond Nonpoint Source Project

NPS Category: Urban Runoff and General
Investigator: Pioneer Valley Planning Commission
Location: Connecticut River Basin

Description:
The watersheds of Lake Lorraine and Fivemile Pond, due to their size and land use practices, make a perfect case study in preventing and controlling NPS pollution at a lake watershed level. This project provides an opportunity to test the effectiveness of several approaches to NPS management including, source control through public education and resident involvement, street and catch basin cleaning, erosion control, and installation of structural best management practices.

Tasks:
1. prepare nonpoint source pollution educational fact sheets and distribute to residents of the watersheds;
2. repair and maintain catch basins in the watersheds;
3. install 11 infiltrations basins to treat the "first flush" (one-half inch) of storm water to reduce pollutant loadings;
4. repair eroding shoreline on publicly owned areas; and
5. conduct pre-and post-monitoring to assess project effectiveness.

Cost: $103,122

Funding: $61,577 by the U.S. Environmental Protection Agency
$27,800 by the city of Springfield
$13,745 by the Massachusetts Department of Environmental Management

Duration: 1995 - 1997

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-02/319

95-02/319: A Demonstration Program to Mitigate Storm Drain Pollution Impacting Shellfish Beds

NPS Category: Urban Runoff
Investigator: Massachusetts Office of Coastal Zone Management
Location: North Shore Coastal Drainage Area and Cape Cod Coastal Drainage Area

Description:
This project utilizes an intergovernmental approach to restoring shellfish beds that are impacted by nonpoint source pollution. It involves the use of an innovative system to treat storm water before it enters shellfish beds. The system was designed by StormTreat Systems, it relies on a series of settling chambers and ends in a constructed wetland that is planted in yet another chamber.

Tasks:
1. install the Storm Treat System at three sites (two in Gloucester and one in Harwich);
2. develop an operation and maintenance plan;
3. design and execution of a storm water monitoring plan;
4. conduct a public meeting in each community before construction begins;
5. install a public display board describing the project at each site; and
6. conduct a workshop at Gloucester and Harwich to describe the project results.

Cost: $124,647

Funding: $71,903 by the U.S. Environmental Protection Agency
$52,744 by the city of Gloucester and the town of Harwich

Duration: 1995-1997

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-03/319

95-03/319: Buttermilk Bay Storm Water Remediation Project

NPS Category: Urban Runoff
Investigator: Town of Bourne
Location: Buzzards Bay Coastal Drainage Area

Description:
The objective of this project is to decrease the fecal coliform counts in the shellfish areas of Buttermilk Bay by installing BMPs to capture and treat the "first flush" of storm water runoff.

Tasks:
1. design and install BMPs to capture the first one inch of runoff at eight high-priority sites;
2. monitor the effectiveness of the BMPs; and
3. provide outreach to the owners of six lower-priority sites with information on the need to reduce polluted runoff to the Bay, and technical information and assistance about BMPs and remedial actions suitable for the storm drainage on their property.

Cost: $240,000

Funding: $144,000 by the U.S. Environmental Protection Agency
$96,000 by the town of Bourne

Duration: 1995 – 1997

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-04/319

95-04/319: Demonstration of Urban Pollution Control in the Green River Watershed

NPS Category: Urban Runoff
Investigator: Franklin, Hampden, and Hampshire Conservation District
Location: Deerfield River Basin

Description:
This project will establish a one-year demonstration project to test an innovative storm water filtration system for urban pollution treatment in limited space areas. The filtration system will be monitored for a year to measure the reduction of suspended solids, bacteria, and volatile organic · carbon. A workshop will disseminate the information gained from the installation of the filtration system to the region's town officials, engineers, and environmental consultants to encourage the use of this type of pollution· control in their communities and projects.

Tasks:
1. install an innovative storm water filtration device at the Greenfield wastewater treatment plant to treat septage runoff spilled from septage haulers;
2. videotape the installation for future technology transfer workshops;
3. monitor the filtration device for influent and effluent water measuring bacteria, suspended solids, and volatile organic carbon for a minimum of ten (10) storm events; and
4. develop and implement a regional workshop on the installation, effectiveness, and maintenance of the filtration device.

Cost: $15,800

Funding: $9,000 by the U.S. Environmental Protection Agency
$6,300 by the city of Greenfield
$500 by the Green River Watershed Preservation Alliance

Duration: 1995 - 1997

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-05/319

95-05/319: Demonstration of an Alternative On-Site Wastewater Disposal System at the Allen's Pond Wildlife Sanctuary, Dartmouth

NPS Category: Land Disposal
Investigator: Buzzards Bay Project
Location: Buzzards Bay Coastal Drainage Area

Description:
The primary purpose of this project is to demonstrate the use of an innovative on-site septic system (OSSS) technology capable of enhanced nitrogen removal. A secondary purpose is to extend the monitoring period for two alternative OSSS currently in operation in Fairhaven. These purposes are part of a larger effort to identify and demonstrate on-site systems with nitrogen removal capabilities, document their performance and cost effectiveness, and encourage the wide-spread use of these systems to help solve the problems of excess nitrogen loading to sensitive coastal embayments as well as to Zone IIs of public water supplies.

Tasks:
1. construct an innovative on-site wastewater disposal system intended to provide enhanced nitrogen removal capacity;
2. monitor the new system and two (2) alternative systems previously installed in the Buzzards Bay watershed;
3. conduct at least two (2) public presentations to discuss the results and applicability of the technologies being tested by this project;
4. publish at least two articles about alternative technologies and Title 5 systems for local weekly newspapers; and
5. present the results of this project to area Boards of Health so they are familiar with the system's design, its performance, and any limitations, and assist local Boards of Health with the review of any proposed alternative systems should they need and request assistance.

Cost: $32,500

Funding: $19,500 by the U.S. Environmental Protection Agency
$10,000 by the Massachusetts Audubon Society
$3,000 by the town of Dartmouth

Duration: 1995 - 1997

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-06/319

95-06/319: Comprehensive Nonpoint Source Management in the Mill River Subwatershed, Hatfield, MA

NPS Category: Land Disposal, General
Investigator: Pioneer Valley Planning Commission
Location: Connecticut River Basin

Description:
This project will address pollution prevention and pollution remediation in the Mill River Watershed in Hatfield. Pollution prevention will be accomplished by developing and implementing land use regulations designed to protect critical water supply resources, and pollution remediation will involve upgrading or replacing inadequate septic systems within the watershed.

Tasks:
1. implement special watershed land use regulations based on nutrient budget analysis and estimated carrying capacity of the land;
2. develop a plan to prioritize 9 septic systems for upgrading or replacement with standard or innovative technologies using a share percentage formula with the landowners for funding;
3. upgrade or replace 7 septic systems with standard technology and 2 septic systems with innovative technology;
4. conduct water quality monitoring to establish baseline and document expected improvements in water quality; and
5. produce a final report comprised of three working papers which describe various aspects of the project.

Cost: $116,325

Funding: $70,265 by the U.S. Environmental Protection Agency
$46,060 by the Pioneer Valley Planning Commission and the town of Hatfield

Duration: 1995-1997

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-07/319

95-07/319: Title 5 Training for Boards of Health in Five Towns in Barnstable County

NPS Category: Land Disposal
Investigator: Barnstable County Department of Health and the Environment
Location: Cape Cod Coastal Drainage Area

Description:
The objective of this project is to ensure consistent, quality review of Title 5 applications and variance requests in the towns of Eastham, Orleans, Provincetown, Truro and Wellfleet.

Tasks:
1. develop a modular Title 5 training course for new board of health members;
2. produce guidelines and training documents for consistent review of Title 5 variance requests; and
3. conduct mock hearings for each participating board of health.

Cost: $37,050

Funding: $21,100 by the U.S. Environmental Protection Agency
$13,450 by the Barnstable County Department of Health and the Environment
$2,500 by the local boards of health

Duration: 1995 - 1996

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-08/319

95-08/319: Swan Pond River Storm Water Remediation Project

NPS Category: Urban Runoff
Investigator: Town of Dennis
Location: Cape Cod Coastal Drainage Area

Description:
The goal of this project is to reduce the runoff contaminant load entering the Swan Pond River system. Infiltrators will be installed proximal to storm drains at two locations associated with high bacterial contamination. Storm water sewer discharges to the system should be remedied through the installation of these best management practices (BMPs).

Tasks:

1. design and install Infiltrators at two sites in the town of Dennis to capture and treat the "first flush" of storm water runoff;
2. develop and implement an operation and maintenance plan to ensure that the BMPs will function properly;
3. produce a Quality Assurance Project Plan (QAPP) in accordance with U.S. Environmental Protection Agency guidance; the QAPP will be administered to monitor and report on the BMPs efficiencies;
4. develop and implement a public outreach plan comprised of workshops, school presentations, news releases, and pamphlets; and
5. prepare a final report describing the effectiveness of the project.

Cost: $92,200

Funding: $55,040 by the U.S. Environmental Protection Agency
$37,180 by the town of Dennis

Duration: 1995 - 1997

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-09/319

95-09/319: Buzzards Bay Action Committee - Holmes Brook Restoration

NPS Category: Urban Runoff, Hydrologic Modification
Investigator: Buzzards Bay Action Committee
Location: Buzzards Bay Coastal Drainage Area

Description:
The threat to shellfishing and other use support in Sippican Harbor posed by NPS pollution compelled the Buzzards Bay Action Committee to assess existing impacts and to recommend remediate action. As a result, two sites will be remediated by means of detention basins and stream bioengineering treatments. The treatments will be managed throughout their life. The result of the remediation will be to reduce the runoff contaminant load to Sippican Harbor and to restore wetland resources and hydraulic function to Holmes Brook.

Tasks:
1. design and install detention basins at two sites in the Holmes Brook watershed;
2. restore Holmes Brook channel, bank and bordering vegetated wetlands through bioengineering treatments;
3. develop and implement an operation and maintenance plan to ensure design functions as intended;
4. monitor best management practices to assess their effectiveness; and
5. conduct project information outreach including: workshops, interpretative signage on-site, descriptive brochure and inclusion of project in local school system environmental education curriculum.

Cost: $103,583

Funding: $45,000 by the U.S. Environmental Protection Agency
$58,583 by the Buzzards Bay Action Committee and the town of Marion

Duration: 1995 - 1997

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-10/319

95-10/319: Developing and Conducting Training Workshops on the Revised Regulations for M.G.L. CH 132, The Forest Cutting Practices Act, and M.G.L. CH 131, the Wetlands Protection Act

NPS Category: Forestry
Investigator: Berkshire-Pioneer Resource Conservation and Development Area Council, Inc.
Location: Statewide

Description:
The project will educate and train licensed timber harvesters, consultant foresters, appropriate staff from the Massachusetts Department of Environmental Protection (DEP), Department of Environmental Management (DEM), Metropolitan District Commission (MDC), Department of Fisheries, Wildlife and Environmental Law Enforcement (MDFWELE), Office of Coastal Zone Management (CZM), and other interested parties such as water purveyors, and conservation commissioners in the use and application of revised regulations for CH 132 and The Wetlands Protection Act with special emphasis on prevention of NPS pollution through the use of best management practices (BMPs).

Tasks:
1. prepare a forestry guidance document for the purpose of explaining and clarifying the revised regulations;
2. conduct 12 workshops for an estimated 400-500 licensed timber harvesters, 100 consultant. foresters, 50-75 agency staff persons from DEP, DEM, DFWELE, CZM and other interested parties totaling 100 in number; and
3. provide outreach and technical transfer of information from workshops through OEM's service foresters, DEP staff, and consultant foresters to forest landowners, and other interested parties.

Cost: $16,300

Funding: $9,700 by the U.S. Environmental Protection Agency
$6,600 by the Massachusetts Department of Environmental Protection and the Department of Environmental Management

Duration: 1995 - 1996

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-12/319

95-11/319: Neponset River Fishway Project

NPS Category: Watershed Resource Restoration
Investigator: Massachusetts Department of Environmental Protection
Location: Neponset River Basin

Description:
The anadromous fish run on the Neponset River was blocked in 1799 with the construction of Baker Dam at Milton Village. This project will open approximately 16 miles of habitat to anadromous fish by constructing fish ladders at Baker Dam and at Tileston Dam in Mattapan. The Neponset River is recognized as hydrologically stressed, and the cumulative effects of water withdrawals and diversions is of particular concern. Compatibility of future water use scenarios and health of the river and its fisheries depend upon adequate instream flows and a more complete database. Installation of a continuous flow gage in the lower Neponset River would allow the observation of flow trends over time, leading to an adequate assessment of the relationships between changing flows and habitat conditions.

Tasks:
Phase I –
1. a permanent continuous flow gage will be installed above the Baker Dam, and
2. fish ladders will be designed for both the Baker and Tileston Dams.

Phase II –
3. the fish ladder will be installed at Baker Dam, opening approximately six miles of habitat to anadromous fish up to the Tileston Dam

Phase III –
4. the fish ladder will be installed at Tileston Dam, opening approximately 16 miles of habitat to anadromous fish
5. a Spawning Habitat Monitoring Program will be conducted to assess the impact of the fish ladder and gage installation

Cost:
Phase I - $34,000
Phase II – $200,000
Phase Ill – $320,000

Funding:
Phase I – $20,000 by the U.S. Environmental Protection Agency
$8,000 by the Dedham/Westwood Water District
$6,000 by EOEA Agencies
Phase II and Phase III: TBD

Duration: 1996 – 1999

FEDERAL FISCAL YEAR 1995
SECTION 319 NPS PROJECT 95-12/319*

95-12/319: Rice City Pond Restoration

NPS Category: Hydrologic Modification and Sediments
Investigator: Massachusetts Department of Environmental Protection
Location: Blackstone River Basin

Description:
This project will implement a multivariate approach toward preventing the resuspension of toxic sediments in the Rice City Pond impoundment on the Blackstone River.

Tasks:
1. raise the primary outlet so as to bring it up to the same height as the secondary outlet in order to control flow patterns;
2. implement a system of flow control among dam operators upstream of Rice City Pond;
3. implement soil bioengineering techniques in the upper impoundment area to prevent streambank erosion; and
4. evaluate results for transferability to similar situations elsewhere.

Cost: $100,000

Funding: $60,000 by the U.S. Environmental protection Agency
$40,000 by the Massachusetts Department of Environmental Protection

Duration: 1995 - 1998

FEDERAL FISCAL YEAR 1996
SECTION 319 NPS PROJECT 96-01/319

96-01/319: Septic System Management 2000 Project

NPS Category: Land Disposal
Investigator: Cooperative Extension System, University of Massachusetts, Amherst
Location: Statewide Massachusetts

Description:
A septic system information database was developed and demonstrated under the S319 project 93-11, Wachusett Septic System Management Program. Project 96-01 will build on 93-11 by offering statewide assistance to any Board of Health wanting to implement the computer program, and· by specifically implementing the computer program in 20 municipalities in the French and Quinebaug, Neponset and Cape Cod Basins. This project will provide the needed assistance to Boards of Health for establishing routine procedures for ongoing monitoring of septic systems.

Tasks:
1. distribute information regarding the use and application of the program to all municipalities that are listed as having any percentage of non-sewered areas; follow-up requests for assistance by holding regional hands-on training workshops and establishing a phone-consultation system;
2. translate the Lotus 123 program into dbase application, and produce copies of the software and user manuals for distribution to all interested communities;
3. conduct hands-on training workshops in the French and Quinebaug, Neponset and Cape Cod Basins, and provide to the Boards of Health in these basins the information and technical assistance needed to implement the computer program; and
4. monitor the application and use of the computer program and adapt the program as necessary based on input from the Boards of Health.

Cost: $123,310

Funding: $73,818 by the U.S. Environmental Protection Agency
$40,800 by 20 Massachusetts Municipalities
$8,692 by the University of Massachusetts Cooperative Extension

Duration: 1996 - 1997

FEDERAL FISCAL YEAR 1996
SECTION 319 NPS PROJECT 96-02/319

96-02/319: Monitoring Strategies for Innovative On-Site Sewage Disposal Technologies

NPS Category: Land Disposal
Investigator: University of Massachusetts, Amherst and Lowell
Location: Statewide Massachusetts

Description:
The purpose of this project is to demonstrate the proper use of innovative onsite sewage disposal technologies by providing guidelines for the engineering, regulation, performance, and monitoring of these systems. Sampling of selected systems will also be conducted to obtain long term monitoring data needed to evaluate these systems.

Tasks:

1. monitor selected innovative technologies and use the data to evaluate the performance of each system and determine its operational limitations; prepare a separate report which presents the monitoring results and publish this report as a Massachusetts Agricultural Experiment Station bulletin to ensure widespread distribution; and
2. prepare a manual which details the conceptual design, performance, advantages and limitations of innovative on-site sewage disposal technologies and provide copies of this manual to each municipal Board of Health in Massachusetts. Results of the monitoring conducted under Task 1 will be included in the manual.

Cost: $92,842

Funding: $54,944 by the U.S. Environmental Protection Agency
$37,898 by the University of Massachusetts Cooperative Extension

Duration: 1996 - 1997

FEDERAL FISCAL YEAR 1996
SECTION 319 NPS PROJECT 96-03/319

96-03/319: Connecticut River Watershed Restoration Project

NPS Category: Hydrologic Modification
Investigator: Franklin County Commission
Location: Connecticut River Basin

Description:
Bioengineering techniques will be used to repair eroded streambank in the upper Connecticut River at Turners Falls Power Pool. Implementation of these techniques will reduce sedimentation and the release of erosion-induced pollutants into the river. The project will demonstrate bioengineering on a large river. with steep banks; previous bioengineering projects funded under the Department's S.319 program have been conducted on small low-order streams.

Tasks:
1. evaluate existing information for eroded sites along the Turners Falls Power Pool to determine where a variety of bioengineering techniques can be demonstrated;
2. select remediation sites based on likelihood of success, cost effectiveness, and value as tools for outreach and technology transfer; a total of 1 000 to 3000 linear feet of eroded bank will be repaired at up to eight sites;
3. design and install bioengineering systems at the selected sites;
4. conduct quarterly monitoring of the project from pre-construction through final evaluation; and
5. maintain a complete record of the project in slide format; this slide record will document site features and appearance before work commences, phases of the bioengineering work, appearance of site immediately after the work has been completed, and subsequent growth of the installed plant materials. The slide record will be included with the final report and will be used for a technical transfer seminar to be conducted under this project.

Cost: $358,600

Funding: $150,000 by the U.S. Environmental Protection Agency
$200,000 by the Western Massachusetts Electric Company
$8,600 by the Franklin County Commission

Duration: 1996 - 1998

FEDERAL FISCAL YEAR 1996
SECTION 319 NPS PROJECT 96-04/319

96-04/319: Demonstration of Urban Streambed Stabilization and Wetlands Function and Wildlife Habitat Improvement Using Soil Bioengineering Treatments at Hearthstone Quarry Brook, Chicopee

NPS Category: Hydrologic Modification
Investigator: City of Chicopee
Location: Chicopee River Basin

Description:
Bioengineering will be used to restore an urban stream that has been adversely impacted by development within its watershed. The existing erosion problem has caused disturbance to the streambed and banks, resulting in loss of wetlands. In addition, the brook will be further impacted by increased storm water flows once combined sewer separation occurs; the bioengineering designs for the project will take into consideration this increase in flow.

Tasks:
1. bioengineering systems will be installed at Hearthstone Quarry Brook. Designs for these systems will be finalized prior to start-up of the 96-04 implementation project;
2. monitoring and maintenance plans will be developed for this installation. In addition, an assessment of erosion processes will be conducted and a long-term monitoring program will be developed to evaluate the success of bioengineering treatments. Pre- and post-construction wetland and wildlife habitat values also will be compiled and summarized, and
3. an on-site technical transfer presentation will be conducted.

Cost: $400,000

Funding: $240,000 by the U.S. Environmental Protection Agency
$160,000 by the city of Chicopee
Duration: 1996 - 1998

FEDERAL FISCAL YEAR 1996
SECTION 319 NPS PROJECT 96-05/319

96-05/319: Spicket River Watershed Revitalization

NPS Category: Urban Runoff
Investigator: Merrimack River Watershed Council
Location: Merrimack River Basin

Description:
The goal of this project is to use the watershed approach to decrease nonpoint pollution in an ultra-urban area. An extensive cleanup, education and outreach program will be conducted by a variety of public and private groups. In addition, the project will demonstrate an innovative best management practice (BMP) for use in ultra-urban areas.

Tasks:
1. evaluate catch basin filters as an innovative BMP to reduce storm water sediment and petroleum hydrocarbon loadings from ultra-urban areas;
2. develop and conduct an extensive education and outreach program in the watershed; this outreach program will include producing outreach materials in Spanish for the large Hispanic population in this watershed; and
3. develop a monitoring program to measure the overall effectiveness of the project which includes both instream collection of samples for water quality analysis, as well as monitoring of public participation.

Cost: $144,585

Funding: $49,285 by the U.S. Environmental Protection Agency
$52,300 by the GenCorp
$16,000 by the Merrimack River Watershed Council
$14,000 by the Massachusetts Department of Environmental Protection $6,000 by the Lawrence Youth Commission
$4,000 by the Ferrous Foundry
$2,000 by the Greater Lawrence Sanitary District
$1,000 by the Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement - Riverways Program

Duration: 1996 - 1997

FEDERAL FISCAL YEAR 1996
SECTION 319 NPS PROJECT 96-06/319

96-06/319: In-House Management Plan for Nonpoint Source Pollution in the Neponset River

NPS Category: Urban Runoff
Investigator: The Westford Group, Inc.
Location: Neponset River Basin

Description:
Foxboro Park raceway, practice track, and parking areas have been identified as significant sources of sediment to the Neponset River. In 1992, the current site managers began track renovations, which included best management practices (BMPs) to reduce sediment loads, and in the spring of 1995, the park was evaluated by the Massachusetts Community Assistance Partnership (MassCAP), which resulted in detailed recommendations for upgrading existing and implementing new BMPs. This project will build on the work that was initiated in 1992, and will utilize the MassCAP recommendations to implement an erosion and sediment control management program.

Tasks:
1. target four locations at the raceway for upgrading of existing best management practices (BMPs) and installation of additional BMPs, including swales, sand filters, and vegetative stabilization of eroding areas;
2. develop and conduct a nonpoint source/erosion and sediment control education program for both inhouse staff and horsemen who groom, train and race their animals at the track; and
3. develop a wet weather monitoring program to supplement the current monthly monitoring, and to more effectively measure the performance of the on-site BMPs and assess sediment loadings to the river.

Cost: $30,155

Funding: $17,293 by the U.S. Environmental Protection Agency
$12,862 by the Foxboro Park

Duration: 1996 - 1997

FEDERAL FISCAL YEAR 1997
SECTION 319 NPS PROJECT 97-01/319

97-01/319: Development of Stormwater Utilities in Two Demonstration Communities: Chicopee & South Hadley

NPS Category: Urban Runoff
Investigator: City of Chicopee
Location: Connecticut and Chicopee River Basins

Description:
The proposed project seeks to address the problem of funding for comprehensive NPS pollution control by creating the first stormwater utilities in Massachusetts.

Tasks:

1. establish a Stormwater Utility Development Advisory Committee from municipal governments, the business community, realtors and developers, citizens and neighborhood councils, and local water quality advocates to review, discuss and make decisions concerning the development of stormwater utilities in the two communities;
2. research a minimum of 10 existing stormwater utilities for information on fee structures and rates, administration, community relations, and legal framework;
3. develop a preferred assessment method for each community by determining the size of an ERU (Equivalent Residential Unit), identifying and preparing a cost-benefit analysis of three to four different assessment methods, and working with the advisory committee to select the preferred assessment method for each community;
4. develop a utility program and budget for each community;
5. determine an initial utility rate (i.e. the cost per ERU) for each community based on the assessment method and utility budget;
6. develop and pursue the implementation of a legal framework at both the state and local levels for the enactment of stormwater fees;
7. conduct community education and outreach activities by developing information materials, conducting media activities, and conducting presentations;
8. transfer the project information by creating and distributing a "How-to" Stormwater Utility Development Kit and conducting presentations.

Cost: $144,743

Funding: $81,943 by the U.S. Environmental Protection Agency
$40,385 by the city of Chicopee
$17,600 by the town of South Hadley
$1,920 by the Chicopee Chamber of Commerce
$1,500 by the Chicopee Manufacturer's Association
$1,500 by the Chicopee River Watershed Council

Duration: 1997 - 1998

FEDERAL FISCAL YEAR 1997
SECTION 319 NPS PROJECT 97-02/319

97-02/319: Red Lily Pond Rejuvenation

NPS Category: Sediment, Watershed Resource Restoration
Investigator: Red Lily Pond Association, Inc.
Location: Cape Cod Coastal Drainage Area

Description:
The purpose of this project is to restore the Red Lily Pond complex and return it to its former function as a valuable fish habitat and migratory fish spawning area. The project will utilize the new techniques of subsidence dredging and reverse re-layering in order to deepen the pond and seal off the nutrients that have accumulated on the bottom of the pond. The existing weed growth in the pond will be removed by hydro-raking the pond prior to dredging. Storm drainage from an adjacent road will be infiltrated to eliminate a direct discharge to the pond.

Tasks:
1. complete the final specifications for subsidence dredging and reverse layering, hydro-raking and drainage improvements;
2. develop Quality Assurance Project Plan (QAPP) and conduct monitoring in accordance with approved plan, including mapping of aquatic flora and fauna by an independent biologist;
3. secure appropriate permits for the project;
4. install drainage improvements;
5. hydro-rake pond and dispose of weeds;
6. subsidence dredge and reverse layer the south basin of Red Lily Pond and dispose of sand;
7. conduct three technology transfer seminars;
8. perform initial repairs to the herring run.

Cost: $426,404

Funding: $160,800 by the U.S. Environmental Protection Agency
$160,399 by the town of Barnstable
$72,455 by the Commonwealth of Massachusetts
$32,750 by the Red Lily Pond Association, Inc.

Duration: 1997 – 1999

FEDERAL FISCAL YEAR 1997
SECTION 319 NPS PROJECT 97-03/319

97-03/319: Technical Outreach to Communities Regarding Alternative On-Site Septic Systems

NPS Category: Land Disposal
Investigator: Barnstable County Department of Health & the Environment
Location: Cape Cod Coastal Drainage Area

Description:
The proposed project will supply ongoing technical assistance to communities relative to alternative on-site septic system technologies. The emphasis of the information will be performance data, permitting procedures and requirements, treatment efficacy, design specifications, monitoring and maintenance requirements, cost effectiveness and installation requirements. Outreach primarily will be focused toward Boards of Health and the design and engineering communities.

Tasks:
1. produce six technical documents discussing specific innovative on-site sewage treatment technologies which focus on systems capable of nitrogen removal;
2. distribute the technical documents to 69 Boards of Health (all Boards of Health in Barnstable County, the Buzzards Bay Coastal Drainage Area, and the Massachusetts Bays communities) and various other Board of Health members, public agencies, engineering firms and citizens in Barnstable County;
3. create and maintain a computer home page/web site for the exchange of technical information regarding alternative on-site septic systems and to serve the statewide audience.

Cost: $35,323

Funding: $20,534 by the U.S. Environmental Protection Agency
$13,973 by the Barnstable County Department of Health & the Environment

Duration: 1997 - 1998

FEDERAL FISCAL YEAR 1997
SECTION 319 NPS PROJECT 97-04/319

97-04/319: Alternative Septic Systems Technologies Workshop Program

NPS Category: Land Disposal
Investigator: Berkshire County Regional Planning Commission
Location: Housatonic and Farmington River Basins

Description:
This project will consist of presenting 15 to 20 workshops in the Housatonic and Farmington River Basins on Department of Environmental Protection approved alternative on-site septic system technologies, the septic system repair program and recent changes to Title 5. The objective of this project is to facilitate the use of alternative technologies in order to remediate water quality problems due to failing septic systems and to educate homeowners on proper septic system maintenance.

Tasks:
1. develop workshop program, agenda, visual aids, educational package schedule and mailing list;
2. conduct 15 to 20 workshops in communities with known septic system problems and communities involved in the Septic System Repair Program; targeted audience will consist of Boards of Selectmen, Planning Boards, Conservation Commissions, Boards of Health, engineers, contractors, realtors, attorneys, lake associations and the general public from all communities within the Housatonic and Farmington River Basins;
3. develop a questionnaire to assess participants awareness level and need for additional education efforts.

Cost: $34,000

Funding: $20,400 by the U.S. Environmental Protection Agency
$5,500 by the Berkshire County Regional Planning Commission
$4,400 by the Tri-Town Health Department
$2,000 by the Pioneer Valley Planning Commission
$1,700 by the Berkshire Housing Development Corporation

Duration: 1997 -1998

FEDERAL FISCAL YEAR 1997
SECTION 319 NPS PROJECT 97-05/319

97-05/319: Leak Prevention for Heating Oil Storage Systems

NPS Category: Underground Storage Tanks
Investigator: Barnstable County Department of Health & the Environment
Location: Cape Cod Coastal Drainage Area

Description:
With the goal of protecting Cape Cod's sole source aquifer, the purpose of this project is to increase compliance with existing regulations on underground heating oil storage tanks (USTs). In addition, low cost-effective containment methods for above ground fuel tanks (AGTs) and underground feed lines will be developed and distributed to interested parties.

Tasks:
1. increase the number of USTs registered by visiting Cape oil distributors to remind them of their responsibilities and potential liabilities under the existing health regulations; oil distributors will be encouraged to send letters to their customers who have unregistered USTs;
2. increase compliance with UST testing requirements by mailing certified letters to the estimated 300 UST owners who do not respond to the initial request for testing of their tank;
3. increase the number of USTs removed by sending letters to owners of active USTs mentioning the possibility of decreased removal costs through participation in a group "tank yank"; lists will be developed for each participating town and competitive bids for UST removal will be sought;
4. develop low cost effective containment procedures to reduce the threat of leaks from AGTs and underground lines by consulting with representatives of health and fire departments, the corrosion control industry, the heating oil industry, builders, plumbing and heating contractors and the Department of Environmental Protection;
5. work with town officials and local business people to pass a regulation or bylaw in Truro requiring containment of AGTs and underground lines;
6. produce and distribute a booklet explaining the proposed containment procedures for AGTs and underground lines; produce a model health regulation or bylaw implementing AGT and underground line containment procedures and distribute with a letter explaining the experiences of Truro in passing such a bylaw.

Cost: $34,507

Funding: $20,534 U.S. Environmental Protection Agency
$13,973 Barnstable County Department of Health & the Environment

Duration: 1997 – 1998

FEDERAL FISCAL YEAR 1997
SECTION 319 NPS PROJECT 97-07/319

97-07/319: Protecting Nitrogen Sensitive Coastal Embayments Through Land Conservation

NPS Category: Urban Runoff
Investigator: Buzzards Bay Project
Location: Buzzards Bay Coastal Drainage Area

Description:
This project will demonstrate the use of conservation restrictions and other land protection tools as Best Management Practices to protect sensitive coastal embayments from nitrogen inputs from increased development. The conservation restrictions and land protection tools will be implemented in two watersheds, Slocums River and Onset Bay.

Tasks:
1. develop a model conservation restriction which gives greater attention than is common in conventional restrictions to nitrogen management relevant issues such as fertilizer use, manure management, septic system maintenance and upgrades, and vegetated buffers;
2. develop a watershed land conservation plan by identifying and mapping all large landowners and land use characteristics within the Slocums River and Onset Bay watersheds and identifying the most critical parcels for conservation;
3. create and distribute outreach materials on the range of conservation options available to private landowners highlighting the model Conservation Restriction for nitrogen sensitive watersheds;
4. host two workshops for landowners in each pilot watershed to discuss land conservation options leading to direct work with approximately twelve landowners to establish land protection measures on their property;
5. implement conservation options through recorded title or deed restrictions.

Cost: $72,500

Funding: $33,000 by the U.S. Environmental Protection Agency
$19,500 by the Massachusetts Environmental Trust
$12,000 by the Dartmouth Natural Resources Trust
$8,000 by the Plymouth County Wildlands Trust

Duration: 1997 – 1998

FEDERAL FISCAL YEAR 1997
SECTION 319 NPS PROJECT 97-08/319

97-08/319: Hall's Pond Wetlands Restoration Project

NPS Category: Watershed Resource Restoration
Investigator: Town of Brookline
Location: Charles River Basin

Description:
The purpose of this project is to restore one acre of wetlands at an urban conservation sanctuary.

Tasks:

1. complete the final design for the restoration of approximately one acre of wetlands and relocation of the pond outlet;
2. secure appropriate permits for the project;
3. purchase materials for the restoration and implement the wetlands restoration plan;
4. prepare a Quality Assurance Project Plan (QAPP) and conduct water quality and wetlands monitoring.

Cost: $114,596

Funding: $68,757 by the U.S. Environmental Protection Agency
$37,839 by the town of Brookline
$8,000 by the Friends of Hall's Pond

Duration: 1997 – 1999

FEDERAL FISCAL YEAR 1997
SECTION 319 NPS PROJECT 97-09/319

97-09/319: Three Bay Area - Ropes Beach Subwatershed

NPS Category: Urban Runoff, Watershed Resource Restoration
Investigator: Town of Barnstable
Location: Cape Cod Coastal Drainage Area

Description:
The purpose of this project is to capture and treat road runoff that is contributing to the contamination of Cotuit Bay, a prime shellfish location and gateway to two herring runs. Under this project a series of rock filled pools and channels will be installed. The pools will be preceded by sediment removal tanks and followed by an infiltration system. The net effect will be removal of sediment, bacteria and nitrogen.

Tasks:
1. prepare final design and engineering drawings necessary to install the remediation system and secure appropriate permits;
2. perform site preparation, and purchase and install all components of the remediation system;
3. develop a Quality Assurance Project Plan (QAPP) and conduct monitoring based on the approved QAPP;
4. conduct a technology transfer presentation.

Cost: $157,050

Funding: $92,700 by the U.S. Environmental Protection Agency
$64,350 by the town of Barnstable

Duration: 1997 - 1999

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-01/319

98-01/319: Determining the Effectiveness of On-Site Septic Systems for the Removal of Viruses

NPS Category: Land Disposal
Investigator: Barnstable County Department of Health & the Environment
Location: Statewide

Description:
The proposed project seeks to determine the removal efficiencies of standard Title 5 systems for viruses and provide a benchmark against which alternative on-site septic system technologies can be compared. In addition, this study endeavors to clarify some of the mechanisms of virus removal and suggest guidelines that Boards of Health can use in their review of variance requests from setback requirements of the regulations.

Tasks:
1. with the cooperation of the Department of Environmental Protection Wall Experimental Station, formulate a quality assurance project plan (QAPP) for sampling viruses beneath septic systems;
2. determine the virus removal effectiveness of standard Title 5 components and selected alternative on-site septic systems by implementing the QAPP;
3. publish test results in a minimum of two environmental publications, and incorporate results in the Correspondence Course for Boards of Health that is being developed under 319 project 95-07, Title 5 Training for Boards of Health in Five Towns in Barnstable County, MA; and
4. publish a final report which will include recommendations on how the information might be used to modify Title 5 if warranted.

Cost: $44,237

Funding: $26,500 by the U.S. Environmental Protection Agency
$17,737 by the Barnstable County Department of Health & the Environment

Duration: 1998 - 2000

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-03/319

98-03/319: Coastal Embayment/Title 5 Training Video

NPS Category: Land Disposal
Investigator: Cape Cod Commission
Location: Statewide/Cape Cod Coastal Drainage Area

Description:
The proposed project will produce a video on methods to identify nitrogen-sensitive coastal embayments and to develop water quality protection and remediation strategies within their watersheds. This video can be utilized in training agency staff, local Boards of Health and other community-based watershed groups.

Tasks:
1. produce training video;
2. provide copies of video to the Department of Environmental Protection for distribution;
3. air video on local Cape Cod community access television and advertise its availability.

Cost: $20,000

Funding: $12,000 by the U.S. Environmental Protection Agency
$8,000 by the Cape Cod Commission

Duration: 1998 - 1999

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-04/319

98-04/319: Restoring Concord's Mill Brook: Nonpoint Source Pollution and Community Involvement

NPS Category: Watershed Resource Restoration, Urban Runoff
Investigator: Division of Natural Resources, Town of Concord
Location: SuAsCo River Basin

Description:
This project will continue to advance the work by the Mill Brook Task Force to restore and conserve the brook. Urbanization and the intensification of land use in the town have resulted in an increase in nonpoint source pollution, which is most evident in the buildup of sediment in the stream bed. By implementing a variety of best management practices (BMPs), this project will result in a reduction of NPS loadings to Mill Brook.

Tasks:
1. implement an innovative stormwater treatment technology at a high impact site;
2. retrofit four catch basins with new sump units and storm drain pillows or sump skimmers;
3. develop a Quality Assurance Plan (QAPP) and monitor to demonstrate the effectiveness of the BMPs installed under tasks 1 and 2;
4. work with the town DPW to develop a long-term plan with recommendations for catch basin technologies and maintenance;
5. work with the town DPW to train street maintenance and snow removal personnel in appropriate techniques to mitigate NPS impacts from these operations; review snow removal and street maintenance practices and develop new policies wherever feasible;
6. where allowed by permit, remove stream bottom sediment and conduct stream bank cleanup;
7. publish NPS pollution related articles in local publications and work with area schools to provide input into curricula regarding Mill Brook stewardship and NPS pollution.

Cost: $128,238

Funding: $71,544 by the U.S. Environmental Protection Agency
$56,694 by the town of Concord
Duration: 1998 – 2000

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-05/319

98-05/319: Nashawannuck Pond Watershed Restoration Project, Easthampton, MA

NPS Category: Watershed Resource Restoration
Investigator: Pioneer Valley Planning Commission
Location: Connecticut River Basin

Description:
Nashawannuck Pond has been reduced in size by sedimentation, and heavy phosphorus loading resulting from this constant sediment loading is accelerating aquatic weed growth. This project will implement recommendations of a 1990 Diagnostic/Feasibility study and build upon previous activities to improve the water quality of the pond.

Tasks:
1. review and update as necessary the 1990 plans for bank stabilization at four identified sites
2. implement stabilization measures to eliminate erosion and sedimentation, prevent further slumping of the banks, and manage access near the pond to prevent future compaction of soil and erosion at the four sites;
3. conduct two half-day workshops on the Nashawannuck Pond Watershed and nonpoint source pollution control;
4. identify demonstration sites and BMPs to show in-the-field methods to improve water quality;
5. produce and distribute a watershed management brochure for Nashawannuck Pond which will inform stakeholders about NPS pollution and increase support for future watershed restoration.

Cost: $94,725

Funding: $54,725 by the U.S. Environmental Protection Agency
$40,000 by the town of Easthampton

Duration: 1998 - 2000

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-06/319

98-06/319: NPS Pollution Correction in the Farmington Watershed - Dirt Roads BMP Handbook

NPS Category: Urban Runoff
Investigator: Berkshire Regional Planning Commission
Location: Farmington River Basin

Description:
Dirt roads are one of the most prominent sources of nonpoint source pollution in rural areas. In the Farmington River Basin approximately 60% of the roads are dirt roads. This project will develop a Dirt Roads Best Management Practices Handbook for use by Highway Departments.

Tasks:
1. develop the Dirt Roads Best Management Practices Handbook that will provide detailed, practical instructions for BMP implementation;
2. select test case locations at which BMP implementation and road improvements will be demonstrated, and
3. conduct workshops on Dirt Road BMPs at which the Handbook will be distributed and the results of the test cases will be explained to Highway Superintendents in Berkshire County.

Cost: $73,750

Funding: $43,950 by the U.S. Environmental Protection Agency
$24,800 by the town of Sandisfield
$5,000 by the Berkshire Regional Planning Commission

Duration: 1998 - 2000

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-07/319

98-07/319: Reducing Stormwater Pollution in an Ultra-Urban Watershed

NPS Category: Urban Runoff
Investigator: City of Somerville, Department of Public Works
Location: Boston Harbor Coastal Drainage Area (Mystic River Basin)

Description:
The overall objective of this project is to improve the water quality of Alewife Brook by treating and reducing stormwater discharges and developing recommendations for meeting stormwater goals in an ultra-urban watershed. Elimination of combined sewer overflows (CSOs) to Alewife Brook is currently being completed. Modelling done by the MWRA has predicted that even with the elimination of the CSOs Alewife Brook will not meet Class B water quality standards due to stormwater discharges.

Tasks:
1. implement an innovative retrofit technology at a storm drain outlet;
2. administer a watershed resident survey to identify environmentally detrimental behavior which results in nonpoint source pollution and conduct an outreach campaign designed to address this behavior;
3. identify and prioritize sites within the watershed where perviousness can be increased, develop recommendations and provide assistance to landowners in implementing recommendations; and
4. conduct a workshop for municipalities within the Alewife Brook watershed and another for Mystic River Basin municipalities on controlling nonpoint source pollution in ultra urban areas.

Cost: $118,700

Funding: $71,900 by the U.S. Environmental Protection Agency
$18,200 by the Alewife/Mystic River Advocates
$15,100 by the City of Somerville
$13,500 by the Department of Fisheries, Wildlife and Environmental Law Enforcement, Riverways Program

Duration: 1998 - 2000

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-08/319

98-08/319: Protection of First Herring Brook

NPS Category: Watershed Resource Restoration
Investigator: Town of Scituate
Location: South Coastal Drainage Area

Description:
This project focuses on the protection of First Herring Brook from nonpoint source pollution through the installation of infiltration best management practices (BMPs). First Herring Brook is a tributary to Old Oaken Bucket Pond, the source of the town's drinking water supply. Direct discharge of stormwater has led to the degradation of the Brook's water quality.

Tasks:
1. disconnect nine direct stormwater discharges in highly developed areas of the First Herring Brook subwatershed and install infiltration BMPs;
2. develop a Quality Assurance Project Plan (QAPP) for pre and post implementation monitoring of First Herring Brook to measure the effectiveness of the infiltration BMPs and conduct the monitoring in accordance with the QAPP; and
3. incorporate the infiltration system designs as standard specifications into the town's local regulations so contracted developers will have guidelines to follow.

Cost: $129,300

Funding: $77,580 by the U.S. Environmental Protection Agency
$51,720 by the town of Scituate

Duration: 1998 - 2000

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-09/319

98-09/319: Manual of Innovative/Alternative On-Site Wastewater Treatment Technologies

NPS Category: Land Disposal
Investigator: UMass Amherst, Department of Plant and Soil Sciences
Location: Statewide

Description:
This project will continue, add to, and update the Manual of Innovative/Alternative On-Site Wastewater Treatment Technologies developed under 319 project 96-02. The manual details the conceptual design of all alternative technologies currently approved by the Department of Environmental Protection, including any conditions to those approvals, advantages and disadvantages of these systems, and where these technologies are most appropriate. Each system description lists the parameters most important from a system performance point of view. Guidelines for system performance testing will be included, with detailed descriptions as to how and where to sample each alternative system.

Tasks:
1. review Department of Environmental Protection files and conduct literature search;
2. prepare updated innovative technologies manual, and
3. distribute updated manual.

Cost: $27,250

Funding: $14,520 by the U.S. Environmental Protection Agency
$12,730 by UMass Amherst, Department of Plant and Soil Sciences

Duration: 1998 - 1999

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-11/319

98-11/319: Development and Demonstration of Protocols for Evaluating Greywater Disposal Systems in Massachusetts

NPS Category: Land Disposal, Groundwater
Investigator: Department of Environmental Protection
Location: Statewide

Description:
This project will assess groundwater and effluent quality data generated by piloting several greywater systems and use these data to develop greywater disposal and reuse guidance and regulations that adequately protect public health and the environment.

Tasks:
1. Select and pilot test four (4) greywater systems;
2. develop a Quality Assurance Project Plan (QAPP) for sampling and analysis;
3. conduct sampling and analysis of these systems including groundwater monitoring; and
4. develop draft guidance and regulations for disposal and reuse of greywater in Massachusetts.

Cost: $195,000

Funding: $110,000 by the U.S. Environmental Protection Agency
$85,000 by the Massachusetts Department of Environmental Protection

Duration: 1998-2000

FEDERAL FISCAL YEAR 1998
SECTION 319 NPS PROJECT 98-12/319

98-12/319: Demonstrating the Use of Eelgrass Monitoring to Assess Coastal Nonpoint Source Pollution

NPS Category: Demonstration
Investigator: Department of Environmental Protection
Location: Statewide Coastal

Description:
This project will establish and demonstrate the use of eelgrass as an environmental indicator to assess water quality conditions in the North Coastal, South Coastal, Boston Harbor, Cape Cod and the Islands, and Buzzards Bay Coastal drainage area. By quantifying the relative health of the plants (presence/absence, depth, leaf density and length) the eelgrass habitat requirements of particular coastal embayments can be established. This will help provide a mechanism to relate anthropogenic inputs to the relative health of estuarine areas. The information obtained can be used to assist Watershed Teams better identify coastal waters that are impaired or in need of further assessment activities and/or potential management actions.

Tasks:
1. establish 40 transects or monitoring stations along coastal Massachusetts;
2. conduct surveys incorporating underwater videography, GPS surveying and high accuracy digital mapping to create an eelgrass monitoring data layer of the relative health of selected coastal areas where nutrient and other land use inputs have adversely effected eelgrass resources;
3. determine the relationship between water quality and eelgrass beds;
4. produce a base map (ARC View) incorporating the fieldnotes - recorded data and representative scanned frames of the underwater video recording; and
5. conduct information transfer by archiving base map and making it available to user groups through the DEP/EOEA Mass GIS data distribution system.

Cost: $50,000

Funding: $30,000 by the U.S. Environmental Protection Agency
$20,000 by the Massachusetts Department of Environmental Protection

Duration: 1998-2000

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-01/319

99-01/319: Alternative Septic System Test Center Project Monitoring

NPS Category: Demonstration Project/Groundwater
Investigator: Buzzards Bay Project
Location: Buzzards Bay Watershed/Statewide

Description:
This project will concurrently monitor contaminant removal by twenty-one wastewater systems at the Alternative Septic System Test Center at the Massachusetts Military Reservation for 12 months. The monitoring will produce a scientifically valid body of data which will be disseminated to state regulators, local boards of health, installers and consumers through trade shows, newspaper articles, site visits, and through Website coverage.

Project goals are to: provide verified, comparable data for regulatory decision making; speed approval of technologies which have advanced contaminant removal, particularly nitrogen; and increase the variety of alternative systems approved to provide greater siting flexibility and thus reduce the cost to consumers and benefit the environment.

Tasks:

1. Monitor six alternative and one conventional onsite wastewater technologies in triplicate for BOD, fecal coliform, TSS ammonium nitrate+nitrite, total dissolved nitrogen, particulate nitrogen and carbon, orthophosphate and total phosphorus. Monitoring will be done in accordance with an EPA-approved sampling protocol.

2. Conduct outreach to disseminate monitoring program results through:
    a. at least one NE Onsite Wastewater Trade Show co-sponsored by the BBP;
    b. publication of two articles about the Test Center in local newspapers and journals such as *Small Flows* and *Environment Cape Cod*;
    c. posting information about the Test Center on the BBP website including description of the facility, goals, testing procedures, notices of facility tours and trade shows; and
    d. a report on the types, uses and performance characteristics of the conventional and alternative systems monitored during this project.

Cost: $187,738

Funding: $112,643 by the US Environmental Protection Agency
$50,000 by the Massachusetts Environmental Trust
$16,095 by the Barnstable County Health and Environment Department
$9,000 by the Center for Marine Science and Technology

Duration: 1999 - 2001

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-03

99-03/319: Pontoosuc Lake Watershed Resource Restoration Proposal

NPS Category: Watershed Restoration Project
Investigator: Berkshire Regional Planning Commission
Location: Housatonic Watershed

Description:
Initial results of a comprehensive Diagnostic/Feasibility Study for Pontoosuc Lake in Pittsfield and Lanesborough indicate that stormwater runoff contains high levels of phosphorus and is exacerbating weed and algae infestations, and that nutrient loading from near-lake sources (residences, businesses, roadways, etc.) is a greater problem than agricultural runoff in the tributaries. This project will improve water quality in Pontoosuc Lake by beginning implementation of the recommendations of the D/F Study. Specifically, the project will correct priority storm drain problems at three stormwater outfalls in the northern cove of the lake by capturing the "first flush" of storm runoff and infiltrating it into the ground. The project will also include work with municipalities to begin a comprehensive program of source controls. Finally, directed outreach efforts will increase the awareness and environmental responsibility of all lake stakeholders.

Tasks:
1. Design and install innovative stormwater infiltration technologies at three sites on the northern cove of Pontoosuc Lake in Lanesborough;
2. Conduct volunteer monitoring of stormwater including rainfall volume, storm drain discharge, solids, conductivity and nutrient levels according to an EPA-approved sampling protocol. Monitoring will be conducted before and after installation of the stormwater infiltration technologies;
3. BRPC will work with Pittsfield, Lanesborough and the County Commissioners to implement a comprehensive program of source controls including septic management, road maintenance and weed harvesting on Pontoosuc Lake; and
4. BRPC will organize and present a workshop for lakeshore businesses to encourage property management efforts that protect the lake including plant material buffer strips, pervious paving materials and other practices to reduce runoff from parking areas.

Cost: $121,995

Funding: $71,450 by US EPA
$21,470 by City of Pittsfield
$2,075 by Berkshire County Commissioners
$7,000 by Housatonic Valley Association
$20,000 by Town of Lanesborough

Duration: 1999 - 2001

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-04/319

99-04/319: Winsegansett Salt Marsh Restoration Project

NPS Category: Demonstration/Watershed Restoration Project
Investigator: Buzzards Bay Project
Location: Buzzards Bay Watershed

Description:
The project will demonstrate restoration of the Winsegansett Salt Marsh, a 30-acre coastal wetland on the western shore of Buzzards Bay. A culvert beneath Winsegansett Avenue will be replaced with a larger box culvert. The restoration of natural tidal flow will increase salinity in the marsh and eliminate an existing stand of Phragmites. The end objective is to permit natural recolonization of spartina plant communities in the upper reaches of Winsegansett Marsh, thereby improving juvenile finfish and shellfish habitat and supporting the feeding habitats of local wildlife species, including the federally-listed endangered Roseate Tern and Osprey.

The project also includes publication and distribution of the "Atlas of Tidally Restricted Salt Marshes in Buzzards Bay" which can be used to target other salt marshes in need of similar restoration efforts.

Tasks:
1. Design and installation of the box culvert at Winsegansett Avenue;
2. Monitoring of pre- and post-construction water quality in accordance with an EPA-approved sampling protocol, and pre- and post-construction GIS mapping of the extent of salt marsh vegetation in Winsegansett Salt Marsh; and
3. Printing and distribution of the "Atlas of Tidally Restricted Salt Marshes" to coastal communities in Buzzards Bay.

Cost: $42,400

Funding: $22,500 by the US Environmental Protection Agency
$19,900 by the Town of Fairhaven

Duration: 1999 - 2001

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-05/319

99-05/319: Telecom City: Malden, Medford, Everett

NPS Category: Demonstration/Watershed Restoration Project
Investigator: Mystic Valley Development Commission
Location: Boston Harbor (Mystic) Watershed

Description:
The project is part of a larger effort to redevelop a 200+ acre brownfield site along the Malden River where the cities of Malden, Medford and Everett meet. The focus of this project is to mitigate stormwater impacts to banks, buffers and surface water quality within the Malden River Corridor by implementing stormwater BMP's, and to develop data on the effectiveness of those BMP's at a difficult urban redevelopment site. The proponent's goal is to put the "environmental portion" of the larger redevelopment project, such as public recreational open space, stormwater controls and wetlands rehabilitation, in place before the proposed industrial redevelopment of the site begins and overrides environmental concerns.

Tasks:
1. Monitoring in accordance with an EPA-approved sampling protocol to establish pre-construction parameters for NPS runoff quality, local hydrology and subsurface geology;
2. Development of a model to quantify the predicted mitigation of NPS runoff impacts through BMP implementation;
3. Design and implementation of stormwater BMP's and restoration of wetlands and wildlife habitat prior to commencement of the industrial redevelopment of the larger brownfields site;
4. Six months of monitoring the BMP's operations and efficiency, and monitoring NPS runoff and surface water quality in accordance with an EPA-approved sampling protocol;
5. Final calibration of the predictive model based on post-construction monitoring results; and
6. Development of an outreach programs for the three host communities and outreach documenting the effectiveness of the BMP's implemented at an urban redevelopment site.

Cost: $250,000

Funding: $150,000 by the US Environmental Protection Agency
$100,000 by the Mystic Valley Development Commission
Duration: 1999 - 2001

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-06/319

99-06/319: Development of a Rational Basis for Designing Recharging Stormwater Control Structures and Flow and Volume Design Criteria

NPS Category: Demonstration/Technical Assistance Project
Investigator: UMass/Amherst
Location: Statewide

Description:
The Massachusetts Stormwater Standards Guidance recommends that 80% of total suspended solids (TSS) be removed from the first 0.5 inches of rainfall. The intensity of the rain event that produces this 0.5 inches will influence both the amount and quality of the TSS. A high intensity storm will produce high TSS with large and small grain sizes. A small intensity storm may have lower TSS but finer grained materials. The typical design standard for infiltration devices is based on flow rate rather than TSS removal rates. Therefore, the relationship between storm characteristics and infiltration device design needs to be clarified in order for the Standards to be applied by regulators.

The project will include a literature review and development of a numerical model of infiltration of stormwater through infiltration structures and the underlying soils. Inputs to the model will include hydraulic conductivity of all relevant porous media, the area of the infiltration structure, the volume of water to be infiltrated and local groundwater conditions. The output of the model will be the time required to complete infiltration. The model and its results can then be used to design and site infiltration structures to implement the Massachusetts stormwater management standards.

Tasks:
1. Literature review and conceptualization of the numerical model;
2. Model development, debugging and parameter investigation;
3. Preliminary and full model runs;
4. Data analysis and report preparation.

Cost: $53,943

Funding: $32,135 by the US Environmental Protection Agency
$21,808 by the University of Massachusetts

Duration: 1999 - 2001

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-07/319

99-07/319: Design and Guidance for Shallow Trench Low Pressure Pipe Distribution Systems for the Massachusetts Title 5 Innovative/Alternative Septic System Program

NPS Category: Technical Assistance Project
Investigator: UMass/Amherst
Location: Statewide

Description:
The project will provide performance data and design criteria for Shallow Trench Low Pressure Distribution Systems (STLPP's) and develop a Design Guidance Manual for the systems. STLPP's are a non-patentable alternative technology in widespread use outside of Massachusetts over the past 10 year. If performance of the systems proves to be acceptable, the developed data and the Design Guidance Manual can be used to draft approval letters for General and Remedial Use Certification by DEP under CMR 310 15.288(2) and STLPP's can become part of the Title 5 Innovative/Alternative Technologies Program.

Tasks:
1. Review and compilation of available performance and design data for STLPP's;
2. Outline and preparation of the Design Guidance Manual;
3. Review of the draft manual by 10 outside reviewers (DEP, Boards of Health or their agents, engineers and sanitarians);
4. Completion of the Design Guidance Manual; and
5. Distribution and presentation of the Manual to DEP staff and all Massachusetts Boards of Health through free mailing and workshop presentations.

Cost: $43,089

Funding: $25,402 by the US Environmental Protection Agency
$177,687 by the University of Massachusetts

Duration: 1999 - 2001

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-08/319

99-08/319: Mill River Watershed Restoration Project

NPS Category: Watershed Restoration Project
Investigator: Franklin Regional Council of Governments
Location: Connecticut Watershed

Description:
This project will permanently stabilize portions of the Mill River riverbank using soil bioengineering techniques. This will prevent erosion which currently threatens the Whately Water Department's water supply well and a monitoring well and will preserve the values of the natural stable stream form. Because of the difficulties associated with siting and developing any water supply source, and the lack of a clear alternative site for the Whately Water Department, relocating the wells would be difficult. In addition, a cut through the meander bend at this location may establish a pattern of instability that will spread upstream as a "head cut" resulting from the change in gradient brought about by the channel shortening. Repair of the bank will not only protect a critical drinking water supply, but it will also prevent what is now a localized instability from spreading through the watershed.

Tasks:
1. Develop a request for proposals to design, permit and construct appropriate soil bioengineering bank reconstruction on the eroded streambank;
2. Construct the soil bioengineering bank stabilization features;
3. Inspect the streambank annually for vegetation viability and project stability according to standard protocols approved by DEP; and
4. Conduct a technology transfer workshop organized jointly by the FRCOG and the Whately Water Department, with handout and presentation materials prepared by both parties.

Cost: $62,875

Funding: $37,600 by the US Environmental Protection Agency
$25,275 by the Town of Whately

Duration: 1999 - 2001

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-09/319

99-09/319: Demonstration of Best Management Practices to Control Agricultural Nonpoint Source Pollution

NPS Category: Agriculture
Investigator: Massachusetts Department of Food and Agriculture
Location: Statewide

Description:
This project will demonstrate how successful implementation of Best Management Practices (BMP's) and farm plans by farmers in targeted watersheds can prevent, control and abate the generation of agricultural nonpoint source pollution.

Tasks:
1. administering an agricultural nonpoint source pollution control program;
2. providing farmers with the knowledge and technical assistance necessary to identify nonpoint source generating activities; and
3. providing technical assistance to farmers to voluntarily implement BMP's.

Cost: $100,963

Funding: $62,238 by the US Environmental Protection Agency
$38,725 by the Massachusetts Department of Food and Agriculture

Duration: 1999-2000

FEDERAL FISCAL YEAR 1999
SECTION 319 NPS PROJECT 99-11/319

99-11/319: Innovative Stormwater Technology Monitoring Initiative

NPS Category: Urban Runoff
Investigator: Massachusetts Department of Environmental Protection and Office of Coastal Zone Management
Location: Statewide Massachusetts

Description:
This project will develop and implement a comprehensive monitoring program to evaluate specific installations of innovative stormwater BMPs. Results and information obtained through the monitoring initiative will be used to develop informational outreach materials for public dissemination and to inform municipal officials and others about BMP selection and application.

Tasks:
1. Convene Innovative Stormwater Technology (IST) working group.
2. Identify innovative BMP technologies and specific installations for inclusion in the initiative and obtain construction certifications from proprietary technology vendor;
3. Develop a Quality Assurance Project Plan (QAPP) and QA/QC criteria and protocols for each application. For each technology and installation a QAPP will be developed and submitted to US EPA for approval. Technical protocols, currently being developed by the STEP program, Guidance for Quality Assurance Project Plans currently being developed by the MA DEP Massachusetts Watershed Initiative Program, and an existing US EPA approved QAPP for an ongoing proprietary stormwater technology BMP monitoring initiative, will be utilized to facilitate and expedite protocol development;
4. Initiate and conduct water quality sample collection and analysis;
5. Develop and distribute IST catalogue. Results and information obtained from this monitoring initiative will be developed into a user-friendly informational catalogue for distribution. Catalogue recipients will be Conservation Commissions, department of Public Works Staff, Local and Regional Planners, Local and Governance Committees. This catalogue will be provided to the Massachusetts Bays Program (MBP) and the Natural Resource Conservation Service (NRCS) Massachusetts Community Assistance Partnership (MassCAP) for informational outreach material.
6. Prepare final report evaluating each technology assessed.

Cost: $195,000

Funding: $110,000 by the U.S. Environmental Protection Agency
$85,000 by the Office of Coastal Zone Management

Duration: 2000-2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-01/319

00-01/319: Implementing the Diagnostic/Feasibility Study Recommendations for Onota Lake

NPS Category: Watershed Restoration
Investigator: Berkshire Regional Planning Commission
Location: Housatonic Watershed

Description:
This project will implement in-lake and watershed management techniques recommended in a comprehensive Diagnostic/Feasibility Study prepared by International Technology Corporation for Onota Lake. This comprehensive approach will reduce the immediate impacts from accelerated eutrophication as well as control the causes of that eutrophication. The project builds upon prior implementation activities and demonstrates the strong support and commitment the City of Pittsfield has made to improving water quality in this important recreational water body. The overall goal of abating the accelerated eutrophication of Onota Lake will be accomplished through the continued implementation of in-lake restoration and watershed management measures to reduce nutrient and sediment loading. Implementation of these measures will improve water quality, improve fish habitat, and improve recreational use of the lake.

Tasks:
1. Short-circuit nutrient rich water entering the lake from north basin tributaries by installing a culvert under the Thomas Island causeway;
2. Evaluate long-term changes in water quality in the lake and measuring pre- and post-installation impacts of bridge culvert installation through a volunteer monitoring program;
3. Decrease the density and distribution of aquatic weeds through a comprehensive weed control program;
4. Decrease the contribution of stormwater-related pollutants and sediments through stormwater retention/detention basins;
5. Reduce soil transport and subsequent lake filling from existing erosion sties, including erosion sites in Burbank park, through an erosion control program; and
6. Prevent and reduce nutrient inputs into the lake through a public education/ involvement/outreach program.

Cost: $283,900

Funding: $167,000 by the US Environmental Protection Agency
$6,000 by the Berkshire Regional Planning Commission
$104,950 by the City of Pittsfield
$5,950 by the lake Onota Preservation Association

Duration: 2000-2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-02/319

00-02/319: Alternative Septic System Test Center Project Monitoring II

NPS Category: Demonstration Project/Groundwater
Investigator: CZM Buzzards Bay Project
Location: Buzzards Bay Watershed/Statewide

Description:
This project will continue the monitoring of contaminant removal by twenty-one wastewater systems at the Alternative Septic System Test Center at the Massachusetts Military Reservation undertaken in project 99-01. The monitoring will produce a scientifically valid body of data which will be disseminated to state regulators, local boards of health, installers and consumers through trade shows, newspaper articles, site visits, and through Website coverage. Project goals continue to be to: provide verified, comparable data for regulatory decision making; speed approval of technologies which have advanced contaminant removal, particularly nitrogen; increase the variety of alternative systems approved to provide greater siting flexibility and thus reduce the cost to consumers and benefit the environment; and provide needed baseline data about the conventional system's contaminant removal capabilities.

Tasks:
1. Monitor six alternative and one conventional onsite wastewater technologies in triplicate for BOD, fecal coliform, TSS ammonium nitrate+nitrite, total dissolved nitrogen, particulate nitrogen and carbon, orthophosphate and total phosphorus. Monitoring will be done in accordance with an EPA-approved sampling protocol.
2. Conduct outreach to disseminate monitoring program results through:
    - at least one NE Onsite Wastewater Trade Show co-sponsored by the BBP;
    - two onsite information tours of the test facility for local, state and regional regulators;
    - publication of two articles about the Test Center in local newspapers and journals
    - posting information about the Test Center on the BBP website
    - Report on types, uses and performance characteristics of conventional and alternative systems

Cost: $190,500

Funding: $112,500 by the US Environmental Protection Agency
$41,400 by the Massachusetts Environmental Trust
$7,200 by the Barnstable County Health and Environment Department
$11,000 by the Center for Marine Science and Technology
$4,800 by the Cape Cod Community College
$5,000 by technology vendors

Duration: 2000 - 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-03/319

00-03/319: Development of a Rapid Field Test for the Quality of Stone Aggregate in Onsite Septic Systems

NPS Category: Demonstration Project/Groundwater
Investigator: Barnstable County Department of Health and the Environment
Location: Buzzards Bay Watershed/Statewide

Description:
This project will develop and/or validate a simple field test for quality of stone aggregate used in the soil absorption portions of onsite septic systems. The overall goal is to encourage the production of better quality aggregate. Involvement of both industry and regulatory entities at critical points in the research will help ensure useful results.

Project goals are to promote the use of aggregate that will maximize the life of soil absorption systems and meet the intent of Title 5, to determine the validity of the various simple field tests predicting the level of fine-textured material in aggregate samples, and to correlate the findings of simple field tests with the actual level of impairment to the leaching facility imparted by the level of fines observed. Other goals include refining the test for aggregate such that the result will indicate an appropriate level of "clean" that is neither too restrictive/cost prohibitive, nor too lenient as to decrease the life of a leaching facility, and producing a guidance document that will describe the appropriate methodology for testing aggregate in the field and to provide training workshops for its use.

Tasks:
1. Research existing rapid tests for quality of stone aggregate used in onsite septic system leach fields;
2. Develop a methodology for testing the quality of aggregate. In this context, aggregate testing means actually testing/observing what effect the aggregate quality has on the percolation rate of the soil it is installed in;
3. Construct scaled-down leach fields that can be loaded with liquid effluent at a rate comparable to the of Title 5 in order to conduct full-scale tests of stone aggregate quality;
4. Conduct tests on 30-40 loads of aggregate, including all appropriate rapid field tests and actual full-scale tests so that the results of the rapid field test and full-scale tests can be correlated, and the most useful and accurate field tests can be identified; and
5. Conduct at least six workshops demonstrating the best methods for testing aggregate in the field.

Cost: $28,500

Funding: $17,000 by the US Environmental Protection Agency
$11,500 by the Barnstable County Health and Environment Department

Duration: 2000 – 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-04/319

00-04/319: Connecticut River Watershed Restoration - Phase II

NPS Category: Watershed Restoration/Demonstration Project
Investigator: Franklin Regional Council of Governments
Location: Connecticut Watershed

Description:
The project will continue bioengineering streambank stabilization begun as an earlier 319 project (Connecticut River Watershed Restoration 96-03). Streambank stabilization will be done at the Turners Falls Power Pool, extending from Turners Falls to the Vermont/New Hampshire border, which is experiencing severe erosion. In this regional severe erosion is increasing nonpoint source pollution in an important anadromous and freshwater fisheries habitat, is causing the loss of prime agricultural land and the loss of woody riparian buffer habitat used by migratory birds, eagles and other wildlife. Bioengineering techniques using native vegetation and natural materials to stabilize the eroding sites will be employed. The project will also include continued monitoring of the previously completed stabilization project funded through the 319 program. The project goals are to build on the success of the previous Connecticut River bioengineering projects in restoring and stabilizing severely eroding streambanks, and to show the effectiveness of "soft" bioengineering as an alternative to riprap and conventional shoreline armoring.

Tasks:
1. Repairing approximately 1000 linear feet of eroded streambank using bioengineering techniques. This will include site selection design preparation, permitting selection of contractor and supervision of design construction and installation;
2. Developing an EPA-approved Quality Assurance Project Plan for monitoring of the bioengineered sites;
3. Monitoring the sites from pre-construction through evaluation of the project's initial and long-term success, and for continued maintenance. Monitoring will be conducted at least on a quarterly basis following installation; and
4. Technology transfer for resource and regulatory professionals who may be interested in applying similar techniques at other locations. Outreach will include site tours, a poster session at the MACC annual meeting, creation of a website describing the use of bioengineering for streambank restoration and informational materials including a cost analysis and written project summary.

Cost: $480,716

Funding: $178,971 by the US Environmental Protection Agency
$10,745 by the Franklin Regional Council of Governments
$291,000 by the Western Massachusetts Electric Company

Duration: 2000 – 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-05/319

00-05/319: Atlas of Stormwater Discharges

NPS Category: Stormwater/Technical Assistance
Investigator: CZM Buzzards Bay Project
Location: Buzzards Bay Watershed

Description:
This project will prepare, print and disseminate a "user friendly" *Atlas of Stormwater Discharges* for the Buzzards Bay. The *Atlas* will then be used for an outreach program designed to assist Buzzards Bay communities in preparing grant application to the DEP 319 and MCZM CPR grant programs to mitigate stormwater discharges into the Bay. The completed *Atlas* will provide communities and EOEA Watershed Teams with a valuable tool for determining where stormwater mitigation projects will provide the "most bang for the buck".

The project is an important first step in implementing the Buzzards Bay Comprehensive Conservation and Management Plan (CCMP), one of the first comprehensive watershed management plans to be completed in the Commonwealth. One of the priority management issues identified in the CCMP is control and remediation of stormwater discharges impacting the water quality of Buzzards Bay. Investigations by the Buzzards Bay Project and Division of Marine Fisheries have identified stormwater runoff as the primary factor in most of the Bay's shellfish bed closures. Today, more than 10,000 acres of shellfish beds in Buzzards Bay are closed to harvest due to elevated levels of fecal coliform bacteria with a subsequent loss of economic opportunity to coastal communities. Due to the unique nature of the Buzzards Bay coastline, restoration of Bay water quality is highly dependent on localized remediation of stormwater runoff.

Tasks:
1. Compile available water quality data for Buzzards Bay;
2. Complete and distribute the *Atlas of Stormwater Discharges* on paper and in digital form to local DPW's conservation Commissions, Boards of Health, Planning Boards, Regional Planning Agencies, advocacy groups, watershed organizations and state and federal transportation agencies;
3. Use the *Atlas* to identify areas in need of additional water quality monitoring;
4. Use the *Atlas* to assist local communities and other organizations to identify priority sites for stormwater remediation.

Cost: $41,000

Funding: $25,000 by the US Environmental Protection Agency
$16,000 by the Massachusetts Environmental Trust

Duration: 2000 - 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-06/319

00-06/319: Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution

NPS Category: Technical Assistance
Investigator: University of Massachusetts/Amherst
Location: Blackstone, Buzzards Bay, Chicopee, Connecticut, Deerfield, Farmington, Hoosic, Housatonic, Ipswich, Merrimack, Nashua, North Coastal, South Coastal, Taunton and Westfield Watersheds

Description:
The crop, dairy and livestock industries are important contributors to the Massachusetts economy through the services and industries they support. Dairy and livestock farmers also contribute to maintaining open space in the Commonwealth by managing 134,000 acres of hay, pasture, and silage. This open space is important to both non-farm residents and tourism. However, on a typical dairy farm there is often an over-supply of farm nutrients on crop land, particularly nitrogen (N), together with phosphorus and potassium, from excess application of dairy manure and from crop residues and commercial fertilizer. This creates a significant nonpoint source pollution risk for both ground and surface waters. This project's goal is to reduce the risk of nonpoint source pollution from dairy farms through development of nutrient management plans for 15-25 dairy farms and through the voluntary adoption of BMPs by farmers. The project will establish an inter-agency advisory committee, conduct educational workshops and meetings, produce educational tools and materials, conduct on-farms demonstrations and educational programs, and provide technical assistance to farmers.

Tasks:
1. Establish an Inter-agency Advisory committee to advise and assist in project design, Agency and farmer involvement, management, data collection, and program implementation;
2. Conduct one to two educational workshops each year providing information on soil basics, manure management, whole-farm nutrient planning, and best management practices for nutrients, pesticides and biosecurity;
3. Develop worksheets, computer programs and educational materials for nutrient management planning;
4. Develop customized nutrient management plans for 15 to 25 farms each year and implement the recommended BMP's; and
5. Implement on-farm demonstration and educational programs for farmers.

Cost: $250,718

Funding: $149,431 by the US Environmental Protection Agency
$101,287 by the University of Massachusetts/Amherst

Duration: 2000 - 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-07/319

00-07/319: Town of Acton Nonpoint Source Control Program

NPS Category: Subwatershed/Demonstration Project
Investigator: Town of Acton
Location: SuAsCo Watershed

Description:
The Town of Acton must implement a Watershed Trading Program developed in 1998 to be considered for an EPA NPDES permit to discharge treated wastewater effluent to the Assabet River. EPA has set a goal of 3:1 for this project, meaning that for every pound of phosphorous discharged into the river from the treatment plant, 3 pounds must be prevented from entering the waterway via nonpoint sources. Acton's Watershed Trading Program recommends both structural and non-structural stormwater BMPs in order to achieve the necessary reductions in phosphorous loading. The project will provide a valuable test case for trading programs that are being promoted as one means available to communities to meet the requirements of the Phase II Stormwater NPDES Program which will become effective over the next few years. The first portion of the project will implement stormwater BMPs to demonstrate that phosphorous reduction can be achieved to the level required under the trading program. The second portion of the project will also focus on mitigation of phosphorus in surface waters. The Town's newly created 9-acre public swimming pond has relatively high background phosphorous concentrations. The Town will construct a pond/wetland recirculation system that will be used to reduce background phosphorus levels in the pond in an effort to prevent phosphorous levels from reaching a point that would support the growth of nuisance levels of algae and macrophytes.

Tasks: To be completed as part of the BMP implementation portion of this project include:
1. Identification of specific sites where the Town has access and resources to install BMPs;
2. Sampling of stormwater runoff to establish pre-BMP water quality;
3. Construction of BMPs;
4. Sampling of stormwater runoff to establish post-BMP water quality; and
5. Documentation of the project's success and to reach the Watershed Trading Program's goals.

Tasks: To be completed as part of the pond recirculation portion of this project include:
1. Design and construction of the wetland recirculation system
2. Design and construction of a handicap accessible trail and viewing area
3. Completion of a demonstration project manual; and
4. Development and production of public education materials.

Cost: $177,740

Funding: $106,644 by the US Environmental Protection Agency
$71,096 by the Town of Acton

Duration: 2000 – 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-08/319

00-08/319: Long Pond Restoration Project, Littleton, MA

NPS Category: Watershed Restoration/Inlake
Investigator: Town of Littleton
Location: SuAsCo Watershed

Description:
Eutrophication of Long Pond has led to extremely dense macrophyte growth along the shoreline of the pond, with subsequent degradation of its recreational uses. Restoration of the recreational and aesthetic values of the pond are overall goals of this project. The water quality impacts of storm drains and septic systems are probably factors in the accelerating rate of eutrophication in the pond, and so will be targeted in this project along with implementation of inlake watershed restoration measures. The project is a Phase II (implementation) project for pond restoration. The goal is to restore water quality and recreational value of Long Pond through the implementation of a watershed management program identified in a 1990 Diagnostic/Feasibility Study. The recommended short-term elements of the program include removal of nuisance plants via macrophyte hydro-raking and installation of bottom barriers in selected areas. Long-term recommendations include installation of a treatment system (detention basin) designed to reduce nutrient and suspended sediment inputs to Long Pond, a watershed maintenance program, and development of an educational program aimed at the abutters and users of Long Pond. The educational program will include information on the use and misuse of storm drains, septic system maintenance and upgrades, restrictions on lawn fertilization, protection of shoreline integrity, and disposal of organic material in waterways. Finally, the project will include development of regulations and water resource bylaws to control development on pre-existing undersized lots within the Long Pond watershed.

Tasks

1. Develop a QAPP for pre- and post-construction water quality monitoring;
2. Conduct macrophyte hydro-raking along the northeastern embayment;
3. Install benthic barriers at the deeper regions around the town beach to prevent encroachment by future macrophyte growth and keep the public swimming area intact;
4. Design and construct a stormwater detention basin/lagoon system;
5. Conduct at least one educational workshop and distribute approximately 5,000 educational brochures to residents on the concepts of "urban housekeeping" in the Long Pond watershed.

Cost: $313,000

Funding: $185,000 by the US Environmental Protection Agency
$128,000 by the Town of Littleton

Duration: 2000 - 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-09/319

00-09/319: Onset Bay, Wareham, MA, Nonpoint Source Pollution Remediation Project

NPS Category: Watershed Restoration
Investigator: Town of Wareham
Location: Buzzards Bay Watershed

Description:
The northern portion of Onset Bay is closed to shell fishing from May 1st through November 1st, due in large part to fecal contamination associated with stormwater runoff. The 1989 report entitled *Sanitary Survey Report of Onset Bay in the Towns of Bourne and Wareham* identified fecal contamination as the principal contributing factor in shellfish area closures in the area. The Town of Wareham has made substantial investment to sewer the Onset and Point Independence areas and so has virtually eliminated failing or substandard septic systems as a source of fecal contamination to the Bay. The Town has also undertaken a comprehensive stormwater management program and has made significant progress in remediating stormwater discharges at several problem area in town. This project will address four stormwater outfalls that discharge directly into Onset Bay from South Boulevard and the Onset Town Pier.

The goals of the project are to upgrade the seasonally closed shell fishing areas of Onset Bay and to mitigate the direct stormwater discharges located at public beaches along South Boulevard. Remediation efforts at the four stormwater discharges will concentrate on subsurface infiltration of the "first flush" or the first one-half inch of runoff from a precipitation event. Soil conditions at the sites are mapped as Carver coarse sands with water tables expected to be in excess of six to ten feet below grade. These soils are excellent for stormwater infiltration and will provide a high degree of treatment. Critical catch basin structures will also be upgraded to provide deep sumps, hoods and pipes to infiltration chambers. All improvements will occur on town-owned land.

Tasks:
1. Develop a QAPP for pre- and post-construction water quality monitoring;
2. Design and construct stormwater remediation BMP's for four stormwater outfalls;
3. Conduct pre- and post-construction water quality monitoring;
4. Conduct public outreach about the project through public hearings and local newspaper coverage; and
5. Conduct at least one educational workshop and distribute educational brochures to area residents on the concepts of sound "urban housekeeping" and the potential sources of fecal contamination to Onset Bay.

Cost: $218,000

Funding: $130,800 by the US Environmental Protection Agency
$87,200 by the Town of Wareham

Duration: 2000 – 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-10/319

00-10/319: Shaw's Plaza Drainage Nonpoint Source Pollution Management

NPS Category: Stormwater/Groundwater
Investigator: Town of Sharon
Location: Taunton Watershed

Description:
The project will develop and implement an NPS pollution management plan for the Shaw's Plaza parking lot drainage system located in the Billing Brook subbasin in Sharon. The management plan is needed to control untreated, unfiltered contaminants from the parking lot that currently discharge directly into Billings Brook. The discharge is located ¼ mile from one of Sharon's public water supply wells, and within 1 ½ miles of another of Sharon's public water supply wells, and four public water supply wells for the Town of Foxboro. Water from the parking area has an impact on the water quality of Billing's Brook, an impact on the health of the wetlands that recharge the six nearby public water supply wells, and perhaps on the quality of the drinking water from the municipal wells.

Due to the configuration of the parking lot site and ownership of the adjacent lands, it is difficult to treat the runoff using the traditional methods of above ground detention, settling and velocity reduction. Therefore, it is anticipated that in-ground stormwater treatment technologies will be used on the site.

Tasks:
1. Develop a methodology to determine and implement appropriate stormwater BMP's to control runoff from the Shaw's Plaza parking lot;
2. Construct a drainage system with all identified BMP's and including oil/gas separator type catch basins and infiltrators;
3. Develop a maintenance program designed to ensure continued proper functioning of the drainage system and BMP's, and
4. Initiate a public-education program on the concepts of sound "urban housekeeping" and potential impacts of NPS contaminants from roads and parking lots on downstream resources.

Cost: $48,500

Funding: $26,000 by the US Environmental Protection Agency
$22,500 by the Town of Sharon

Duration: 2000 – 2002

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-12/319

00-12/319: Salisbury Pond Resource Restoration

NPS Category: Resource Restoration
Investigator: City of Worcester Parks, Recreation and Cemetery Department
Location: Blackstone River Watershed

Description:
Salisbury Pond is experiencing rapid filling due to sedimentation from upstream development and urban runoff. Several studies have been done on Salisbury Pond, including a 1987 D/F study and a 2000 MA DEP sediment investigation. A draft TMDL identified high phosphorus levels as the cause of high algal blooms and aquatic macrophytic vegetation. Contaminated sediment and high bacteria counts have also been problematic.

The project will design and install a structural BMP at the pond's main inlet to reduce phosphorus and sediment entering the pond. Two sediment chambers will be installed in upstream tributaries, with an anticipated 80% reduction in grit and oil. A steering committee will meet monthly to provide project oversight and facilitate public participation in the project.

Tasks:
1. Design, permitting and construction of structural best management practices at the main inlet to Salisbury Pond;
2. Design and construction of two underground sediment/contaminant removal systems in two subwatersheds, the Park Avenue outfall and the Weasel Brook subwatershed;
3. Maintenance of BMPs and sediment/contaminant removal systems;
4. Development and implementation of a DEP- and EPA-approved QAP; and
5. Outreach and education through storm drain stenciling and an educational kiosk.

Cost: $ 297,000

Funding: $174,000 by the U.S. EPA
$14,000 by Worcester Polytechnic Institute
$1,000 by the Regional Environmental Council
$8,000 by the Mill Brook Task Force
$15,000 by the Worcester Parks Department
$4,000 by Massachusetts Audubon Society
$5,000 by Tighe and Bond
$61,500 by the Worcester DPW
$9,000 by the Norton Company
$1,000 by Frost Manufacturing
$3,000 by the MA Dept. of Public Health

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-13/319

00-13/319: Implementation of Nutrient Management Standards on Massachusetts Crop/Livestock Farms to Reduce the Risk of Nonpoint Source Pollution

NPS Category: Agriculture
Investigator: UMass/Amherst
Location: Statewide

Description:
The goal of this project is to reduce the risk of nonpoint source pollution from crop/livestock farms through implementation of best nutrient management practices by farmers. This project complements and builds upon a current 319 grant, Project 00-06, "Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution." The new grant will use the tools developed in the current program to further work with farmers and encourage their participation in Comprehensive Nutrient Management Planning.

Tasks:
1. Coordination of an inter-agency and farmer advisory committee;
2. Publication of written standards and guidelines for nutrient management practices;
3. Summary of available resources including educational materials, Internet resources, and a list of trained nutrient management planners;
4. Case studies based on development and implementation of nutrient management plans on selected farms;
5. Regional educational workshops and meetings for farmers and professionals; and
6. On-farm demonstrations of nutrient planning and best management practices.

Cost: $289,192

Funding: $154,620 by the U.S. EPA
$134,572 by the University of Massachusetts

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-14/319

00-14/319: Forestry Best Management Practices (BMP) Implementation Monitoring Protocol Project

NPS Category: Forestry
Investigator: Massachusetts Department of Environmental Management
Location: Westfield Watershed and Statewide

Description:
The purpose of the project is to develop a forestry BMP monitoring protocol for use in evaluating and monitoring the effectiveness of BMPs in controlling NPS pollution, in conjunction with forest harvesting operations conducted under the state's Forest Cutting Practices Act, Ch. 132 s. 40-48. Tasks include development of assessment methods to evaluate the effectiveness of BMPs contained in the Massachusetts BMP Manual, which are required in the MA Forest Cutting Practices Regulations. This will result in the development of performance standards for forestry BMPs. A draft field manual will be developed explaining the measurement and interpretation procedures. Field surveys on completed harvests in the Westfield watershed will be conducted to test the monitoring protocol, and the manual will be adjusted based on those findings.

The project is consistent with Forestry Actions/Implementation efforts outlined in the Massachusetts Nonpoint Source Management Plan, Volume I, p. 46. As forestry activity is generally regarded to be a source of nonpoint source pollution, particularly phosphorus, the development of performance standards and a rigorous investigation into the effectiveness of forestry BMPs will greatly enhance efforts to implement TMDLs in forested watersheds.

Tasks:
1. Development of reliable assessment methods for evaluating forestry BMPs;
2. Development of performance standards for forestry BMPs;
3. Field surveys on completed harvests in the Westfield Basin to test the protocols and assessment methods being developed and tested; and
4. A field manual explaining the BMP evaluation procedures and performance standards.

Cost: $118,203

Funding $70,922 by the U.S. EPA
$47,281 by the Massachusetts Department of Environmental Management

Duration: 2002 – 2005

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-15/319

00-15/319: Revision of the Massachusetts Nonpoint Source Management Manual

NPS Category: General
Investigator: GeoSyntec Consultants
Location: Statewide

Description:
The purpose of this consultant contract is to develop and republish a nonpoint source pollution (NPS) management guide for municipal officials on behalf of the Department of Environmental Protection. The Massachusetts Nonpoint Source Management Manual (Manual) was originally published in 1993. The Manual described nonpoint source pollution problems that cause degradation of water quality. The Manual also identified and explained the human activities and multiple land uses associated with NPS pollution problems. Management alternatives for NPS problems were covered in terms of applicable federal, state, and local regulatory programs and appropriate Best Management Practices (BMPs). The Manual was written and designed to be user friendly to local officials who have limited knowledge or training in NPS pollution control. Although the Manual is still useful to local officials, the information is dated and incomplete. The scope of the literature and research on NPS issues has broadened considerably since publication of the Manual, and a great deal of new material is available on the topic. In addition, new regulatory and funding programs such as the Stormwater Management Policy, the Rivers Protection Act, the Total Maximum Daily Load (TMDL) Program, National Pollution Discharge Elimination Program (NPDES), Phase II, the Source Water Protection Program, the 319 and 604b competitive grant programs, and the State Revolving Funds have been established to address NPS problems. Consequently, revisions to the Massachusetts NPS Manual must reflect current knowledge of the subject and new or revised regulatory programs. The revised Manual will be restructured to maximize accessibility of information in electronic format as well as in print. The project deliverable is a nonpoint source management manual for Massachusetts municipal officials, based on the 1993 Massachusetts Nonpoint Source Management Manual. Revisions to the Manual will reflect current knowledge of the subject and must include information about new regulatory programs and funding options, still in a user-friendly format. The final product will be produced in three versions: hard copy, CD ROM, and Web-based.

Tasks:
1. Development of a revised Massachusetts Nonpoint Source Management Manual in three versions: hard copy, Web-based, and CD-ROM; and
2. A distribution plan that will identify a strategy for effective distribution and evaluation of the revised Manual.

Cost: $149,943

Funding: $89,966 by the U.S. EPA
$2,500 by GeoSyntec Consultants
$57,477 by the Massachusetts Department of Environmental Protection

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-16/319

00-16/319: Lake Wyola TMDL Implementation Project

NPS Category: Resource Restoration
Investigator: EOEA, Division of Conservation and Recreation (formerly Department of Environmental Management)
Location: Connecticut Watershed

Description:

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

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

Tasks:

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

Cost: $124,201

Funding: $74,100 by the US EPA
$41,351 by EOEA/DCR
$8,750 by the Town of Shutesbury

Duration: 2004 – 2007

FEDERAL FISCAL YEAR 2000
SECTION 319 NPS PROJECT 00-17/319

00-17/319: Local Development of Stormwater Best Management Practices on Residential Property: Overcoming Barriers to Implementation

NPS Category: Urban Runoff/Outreach and Education
Investigator: EOEA: DFWELE/Riverways
Location: Connecticut, South Coastal Watersheds

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

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

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

Cost: $109,645

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

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-01/319

01-01/319: Lake Cochituate, Snake Brook NPS Remediation, Phase I

NPS Category: Watershed Restoration
Investigator: Department of Environmental Management
Location: SuAsCo (Concord) Watershed

Description:
The project is Phase I of a larger plan to rehabilitate Lake Cochituate. BMP's will be installed to reduce the heavy loads of sediment in Snake Brook, and ultimately Lake Cochituate. Lake Cochituate is a large, high-profile, multiple-use water body in need of restoration. This project will begin to address the sedimentation and nutrient loading from a major inflow (Snake Brook) that have accelerated eutrophication in the lake. It will result in measurable reduction in sediment and nutrient loading to Lake Cochituate prior to determining if dredging will be needed at the mouth of the brook. If dredging is ultimately needed, this project will help ensure that repeated dredging is not required. The project goal is to mitigate sediment and nutrient loads from the Snake Brook watershed by decreasing loading coming from stormwater. This can restore the recreational, habitat and aesthetic values that have been lost due to sedimentation where Snake Brook enters Lake Cochituate. Project success will be measured through pre-and post-project water quality monitoring. The water quality monitoring program will be designed to measure key indicators of nutrient and sediment loading, including total phosphorus, total suspended solids and turbidity.

Tasks:
1. Design and construction of a detention pond and wetland enhancement immediately east of where Snake Brook enters Lake Cochituate;
2. Design and construction of a detention pond and wetland enhancement for the drainage channel in the watershed;
3. Design and installation of five stormwater filtration basins along a subwatershed stormwater drain system;
4. Develop a GIS map of the stormwater drainage system within the Snake Brook watershed;
5. Pre- and post-construction water quality monitoring, and;
6. Public education campaign.

Costs: $235,346 (over $200,000 for design and construction of BMP's, $12,000 for outreach $5,000 for monitoring)

Funding: $129,500 by US Environmental Protection Agency
$85,950 by the MA Department of Environmental Management
$17,600 by the Town of Natick
$1,816 by the Town of Wayland
$480 in volunteer labor

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-02/319

01-02/319: Boat Waste Oil Recovery Program for New Bedford Harbor

NPS Category: Demonstration Project
Investigator: Coastal Zone Management Buzzards Bay Project
Location: Buzzards Bay Watershed

Description:
The project implements a portion of the Buzzards Bay CCMP by recovering 30,000 gallons of oil per year. It includes recycling, educating and getting support from commercial vessel operators, marinas and oil retailers, and achieving 100% compliance with Waste Oil Recycling permitting requirements. The proponent estimates that the project will prevent 100,000 gallons of oil from entering New Bedford Harbor and reduce the US Coast Guard's need to respond to chronic small oil spills in the Harbor. The project addresses a difficult problem, i.e. small oil spills are hard to trace to individual boats and fishermen are notoriously hostile toward participating in programs that include regulation or fees. The waste oil recovery facility is a proven technology (it has been used in Texas) that will remain in place after this grant expires. This project compliments a waste oil recovery project aimed at recreational boat owners that is currently funded through the CZM CCRP Program.

The success of this project will be evaluated based on:

- The number of gallons of hydrocarbon collected through recycling and reclamation;
- The percentage of oil sold that is recycled and accounted for;
- The percentage of oil retailers accepting oil, which have obtained Waste Oil Recycling permits;
- Any bylaws or regulations adopted to facilitate oil recovery; and,
- The number of oil sheen incidents that the US Coast Guard must respond to annually.

Tasks:

1. Construction of the oil reclamation and recycling facility;
2. Operation and maintenance of the facility;
3. Coordination of a Waste Oil Recovery Program with the New Bedford Harbor Development Commission;
4. Coordination and promotion of an enhanced voluntary recycling program for commercial vessels; and,
5. Conducting workshops and outreach to improve compliance with Hazardous Waste and Waste Oil regulations.

Cost: $300,000 ($230,000 for design, construction and operation of the facility $70,000 for Coordinator salary and outreach activities

Funding: $147,000 by US Environmental Protection Agency
$51,000 by the City of New Bedford
$96,000 by the New Bedford Harbor Development Commission
$1,000 by Coastal Zone Management
$5,000 by the Buzzards Bay Project

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-03/319

01-03/319: Parker Pond Restoration, Gardner

NPS Category: Watershed Resource Restoration
Investigator: City of Gardner
Location: Millers Watershed

Description:
The project will fund part of Gardner's program to restore the warm water fishery and recreational potential of Parker Pond. It will address stormwater discharges by installing three Vortex units and a phytoremediation system at a large stormwater discharge point. The larger program to restore the pond includes funded efforts to increase street sweeping, line 650 feet of a major storm drain, and reconstruct the outlet structures and seal the berm of Parker Pond Dam. The Army Corps of Engineers and Gardner are developing plans to dredge about seven feet of soft sediment to return the pond to a depth of ten feet. The City of Gardner has already demonstrated its commitment to rehabilitating the pond. The ACOE will not proceed with dredging the pond until sediment and nutrient controls are in place in the contributing watershed. This grant will enable a community that has few resources for this type of project to pursue measure that can leverage ACOE participation in the dredging that will restore a recreational and fisheries resource for the City.

The anticipated result of this grant project is to reduce excessive sediment, nutrient and related pollutant loading entering Parker Pond in stormwater from the Wasa Street drainage area. The project proponents anticipate removing 70-90% of sediments from stormwater entering the Vortex units during the first flush of a rainstorm (based on information provided by the manufacturer). Research sited by the proponent estimates that phosphorus removal through the phytoremediation system will be 50%.

Tasks:
1. Design, permit and install three Vortex stormwater treatment units;
2. Design, permit and construct a stormwater phytoremediation system at the outlet of Wasa Street;
3. Increase the frequency of street sweeping and stormdrain maintenance in downtown Gardner; and
4. Conduct an outreach and public education program.

Cost: $330,000 ($307,000 for design, permitting and construction of BMP's,
$12,000 for water quality monitoring $6,000 for increased street
sweeping and stormdrain maintenance$ 5,000 for outreach and education

Funding: $198,000 by the US Environmental Protection Agency
$132,000 by the City of Gardner

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-04/319

01-04/319: Massachusetts Buffer Manual and Demonstration Projects

NPS Category: Demonstration Project
Investigator: Berkshire Regional Planning Commission
Location: Housatonic/Farmington Watersheds

Description:
The project will promote vegetated buffers as an effective and attractive way to minimize NPS pollution. It includes writing and promoting a "Buffer Manual" modeled after Maine's highly regarded manual and installing five demonstration projects. The demonstrations will be at a wetland site (Berkshire Botanical Garden, Stockbridge), a recreational site (Big Pond, Otis), a riverbank site (Housatonic River, Great Barrington), a vernal pool (Kennedy Park, Lenox), and a lakefront site. There is an audience and a need for this type of Massachusetts-specific manual accompanied by successful demonstration sites. Vegetated buffers minimize NPS pollution by lowering runoff velocity, trapping sediment, filtering pollutants and absorbing nutrients. However, property owners who desire the typical mowed lawn down to the banks of a lake or stream are often reluctant to maintain or create a buffer that they perceive might impair their access or view of the water. Property owners will more readily accept buffers if they understand the need for buffers and can witness "real life" demonstration projects that show that buffers can be designed to function both as water quality BMP's and as attractive landscape features.

Project success will be evaluated in two ways:

- The overall effectiveness of the demonstration sites will be documented and evaluated through photographing pre- and post-buffer conditions, calculating the increase in vegetative cover and recording the survival rate of the plants over a one-year span.
- Landowner and Conservation Commission views on buffers will be documented and evaluated through surveys of workshop participants. Surveys will also be sent to a wider audience of landowners and Conservation Commissions to develop a more complete profile of public attitudes.

Tasks:

1. Researching, drafting and distributing the Buffer Manual;
2. Designing, installing and monitoring five demonstration buffers; and
3. Conducting outreach and public education through workshops and on-site demonstrations.

Cost: $147,440 ($51,000 for development and production of the manual and outreach and education $96,000 for installation of demonstration buffers)

Funding: $84,759 by the US Environmental Protection Agency
$50,127 by demonstration site owners
$2,554 by the MA Department of Environmental Management
$10,000 by the MA Watershed Initiative

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-05/319

01-05/319: Evaluation of Phosphorus Removal in Onsite Septic Systems

NPS Category: Demonstration Project
Investigator: Barnstable County Department of Health and the Environment
Location: Buzzards Bay and all watersheds

Description:
The project will test a minimum of four different onsite septic technologies that purport to remove phosphorus and test the efficacy of installing phosphorus-removing reactive media beneath standard septic systems. The project also includes a report on the feasibility of scaling up the tested technologies to serve small clustered areas of development and the potential for using small packaged treatment plants for removing phosphorus from wastewater. The goal is to develop proven options for reducing phosphorus inputs to freshwater bodies from onsite septic systems. Testing will be done at the Massachusetts Alternative Septic System Test Center.

This research project will support implementation of Total Maximum Daily Loads (TMDL) of phosphorus to freshwater bodies that do not meet water quality standards. All information that can be used to reduce phosphorus inputs will be vital in implementing lake TMDL's in coming years. It will also further the goals of the Department's Title 5 Program that approves alternative onsite septic systems and alternatives to onsite septic systems where appropriate.

Tasks:
1. Install four or five technologies and test influent and effluent bi-weekly for one year for orthophosphate, total phosphorus, alkalinity, pH, temperature and dissolved oxygen (technologies to be tested are the Wallax System, the PHOSPHEX, the Waterloo Biofilter, the Krafta Compact Clarifier and one other yet to be identified);
2. Field test at least three different media for their ability to enhance phosphorus removal when installed beneath standard septic systems;
3. Prepare a report that presents options for the control of phosphorus inputs to surface water from septic systems, placing all options in perspective and in context with present state regulations;
4. Conduct an educational and outreach program, including workshops for Boards of Health and lake associations and publication of research results.

Cost: $89,358
$60,000 for installation and testing of alternative technologies and media
$16,200 for laboratory costs
$13,000 for report preparation and educational program

Funding: $53,139 by the US Environmental Protection Agency
$22,500 by the owners of the alternative septic technologies to be tested
$13,719 by the Barnstable County Department of Health and the Environment

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-06/319

01-06/319: Memorial Pond Restoration, Phase I

NPS Category: Watershed Resource Restoration
Investigator: Town of Walpole
Location: Boston Harbor (Neponset) Watershed

Description:
The project is the first phase of a larger plan to rehabilitate Memorial Pond in Walpole. Stormwater BMP's (sediment forebays followed by constructed wetlands or extended swales/detention ponds) will be built at two stormwater discharges (Stone Street and East & Diamond Streets) that were identified in *Memorial Pond Investigation and Management Plan* (1999) as major sources of sediment and nutrients to the Pond.
It will result in measurable reduction in sediment and nutrient loading to Memorial Pond prior to undertaking a planned dredging project to remove sediments and nuisance aquatic vegetation in the pond. Nonpoint source pollutant inputs will be addressed first to help ensure that repeated dredging is not required. The outlet to the pond will also be rebuilt to allow future drawdowns needed to control nuisance aquatic vegetation.

The project goal is to mitigate sediment and nutrient loads in Memorial Pond by decreasing loading coming from stormwater. This will maintain the pond as an important aesthetic feature in the Town. Project success will be measured through pre-and post-project water quality monitoring. The water quality monitoring program will be designed to measure key indicators of nutrient and sediment loading, including total phosphorus and total suspended solids. Actual measured performance of the stormwater BMP's will be compared to both the predicted performance of the BMP's based on their design, and the performance of similar stormwater BMP systems reported in the literature.

Tasks:
1. Design, construct and monitor stormwater BMP's (sediment forebays followed by constructed wetlands or extended swales/detention ponds) at Stone Street and at East and Diamond Streets;
2. Prioritize additional storm discharges for treatment;
3. Design and construct a modified pond outlet structure with drawdown capability.

Cost: $199,950
$132,000 for design and construction of BMP's
$14,500 for assessment of additional stormwater discharges
$5,500 for pre- and post-construction monitoring
$3,000 for education and outreach

Funding: $119,950 by the US Environmental Protection Agency
$80,000 by the Town of Walpole

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-07/319

01-07/319: Wareham NPS Remediation Program: East River, Broad Cove, Muddy Cove

NPS Category: Subwatershed Project
Investigator: Town of Wareham
Location: Buzzards Bay Watershed

Description:
The northern portion of Onset Bay is closed to shell fishing from May 1st through November 1st, due in large part to fecal contamination associated with stormwater runoff. The 1989 report entitled *Sanitary Survey Report of Onset Bay in the Towns of Bourne and Wareham* identified fecal contamination as the principal contributing factor in shellfish bed closures in the area. The Town of Wareham has made substantial investment to sewer the Onset and Point Independence areas and so has virtually eliminated failing or substandard septic systems as a source of fecal contamination to the Bay. The Town has also undertaken a comprehensive stormwater management program and has made significant progress in remediating stormwater discharges at several problem areas in town. This project will install stormwater BMP's (i.e.; deep sump catch basins, infiltration chambers and possibly Stormtreat systems) at seven stormwater outlets in Onset village. The BMP's will be installed on town land in the road right-of-way at one site at the East Avenue boat ramp, four sites along North Boulevard, one site at the Stone Bridge Marina and one site off of East Boulevard. The project augments previous projects undertaken by the Town of Wareham to remediate stormwater impacts to local shellfish beds. The work done in this project will be upstream of work done as part of another 319-funded project (00-09) which addressed four stormwater outfalls that discharge directly into Onset Bay and a similar project funded through the CZM CPR Program.

The goals of the project are to upgrade the seasonally closed shell fishing areas of Onset Bay, protect swimming beaches along Onset Bay and begin remediation of estuarine resources in the Bay by reducing fecal coliform entering Onset Bay. Project success will be monitored through pre- and post-construction water quality monitoring at the stormwater discharge points and through ongoing water quality sampling performed by the Massachusetts Division of Marine Fisheries. Positive effects should be immediately observable as each outlet is remediated. Reducing fecal coliform pollution and improving the health of the shellfish stock will be the ultimate gauge of success for this project.

Tasks:
1. Design, permitting and construction of BMP's for seven discharge locations; and
2. Pre- and post-construction water quality monitoring.

Cost: $455,000 ($ 30,000 for BMP design$ 5,000 for permitting, $410,000 for BMP Construction $ 10,000 for pre- and post-construction monitoring)

Funding: $273,000 by the US Environmental Protection Agency
$182,000 by the Town of Wareham

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-08/319

01-08/319: Gray's Beach Park Restoration, Kingston

NPS Category: Watershed Restoration Project
Investigator: Town of Kingston
Location: South Coastal Watershed

Description:
This project is part of Kingston's 2000 Stormwater Project that seeks to install stormwater BMP's at a number of sites to improve water quality in the Jones River, Kingston Bay and Plymouth Bay. This phase of the overall project is the redesign of the Gray's Beach Park recreation area and will reduce soil erosion and the resulting pollution caused by stormwater runoff. BMP's to be installed include swales, sand filters, curbing and deep sump catch basins. Anticipated environmental benefits will be to treat and redirect stormwater away from the Kingston's only public swimming beach and to begin the work needed to reopen the shellfish beds in Kingston Bay that have been closed for several years. This project compliments the NPS reductions from ongoing sewer installation in the Rocky Nook area of Kingston and from a nonpoint source pollution remediation project funded through the CZM CPR Program. Success of the project will be evaluated through continued water quality monitoring and monitoring for erosion and scouring at the boat ramp and boardwalk area. Short-term environmental improvements include improved water quality in Kingston Bay and Gray's Creek, improved water quality at the public swimming area, elimination of erosion at the beach and boat ramp. Long-term improvements that are expected from the overall stormwater management program include reopening the closed shellfish beds. Project completion will be marked by a clambake.

Tasks:
1. Site preparation where sand filters and swales will be constructed;
2. Design and install deep sump catch basins near the boat ramp;
3. Regrade recreational lawn area and design and construct water quality swales and drainage channel parallel to the beach;
4. Install curbing;
5. Regrade beach area and design and construct boulder retaining wall and dunes;
6. Design and construct sand filter to treat stormwater before outfall, and;
7. Conduct pre- and post-construction water quality monitoring.

Cost: $226,105 ($ 18,000 for project design, $206,905 for recreational area reconstruction ($97,100 for direct stormwater remediation efforts) $1,200 for pre- and post-construction monitoring

Funding: $75,000 by the US Environmental Protection Agency
$90,825 by the Town of Kingston
$60,280 by sources to be determined

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-09/319

01-09/319: Nashawannuck Pond Restoration, Phase II

NPS Category: Watershed Resource Restoration
Investigator: City of Easthampton
Location: Connecticut Watershed

Description:
Over the past twenty years Nashawannuck Pond, a large, multiple-use water body within Easthampton, has been reduced in size by sedimentation caused by residential development and road maintenance. Heavy phosphorus loading resulting from the constant sediment loading is accelerating aquatic weed growth and eutrophication in the pond. This project will implement recommendations from the 1990 Diagnostic/Feasibility study and build upon previous activities to improve the water quality of the pond. Stormwater BMP's (3-6 Vortechs Systems, improving eight catch basin systems and purchasing a vacuum maintenance system for cleaning the Vortechs units) will be installed on Broad Brook to reduce sediment and nutrient loads to Nashawannuck Pond. This project will expand on work done to stabilize the banks of Nashuwannuck Pond proper in project 98-05. Success of the project will be measured in the long-term by the reduction of sediment in Nashawannuck Pond. Indicators of success in the short-term will be improved water quality measured through the pre- and post-construction water quality monitoring program, and through and analysis of the weight and composition of the sediments removed from the catch basins and Vortechs systems.

Tasks:
1. Design and install three to six Vortechs units along the eastern shoreline of the pond and at two road crossing on Hendrick Street on Broad Brook;
2. Design and install eight deep-sump catch basins between Holyoke Street and the pond;
3. Purchase a maintenance system for the Vortchs units;
4. Prepare an educational video detailing the project;
5. Conduct a training forum for regional Departments of public Works; and,
6. Conduct pre- and post-construction water quality monitoring.

Cost: $171,420
$142,000 for design and installation of BMP's
$18,200 for water quality monitoring
$6,700 for outreach and technology transfer

Funding: $102,852 by the US Environmental Protection Agency
$12,600 by the Pioneer Valley Planning Commission
$55,968 by the City of Easthampton

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-10/319

01-10/319: TMDL Implementation, Watershed Assessment & Work Plan Development

NPS Category: Subwatershed
Investigator: to be determined
Location: Various Watersheds

Description:
This project will be the first step in implementing approved TMDL's. The Department will identify up to three specific waterbodies per year that have completed and approved TMDL's and that have a suite of implementation measures that appear to be technically and practically feasible in the near term. As the first step in implementation, the Riverways Program will join DEP as a partner to conduct tributary/lake watershed assessment surveys for these waterbodies. This project will also work to develop a process for building a capable volunteer network within a watershed to conduct assessment surveys in other watersheds in the future as more TMDL's are completed and approved.

Tasks:
1. Organize watershed volunteer groups;
2. Conduct volunteer training sessions based DFWELE's Shoreline Survey Training;
3. Oversee watershed field surveys and compile the results;
4. Draft scopes and schedules for putting the TMDL's recommendations in place;
5. Work with stakeholders to identify potential funding sources; and
6. Begin to put remedial measures (both structural and nonstructural) in place.

Cost: $145,000

Funding: $100,000 by the US Environmental Protection Agency
$ 45,000 through investigator

Duration: 2001-2003

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-12/319

01-12/319: Cranberry Bog Phosphorus Dynamics for TMDL Development

NPS Category: TMDLs
Investigator: University of Massachusetts Cranberry Experiment Station
Location: Statewide

Description:
This project will study phosphorus dynamics in selected Massachusetts cranberry bogs to assist the Department in formulating Total Maximum Daily Load (TMDL) performance standards.

Specifically, this project will: (1) determine phosphorus and nitrogen import and export from representative cranberry beds associated with water management, including floods, irrigation, and rain events; (2) determine nitrogen and phosphorus export from a natural freshwater wetland; (3) determine phosphorus and nitrogen export from beds where phosphorus fertilizer rates are reduced to less than 20 lb. phosphorus/acre; and (4) determine the impact of reduction in phosphorus fertilization on cranberry sustainability.

Tasks:
1. Preparation of a Quality Assurance Project Plan (QAPP);
2. Select and study six bogs and one natural wetland reference site;
3. Determine water and nutrient budgets;
4. Perform soil nutrient and tissue analysis;
5. Monitor crop yields and crop quality; and
6. Conduct field fertilizer plot experiments.

Cost: $288, 040

Funding: $187,197 by the U.S. Environmental Protection Agency
$100, 843 by the University of Massachusetts

Duration: 2001-2004

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-13/319

01-13/319: Lake Buel Implementation and Demonstration Project

NPS Category: Resource Restoration
Investigator: Berkshire Regional Planning Commission
Location: Housatonic Watershed

Description:
Lake Buel is 303d listed for nutrient impairment. A D/F study completed for the lake in 1982 indicates that a large volume of the total annual phosphorus load enters from the northern inlet. Several other subsequent studies have also addressed the impairment problems at Lake Buel, particularly the infestation of non-native aquatic species related to excess nutrients/phosphorus. Many of the recommendations of those studies have already been implemented, including weed harvesting and water quality monitoring.

This project seeks to implement remaining recommendations of the D/F study and the 1997 MADEP Water Quality Assessment.

Tasks:
1. Monitor water quality and develop a QAPP;
2. Design and install one or more stormwater BMPs at the north cove inlet;
3. Conduct a plant replacement project to establish *Chara*, a native non-nuisance species, as a replacement for the currently dominant milfoil;
4. Design and install one or more stormwater BMPs at the public boat ramp;
5. Develop a septic system maintenance program for the Lake District; Develop drainage standards for subdivisions in watershed communities;
6. Conduct annual weed harvesting; and
7. Develop and conduct an outreach and education program.

Cost: $164,846

Funding: $98,346 by the U.S. Environmental Protection Agency
$2,000 by the Berkshire Regional Planning Commission
$16,000 by the Massachusetts Public Access Board
$48,500 by the Lake Buel Restoration Preservation District

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-14/319

01-14/319: Pontoosuc Lake Watershed Resource Restoration Project

NPS Category: Urban Runoff
Investigator: Town of Lanesborough
Location: Housatonic River Watershed

Description:
This project builds upon a FFY 99 s319 project (99-03) to implement recommendations of a 1999 D/F study. Three other reports have also been completed, each documenting the problems at Pontoosuc Lake. Several recommendations from those studies have been implemented to date. This project will install a stormwater BMP that was designed under the previous grant. In addition, areas of erosion near the BMP locations will be stabilized to prevent sedimentation from entering the lake. The Housatonic Valley Association will conduct a storm drain stenciling and public outreach program to help watershed residents understand the role they can play in reducing NPS, and an ongoing weed harvesting program will be continued.

Tasks:
1. Installing a stormwater BMP in a priority location;
2. QAPP development and water quality monitoring;
3. Stenciling storm drains;
4. Erosion control;
5. Weed harvesting; and
6. Implementing source controls.

Cost: $93,883

Funding: $55,990 by the U.S. EPA
$31,455 by the Town of Lanesborough
$750 by the Housatonic Valley Association
$5,000 by the Berkshire Regional Planning Commission
$688 by the Housatonic EOEA Watershed Team

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-15/319

01-15/319: Implementing a Stormwater Remediation Strategy at Ashmere Lake

NPS Category: Resource Restoration
Investigator: Town of Hinsdale
Location: Housatonic Watershed

Description:
Ashmere Lake is 303d listed for noxious aquatic plants. Several studies have identified problems at the Lake and have recommended solutions. This project seeks to implement a comprehensive stormwater remediation strategy recommended by studies to prevent sedimentation from gravel roads and prevent the spread of non-native aquatic species. The Town will be supported by the Berkshire Regional Planning Commission in carrying out this project.

Tasks:
1. Develop a QAPP and conduct pre-and post-construction monitoring;
2. Design and install BMPs for road runoff diversion and treatment;
3. Prepare an operation and maintenance plan and program for catch basin maintenance;
4. Conduct an outreach and technology transfer program that includes a storm drain stenciling program, signage at lake access points, and training for municipal officials using the NEMO model;
5. Develop a lake management plan; and
6. Conduct in-lake treatment of non-native invasive aquatic plant species.

Cost: $175,926

Funding: $104,610 by the U.S. EPA
$66,020 by the Town of Hinsdale
$2,250 from the Berkshire Regional Planning Commission
$3,046 from the Housatonic Valley Association

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-16/319

01-16/319: Plymouth Road Stormwater Treatment System

NPS Category: Urban Runoff
Investigator: Town of Bellingham Department of Public Works
Location: Charles River Watershed

Description:
The Charles River is 303d listed in several locations for multiple pollutants including nutrients, organics, low dissolved oxygen, and pathogens. The Town's Comprehensive Water Resources Management Plan indicates that overland stormwater runoff plays a large role in the degradation of Charles River water quality.

This project will install a stormwater treatment system consisting of a degritter, oil/water separator, and infiltration trenches at the outfall to the Charles River on Plymouth Road. This system is anticipated to reduce the discharge of first flush TSS to zero and remove 80% of TSS for the 2-year 24-hour storm. The infiltration feature of the BMP will recharge groundwater upstream of the outfall to help maintain flows during dry weather.

Tasks:
1. Develop a QAPP and conduct pre- and post-water quality monitoring;
2. Design and construct a stormwater treatment system; and
3. Develop and implement an outreach and technology transfer program.

Cost: $79,960

Funding: $45,000 by the U.S. EPA
$34,960 by the Town of Bellingham

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-17/319

01-17/319: North Green Stormwater Management Project

NPS Category: Urban Runoff
Investigator: Town of Ipswich Department of Public Works
Location: Ipswich River Watershed

Description:
The North Green area is located in downtown Ipswich, adjacent to the Ipswich River. There is no enclosed drainage system in this area, and stormwater runoff sheet-flows into the Ipswich River. Two studies prepared for the Town of Ipswich conclude that urban runoff is the largest contributing factor to stormwater pollution in the Ipswich River.

The goal of this project is to treat stormwater from the North Green area before it enters the river. This will be accomplished by constructing a closed drainage system in the area, consisting of deep sump catch basins, catch basins with outlet hoods, and Stormceptor/Vortechs units. It is anticipated that 80% of TSS will be removed from the stormwater prior to discharge into the River. Matching funds will come from Coastal Pollution Abatement Funds and from local Ch. 90 money, as well as in-kind contributions from the Town.

Tasks:
1. Develop a QAPP and conduct pre- and post construction water quality monitoring;
2. Field survey of the project area;
3. Environmental permitting;
4. Engineering, design and construction of a closed drainage system; and
5. Outreach and technology transfer.

Cost: $398,548

Funding: $228,000 by the U.S. EPA
$50,000 by the Massachusetts Coastal Zone Management
$120,548 by the Town of Ipswich, including $62,000 of Chapter 90 funds

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-18/319

01-18/319: Lagoon Pond Runoff Renovation Project

NPS Category: Urban Runoff
Investigator: Town of Oak Bluffs
Location: Islands Watershed

Description:
Lagoon Pond receives direct discharge of untreated stormwater at three locations. Fecal coliform bacteria is a known pollutant carried by this runoff. Nitrogen, phosphorus, and BOD typical of residential stormwater are also suspected to be present. A Lagoon Pond study funded by 604(b) identified this situation as needing corrective action.

The project will infiltrate and thereby treat the first flush of stormwater from the three sources to remove bacteria, BOD, and phosphorus. This will be accomplished by installing catch basins and infiltration systems designed to capture the first flush of stormwater.

Tasks:

1. Construction of runoff interception, infiltration and treatments systems at three subwatersheds; sites: Vineyard Avenue, Lagoon Road, and Hudson Avenue; and
2. Outreach and technology transfer through placement of educational signage at each project area and regular press releases.

Cost: $122,745

Funding: $73,030 by the U.S. EPA
$48,966 by the Town of Oak Bluffs
$750 by the Dukes Conservation District

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-19/319

01-19/319: Oldham and Furnace Pond Stormwater Treatment

NPS Category: Urban Runoff
Investigator: Town of Pembroke
Location: South Coastal Watershed

Description:
A 1993 D/F study found high levels of nutrients and invasive aquatic vegetation in both Oldham Pond and Furnace Pond. Stormwater impacts were also noted in the study. A subsequent DEM study made specific recommendations for stormwater BMPs.

This project will implement structural and non-structural BMPs to prevent the key pollutant, phosphorus, from entering the ponds. This will be done by converting twenty-nine catch basins to leaching catch basins; cleaning, widening, and revegetating a drainage ditch; and strengthening local controls on sedimentation and erosion.

Tasks:
1. Design, permitting and construction of stormwater best management practices at twenty-nine locations;
2. Modification of town sedimentation and erosion control bylaws and regulations;
3. A DEP- and EPA-approved QAPP for monitoring the effectiveness of the BMPs; and
4. Development and distribution of educational brochures targeted to watershed residents about lawn care and fertilizer use, pet waste, and waterfowl management. Letters will be sent to lawn care professional encouraging conservative application of fertilizers in the watershed.

Cost: $194,448

Funding: $116,669 by the U.S. EPA
$77,779 by the Town of Pembroke

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-20/319

01-20/319: Lake Attitash Stormwater Treatment Program

NPS Category: Resource Restoration
Investigator: Town of Amesbury
Location: Merrimack Watershed

Description:
Lake Attitash is a 360-acre natural lake used for recreation. Water quality in the Lake has been a problem for several years, evidenced by algae and weed growth as well as beach closures. Previous studies have indicated that stormwater is a significant contributor to the water quality problems.

Based on recommendations from a DEM-funded study, this project focuses on implementation of structural and non-structural stormwater BMPs in one of the largest direct drainage contribution areas of Lake Attitash. Three direct discharges will be treated by one structural BMP, consisting of a series of baffle tanks designed to reduce velocity and trap sediment.

Tasks:
1. DEP and EPA approved QAPP to determine the effectiveness of the BMPs;
2. Design, permitting and installation of stormwater best management practices at three direct discharges into the Lake; and
3. A half-day seminar to present project results to watershed residents, and others.

Cost: $163,675

Funding: $98,205 by the U.S. EPA
$65,470 by the Town of Amesbury

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-21/319

01-21/319: Lake Quinsigamond and Lake Ripple Restoration Project

NPS Category: Resource Restoration
Investigator: Lake Quinsigamond Commission
Location: Blackstone River Watershed

Description:
Water quality in Lake Quinsigamond and Lake Ripple has degraded due to increased urban runoff and nutrient loading, as identified in the TMDL for Lake Quinsigamond and a 1987 D/F study. Lake Quinsigamond is 303d-listed for nuisance aquatic plants and organic enrichment/low dissolved oxygen. Lake Ripple suffers from high salt and sand runoff from Routes 122 and 140. No TMDL has been done for Lake Ripple, but the grantee feels it would be unlikely to meet clean water standards.

The project will implement structural and nonstructural BMPs to address NPS pollution, primarily phosphorus, in the Lake Quinsigamond watershed, and sediment loading in Lake Ripple. This project is identified as a priority in the Blackstone River Basin FY 2001 EOEA Watershed Team Workplan.

Tasks:
1. Water quality sampling;
2. Design and installation of a sediment removal BMP for Lake Ripple;
3. Stream bank restoration in the Quinsigamond River;
4. Mapping of storm drains into Lake Quinsigamond and Flint Pond;
5. Installation of a phosphorus and sediment removal BMP for Lake Quinsigamond; and
6. Removal of sediment under Route 20 at Half Moon Bay.

Cost: $405,000

Funding:
- $243,000 by the U.S. EPA
- $67,500 Shrewsbury Engineering Dept.
- $25,740 Graves Engineering/Town of Grafton
- $4,360 Lake Quinsigamond Commission
- $3,000 Shrewsbury Highway Dept.
- $3,000 Grafton DPW
- $13,800 Town of Shrewsbury
- $24,800 MA Environmental Trust
- $2,000 Shrewsbury Health Dept
- $6,000 Students/Grafton H.S. and Shrewsbury H.S.

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-22/319

01-22/319: Stormwater Management Plan at the Millyard Marketplace

NPS Category: Urban Runoff
Investigator: Town of Sturbridge
Location: Quinebaug Watershed

Description:
Impervious parking area around the Millyard Marketplace, which is adjacent to the Quinebaug River, causes flash flooding during storm events. In addition, stormwater runoff from the parking lot contributes non-point source pollution directly into the River. This project focuses on implementing BMPs that will abate the flash flooding and improve the water quality of discharge at the Marketplace.

BMPs to be implemented include construction of 250 linear feet of low-gradient trough around portions of the parking area that will detain sediment, and 440 linear feet of low-gradient, serpentine grassed waterway that will remove fines and nutrients. A vortex-type BMP will be installed to treat stormwater flowing from the storm sewer at Route 20, and a concrete sediment basin will be installed at the Route 20 outlet pipe. Two new catch basins will be installed to better control the Route 20 stormwater. A new public park will be created that will include an educational kiosk. This is a priority project in the FY 2002 French/Quinebaug EOEA Watershed Team Plan.

Tasks:
1. Planting swales and filter strips to slow runoff into the river;
2. Removal and relocation of a parking lot and widening of the existing buffer;
3. Installation of improved drainage from Route 20;
4. Renovation of an existing detention basin to improve volume and filtration capacity; and
5. Creation of a new public park with education kiosk.

Cost: $86,660

Funding: $51,660 by the U.S. EPA
$35,000 by the Massachusetts Turnpike Authority

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-23/319

01-23/319: Demonstration of Innovative Stormwater Management Retrofit Systems

NPS Category: Urban runoff
Investigator: Center for Urban Watershed Renewal
Location: North Coastal Watershed

Description:
The project seeks to demonstrate the feasibility of retrofitting existing urbanized landscapes with best management systems that will increase infiltration rates, provide filtering mechanisms for stormwater runoff, and improve the water quality of runoff. The project will install a volume dependent stormwater retention planter, a vegetated infiltration system, and a vegetated roof at two sites on the North River in Salem.

Tasks:
1. Prepare a final design for the stormwater retrofitting systems;
2. Site preparation for installation of stormwater management retrofitting systems;
3. Construction of stormwater management retrofitting systems, including volume-dependent stormwater retention planters; vegetated infiltration systems; structural support for vegetated roofs; and vegetated roofs;
4. Preparation and implementation of QAPP for monitoring pre- and post- construction effectiveness of BMPs; and
5. Technology transfer including production of a documentary video, open houses, seminar and training session, and final report relating project details.

Cost: $175,370

Funding: $85,637 by the U.S. EPA
$89,733 by The Bioengineering Group, Inc.

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-24/319

01-24/319: Storm Water System Maintenance and Residuals Waste Handling

NPS Category: Urban Runoff
Investigator: City of Quincy
Location: Boston Harbor Watershed

Description:
Storm water runoff is negatively impacting the natural and recreational resources at Wollaston Beach. Chronic bacteria problems cause frequent swimming advisories and have a negative impact on surrounding marsh areas. Stormwater from eight outfalls discharges directly onto Wollaston Beach. The City has developed a five-year capital plan to restore water quality at Wollaston Beach. The plan includes eliminating sources of pollution by upgrading sewer and storm drains.

The project seeks to obtain a Beneficial Use Determination for catch basin residuals. Disposal of catch basin residuals is a statewide problem that will grow more serious with the onset of Phase II Stormwater requirements, and development of a BUD is seen as the first step toward solving the problem on a statewide basis. Anticipated results include development of guidelines for other cities and towns seeking to use a similar strategy for disposal of this material. Ideally, the quality of catch basin residuals can be related to land use surrounding the catch basin, enabling development of a set of standard land use-based protocols.

Tasks:
1. Assessment of city stormwater collection procedures including development and implementation of a DEP- and EPA-approved QAPP;
2. Development of an operation and maintenance plan for the existing collection system;
3. Construction of a processing area for catch basin residuals; and
4. Development of additional Beneficial Use Determinations based on collected data.

Cost: $143,389

Funding: $85,535 by the U.S. EPA
$57,854 by the City of Quincy

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-25/319

01-25/319: 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:
This project will continue to operate and maintain the very successful Massachusetts Alternative Septic System Test Center located at the Otis Air National Guard Base on Cape Cod. MASSTC monitors the contaminant removal capabilities of conventional and alternative wastewater treatment systems. This provides a body of verified, comparable data about the effectiveness of these systems, which is disseminated to state regulators and local officials. With this project, the MASSTC seeks to continue its current operation while expanding the program to accept and test as many other new technologies as possible. In addition, the MASSTC is open as a training and educational facility to various groups who wish to observe first-hand the systems that are undergoing evaluation.

Tasks:
1. Conducting regular facility operations;
2. Solicitation, testing, research, and development of new on-site technologies;
3. Data analysis and synthesis into report format;
4. Tours and educational outreach for Test Center visitors, including regulators, municipal officials, contractors, realtors, engineers, designers, and others; and
5. General outreach and education including presentations, workshops, and the publication of articles.

Cost: $250,273

Funding: $150,164 by the U.S. EPA
$100,109 from Vendors, through the ETV program

Duration: 2002 - 2005

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-26/319

01-26/319: Massachusetts Estuaries Project

Investigator: University of Massachusetts-Dartmouth
Location: Southeastern Coastal Massachusetts

Description:
This project will begin to implement the Linked Watershed Embayment Model Approach in 89 coastal estuaries in Southeastern Massachusetts for TMDL development.

Tasks:
1. Develop a Quality Assurance Project Plan;
2. Collect data and implement the Linked Watershed Embayment Approach in 20 embayments;
3. Provide technical assistance and training for municipalities and volunteer groups;
4. Conduct Linked Model training;
5. Conduct public participation; and
6. Report results.

Cost: $2,172,000

Funding: $706,187 from US EPA
$198,813 from state and local funds
$1,267,000 other non-federal match

Duration: 2002-2008

FEDERAL FISCAL YEAR 2001
SECTION 319 NPS PROJECT 01-27/319

01-27/319: Beaver Brook Culvert Rehabilitation and Improvements to Beaver Brook Park

NPS Category: Resource Restoration
Investigator: City of Worcester
Location: Blackstone Watershed

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

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

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

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

Cost: $433,334

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-01/319

02-01/319: Indian Lake Watershed Resource Restoration

NPS Category: Urban Runoff
Investigator: City of Worcester Department of Public Works
Location: Blackstone Watershed

Description:
Indian Lake is the largest body of water located completely within the City of Worcester. The Lake's 2000-acre watershed area is heavily urbanized. Over the past 50 years, development within the Mill Brook watershed has increased dramatically, which has caused water quality problems. Sedimentation and high phosphorus loads have led to eutrophication of the Lake with 303d listed impairment of water quality from low dissolved oxygen, nuisance aquatic plants, and organic enrichment. This project is part of a comprehensive effort to improve water quality and recreational opportunities at Indian Lake and in the surrounding watershed by treating polluted urban stormwater runoff, which results in sedimentation and nutrient inputs to the Lake and its tributaries. Structural Best Management Practices (BMPs) will be installed to remove sediment and nutrients from stormwater entering the Lake, while public outreach and education will help to reduce watershed contaminants at the source.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Design and installation of a series of structural Best Management Practices (BMPs) to prevent contaminated runoff from reaching the Lake;
4. Conducting minor repairs to the impoundment dam;
5. Implementation of a long-term weed control plan;
6. Development and implementation of a long-term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
7. Outreach and education to stakeholders.

Cost: $437,900

Funding: $253,000 by the U.S. EPA
$3,000 City of Worcester Department of Public Health
$103,060 City of Worcester Department of Public Works
$6,400 City of Worcester Parks, Recreation and Cemetery Department
$57,290 Indian Lake Watershed Association
$1,500 Morgan Construction/Norton Co.
$1,000 Regional Environmental Council
$5,000 Tighe and Bond
$5,150 Worcester Polytechnic Institute

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-02/319

02-02/319: Wall Street Highway Yard Stormwater Improvements Project

NPS Category: Urban Runoff
Investigator: City of Attleboro
Location: Ten Mile Watershed

Description:
The City of Attleboro's Wall Street Highway Yard is a 6.6-acre parcel on the banks of the Ten Mile River. There is currently no treatment or buffer for stormwater runoff from the highway facility. The drainage system from the highway yard discharges directly into the River from two outfalls and two overland flow locations. Documented water quality data for similar facilities shows that oil and grease, automotive fluids, sediment, metals, nutrients, and toxic chemicals are among the nonpoint source pollutants likely to be found in runoff from the site. The site directly abuts the Ten Mile River, which is 303d listed for toxicity, metals, nutrients, organic enrichment/low dissolved oxygen, and pathogens.

The goal of this project is to improve water quality and the physical and biological health of the riparian corridor at this site by implementing structural and non-structural Best Management Practices to reduce non-point source pollution entering the Ten Mile River from this location.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Work at several locations to implement installation of six new storm drain inlet catch basins;
4. Construction of a bioretention facility and swale;
5. Improved overland drainage into infiltration systems;
6. Installation of vegetated riparian buffers;
7. Development and implementation of a long term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
8. Education of facility users about BMPs to be used on-site.

Cost: $260,825

Funding: $155,975 by the U.S. EPA
$104,850 by the City of Attleboro

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-03/319

02-03/319: Stormwater Management on the Middle Pond of the Congamond Lakes

NPS Category: Urban Runoff
Investigator: Pioneer Valley Planning Commission
Location: Westfield Watershed

Description:
The Congamond Lakes are three interconnected ponds: North, Middle, and South Ponds. Together, the three ponds are approximately three miles long and up to one-third of a mile wide, with a total surface area of 465 acres. The Congamond Lakes are 303d listed for noxious aquatic plants. The Lakes are heavily used for recreational purposes, and the eutrophication of the Lakes has become a deterrent to recreation as well as a potential health hazard.

The purpose of this project is to address the quality of street runoff entering Middle Pond of the Congamond Lakes from the Berkshire Avenue Sub-basin drainage area. A diagnostic/feasibility study conducted in 1983 recommended stormwater management measures, including structural Best Management Practices as well as watershed controls for source reduction of pollutants.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Design and construction of a detention basin with a water quality swale;
4. Removal of accumulated in-lake sediment;
5. Development of stormwater control bylaws;
6. Development and implementation of a long term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
7. On-site technical assistance for watershed residents.

Cost: $155,435

Funding: $92,935 by the U.S. EPA
$62,500 by the Town of Southwick

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-04/319

02-04/319: Implementing Nonpoint Source BMPs at Richmond Pond

NPS Category: Urban Runoff
Investigator: Town of Richmond/Richmond Pond Association
Location: Housatonic Watershed

Description:
Richmond Pond is a 218-acre water body that is listed as impaired by noxious aquatic plants (invasives) in the 1997 DEP water quality assessment report. The Pond is heavily used for recreation by residents and by several camps. The heavy weed growth impairs swimming and boating on the Pond. Results of a 1990 Diagnostic/Feasibility study indicate that the installation of structural and non-structural dirt road best management practices, installation of buffers along shoreline and tributary corridors, and installation of detention basins at tributary inlets will improve water quality in Richmond Pond, thus helping to control weed growth.

Project goals include implementation of watershed and in-lake BMPs to mitigate NPS, restoration and protection of recreational uses and habitat value, and implementation of D/F recommendations for the elimination and control of invasive aquatics. This project will also implement recommendations from a stormwater assessment report, 99-10/MWI, to address stormwater and erosion around the lake.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Design and install a detention pond;
4. Drainage improvements;
5. Installation of vegetative buffers;
6. Development and implementation of a long-term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
7. Education and outreach work, which will feature brochures and training workshops for watershed residents about buffer design and installation.

Cost: $92,000

Funding: $55,200 by the U.S. EPA
$36,800 by the Town of Richmond

Duration: 2003 – 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-05/319

02-05/319: Neponset River Watershed Bacteria TMDL Implementation Project

NPS Category: Urban Runoff
Investigator: Neponset River Watershed Association
Location: Boston Harbor/Neponset Watershed

Description:
Much of the Neponset River and many of its tributaries fall short of their designated uses for primary and secondary contact recreation due to bacterial pollution. Many point sources of bacterial pollution have been identified and addressed by DEP and NepRWA in the past decade, but mainstem bacteria problems persist. Many tributaries are also included on the 303 d list for other impairments including sedimentation, toxicity, aesthetics, habitat degradation, and temperature. A draft TMDL has been developed for bacteria in the Neponset River. This project seeks to comprehensively implement the recommendations of the draft TMDL, with the goal of abating the worst sources of NPS bacterial pollution and restoring designated uses of the Neponset River.

The project focuses on four major strategies: managing residential stormwater runoff, ensuring proper maintenance of septic systems, detailing sources of NPS bacteria as called for in the TMDL, and a strong outreach and technology transfer component. Project success will be gauged through water quality monitoring, and ultimately by the number of stream segments restored to their designated uses.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-implementation water quality monitoring to document project results;
3. Design and installation of structural BMPs (enhanced wetland, phyto-enhanced buffer, bioretention cells) on Pine Tree Brook;
4. Development and implementation of a long-term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
5. Outreach and education about watershed BMPs and proper septic maintenance.

Cost: $472,152

Funding: $283,005 by the U.S. EPA
$40,577 by the Neponset River Watershed Association
$116,654 by the Town of Milton
31,915 by the Town of Walpole

Duration: 2003 – 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-06/319

02-06/319: Head of Westport Stormwater Project

NPS Category: Urban Runoff
Investigator: Town of Westport
Location: Buzzards Bay Watershed

Description:
In the Town of Westport, the Westport River has 35 miles of shoreline and drains approximately 85% of the town's land area. The river supports an extensive and productive estuarine habitat including over 1000 acres of salt marsh vegetation. Within the estuary, there are approximately 3000 acres of shellfish beds. Two branches of the River, the East Branch and the West Branch, converge at Westport Point to form a single discharge into Buzzards Bay. The tidal component of the East Branch extends from the area known as the Head of Westport to the mouth of the river. The watershed of the East Branch is the larger of the two branches and consists primarily of agricultural and residential land use in the lower region, and forest in the upper part. Currently, the East Branch of the Westport River from Lake Noquochoke to the West branch is 303d listed for pathogens. This bacterial contamination threatens the health of the shellfish beds located within the watershed, causing restrictions on harvesting.

The goal of the project is to improve water quality in the East Branch by reducing nonpoint source pollution at the Head of Westport through implementation of a combination of structural stormwater control Best Management Practices to remove bacteria from the first flush of stormwater, and public outreach and education to watershed stakeholders.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Construction of a sediment forebay for pretreatment of stormwater runoff before discharge into two retention ponds;
4. Construction of a sediment basin to discharge into a constructed wetland;
5. Development and implementation of a long term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
6. Outreach and education to watershed stakeholders in collaboration with the Buzzards Bay Program.

Cost: $444,144

Funding: $g264,332 by the U.S. EPA
$160,441 by the Town of Westport
$19,371 by the Westport River Watershed Alliance

Duration: 2003 – 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-07/319

02-07/319: Lake Singletary Storm Drain Retrofit Program

NPS Category: Urban Runoff
Investigator: Town of Millbury
Location: Blackstone Watershed

Description:
Lake Singletary lies in the towns of Millbury and Sutton. The Lake shows signs of eutrophication, including periodic algae blooms, reduced transparency, and infestation of nuisance aquatic plants. The degraded condition of the Lake impairs recreational and aesthetic values of Lake Singletary. A Diagnostic/Feasibility study and a lake management plan have been completed, with a recommendation that phosphorus loads to the lake must be reduced to slow the eutrophication process. Management options proposed in the lake management plan include stormwater management to reduce sedimentation and nutrient loading.

The Town of Millbury will coordinate with the Town of Sutton and the Lake Singletary Watershed Association to implement BMPs by retrofitting 20 existing stormwater structures and enhancing three wet detention swales and catch basins. Outreach and education will be undertaken by the LSWA, who will carry out such projects as storm drain stenciling, maintaining a web site, and producing a video for local cable access television.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Retrofit of 20 existing catch basins;
4. Repair and enhancement of three wet detention swales and catchment areas;
5. Development and implementation of a long-term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
6. Outreach and education to watershed stakeholders about nonpoint source pollution and water quality issues.

Cost: $134,329

Funding: $70,907 by the U.S. EPA
$53,022 by the Towns of Millbury and Sutton
$10,000 by the Lake Singletary Watershed Association
$400 by the Boy Scouts of America

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-08/319

02-08/319: Hammond Pond Stormwater Management Plan Implementation Phase I

NPS Category: Urban Runoff
Investigator: City of Newton
Location: Charles Watershed

Description:
Hammond Pond is a shallow 22-acre freshwater kettle pond. Its watershed is approximately 167 acres, located in Newton and Brookline. Dominant land use of the watershed (38%, 64 acres) is commercial. The Pond is widely used for recreational and aesthetic purposes including catch and release fishing, bird watching, and canoeing. Hammond Pond is experiencing accelerated eutrophication and bacterial contamination and is 303d listed for noxious aquatic plants. 71% of the Pond's inflow is from rainwater. Stormwater runoff and direct contamination by large numbers of waterfowl are regarded as the primary causes of the impairments.

This project proposes implementation of several high-priority projects that are recommended in an overall master plan. The goal is to treat the greatest amount of runoff possible, with the greatest quantifiable pollutant load removal. The proximity of the site to a very large shopping mall, coupled with the heavy recreational use of the Pond, will maximize the opportunity for outreach and education to stakeholders, as well as the visibility and technology transfer of the Best Management Practices that will be used.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Design, permitting, and installation of Phase I BMPs (bioretention facilities, sand filter, Vortechs unit, buffers, forebay, paving modification)
4. Development and implementation of a long term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
5. Outreach and education to stakeholders about waterfowl feeding and other NPS problems.

Cost: $249,257

Funding: $149,500 by the U.S. EPA
$74,075 by the City of Newton
$12,160 by the Friends of Hammond Pond
$500 by the Chestnut Hill Village Alliance
$1,000 by the Charles River Neighborhood Foundation
$6,022 by the Charles River Watershed Association
$6,000 by the Chestnut Hill Garden Club

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-09/319

02-09/319: Stormwater Remediation for Plymouth Harbor and Plymouth Bay

NPS Category: Urban Runoff
Investigator: Town of Plymouth Department of Public Works/Engineering
Location: South Coastal Watershed

Description:
Plymouth Harbor is listed on the 303(d) list of impaired waters due to bacterial contamination from stormwater runoff. This bacterial contamination has caused beach closures in the Harbor and has contributed to the prohibition of shellfishing in Plymouth Harbor and Plymouth Bay. The Town of Plymouth is undertaking a comprehensive, three-phase program to address bacterial pollution in the area. The first two phases, which are fully funded and underway, are the expansion and improvement of the Plymouth Wastewater Treatment Plant and a new Plymouth Harbor Pump-Out Program. The Pump-Out Program provides a pump-out boat that services recreational vessels in the Harbor and provides a shoreside pump-out facility that can accommodate larger commercial boats and the residential fleet.

This project will fund and implement the third phase of the Town's comprehensive clean-up program. It addresses the impacts of non-point source pollution due to stormwater runoff from the watershed. A substantial amount of study has already been completed by the Town to determine the most appropriate approach to this phase of the work. Three Best Management Practices (BMPs) will be designed and installed in locations that have been selected to provide the maximum amount of remediation. These BMPs will be infiltration stormwater treatment devices for removal of bacteria. Pre-and post-implementation water quality monitoring will be conducted in accordance with a Quality Assurance Project Plan in order to measure and document project success. Development and implementation of an Operation and Maintenance Plan will ensure that the BMPs continue to function properly. The Town will promote outreach and education about this project through a variety of activities including press releases, local events, and through the Town's web site.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Final design and installation of stormwater BMPs in three locations;
4. Development and implementation of a long-term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
5. Outreach and education about the project.

Cost: $435,000

Funding: $249,000 by the U.S. EPA
$186,000 by Town of Plymouth

Duration: 2003 – 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-10/319

02-10/319: Implementation of TMDL Recommendations at Lake Boon

NPS Category: Urban Runoff
Investigator: Lake Boon Commission (Town of Stow)
Location: SuAsCo Watershed

Description:
Lake Boon is a 163-acre great pond located in the towns of Stow and Hudson. The Town of Stow will administer this contract on behalf of the Towns of Stow and Hudson and the Lake Management Commission. The 1000-acre watershed is a mix of forest and residential development, with many lakefront cottages that been converted into year-round homes. The Lake is divided into four basins, the first and largest of which is largely natural. The remaining three basins are man-made as a result of damming of the outlet pond in the mid 1800's. The second, third and fourth basins are overgrown with invasive weeds that have spread considerably in the last decade. Lake Boon is 303d listed for nuisance aquatic plants, and a TMDL for phosphorus is in the final draft stages.

Activities proposed have been recommended in at least one of three studies that have been completed for the Lake. The project goal is to improve water quality in the Lake through installation of structural stormwater treatment devices, and to reduce non-point source pollution at the source by encouraging good practices among watershed residents and stakeholders. An aquatic plant replacement program will also be conducted.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Development and implementation of a long-term operation and maintenance plan to ensure continued effectiveness of the BMPs;
4. Conducting a lake watershed survey;
5. Installation of 26 stormwater BMPs (leaching catch basins);
6. Development and implementation of a septic pumping reminder program;
7. A plant replacement program; and
8. Educational brochures and outreach to stakeholders.

Cost: $143,214

Funding: $84,692 by the U.S. EPA
$49,322 by the Towns of Stow and Hudson
$1,200 from the Lake Boon Commission
$8,000 from the Lake Boon Improvement Association

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-11/319

02-11/319: Wachusett Mountain NPS Pollution Management

NPS Category: Urban Runoff
Investigator: Wachusett Mountain Associates (WMA)
Location: Nashua Watershed

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

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

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

Cost: $161,000

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

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-12/319

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

NPS Category: Resource Restoration
Investigator: Town of North Reading
Location: Ipswich Watershed

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

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

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

Cost: $384,920

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2002
SECTION 319 NPS PROJECT 02-13/319

02-13/319: Mill Creek Estuary Stormwater Mitigation

NPS Category: Urban Runoff
Investigator: Town of Sandwich
Location: Cape Cod Watershed

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

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

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

Cost: $425,518

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

Duration: 2007 – 2010

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-01/319

03-01/319: 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:
This project will continue to operate and maintain the very successful Massachusetts Alternative Septic System Test Center located at the Otis Air National Guard Base on Cape Cod. MASSTC monitors the contaminant removal capabilities of conventional and alternative wastewater treatment systems. This provides a body of verified, comparable data about the effectiveness of these systems, which is disseminated to state regulators and local officials. With this project, the MASSTC seeks to continue its current operation while expanding the program to accept and test as many other new technologies as possible. In addition, the MASSTC is open as a training and educational facility to various groups who wish to observe first-hand the systems that are undergoing evaluation.

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

Tasks:
1. Conducting regular facility operations;
2. Solicitation, testing, research, and development of new on-site technologies;
3. Data analysis and synthesis into report format;
4. Tours and educational outreach for Test Center visitors, including regulators, municipal officials, contractors, realtors, engineers, designers, and others; and
5. General outreach and education including presentations, workshops, and the publication of articles.

Cost: $206,731

Funding: $124,005 by the U.S. EPA
$34,226 by the Barnstable County Dept. of Health and the Environment
$48,500 by technology vendors (ETV program of the US EPA)

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-02/319

03-02/319: Comparison Of Virus Removal In Aggregate Free Chamber Leaching Systems vs. Aggregate Laden Trenches

NPS Category: Land Disposal
Investigator: Barnstable County Dept. of Health and the Environment
Location: Statewide

Description:
In recent years, the Commonwealth of Massachusetts has been petitioned by vendors of chamber-type leaching structures to reduce the required area for soil absorption when their product is used without aggregate. Regulators at the state level are concerned that the higher loading rates of such a system might reduce the virus removal capability as compared to standard aggregate-laden trenches.

The goal of the proposed project is to determine whether aggregate-free leaching systems challenged with the requested loading rates provide the same degree of pathogen removal as aggregate-laden leaching trenches loaded at the rates prescribed in Title 5.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Design and construction of test systems;
3. Monitoring to document project results; and
4. Technology transfer of results through publication of articles, presentation, and two workshops.

Cost: $39,159

Funding: $23,359 by the U.S. EPA
$15,800 to be determined

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-03/319

03-03/319: South Coastal Inter-Municipal Water Quality Improvement Project

NPS Category: Urban Runoff
Investigator: Town of Pembroke
Location: South Coastal, Taunton Watersheds

Description:
This project is part of a multi-community effort to work collectively in reducing stormwater contaminants from entering 15 303d-listed waterbodies in the towns of Pembroke, Hanover, and Hanson. Pembroke is the lead applicant for this cooperative proposal. In 2001, the towns of Pembroke and Hanson jointly purchased a weed harvester, and in 2000 the same towns jointly applied for and received a CPR grant to install several BMPs for the Indian Head River.

The principal activity of this project will be to purchase and share a Johnston 605 PM-10 vacuum street sweeper to remove roadside sediment, nutrients, toxics, and other pollutants that currently enter stormwater infrastructure. A strategic Pavement Cleaning program will be developed to target the 15 303d-listed waterbodies within the boundaries of the three towns. Storm drain markers, signage, and an intensive public education and outreach program will also be implemented under this proposal.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Purchase and operation of the Johnston 605 PM-10 Vacuum Sweeper;
3. Finalization of an intermunicipal agreement for shared operation of the equipment;
4. Development and implementation of a Pavement Cleaning Program to ensure maximum efficiency of the program;
5. Development and implementation of a public outreach and education program for stakeholders;
6. Water quality monitoring to document project results; and
7. Technology transfer with regard to the effectiveness of the pavement cleaning program.

Cost: $356,910

Funding: $211,212 by the U.S. EPA
$186,000 by the Towns of Pembroke, Hanover, and Hanson

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-04/319

03-04/319: Dorothy Pond Perimeter and Local Watershed Stormwater Management/Remediation Proposal

NPS Category: Urban Runoff
Investigator: Town of Millbury
Location: Blackstone Watershed

Description:
Dorothy Pond is an enhanced great pond, approximately 160 acres in size. It is fed by Broadmeadow Brook, with a watershed in the northeast quadrant of Millbury. The Pond is adversely impacted by urban and residential development on the shoreline and in its watershed. Nutrients and sedimentation have caused the Pond to become eutrophic with significant annual growth of nuisance aquatic vegetation. Water quality sampling has demonstrated that nutrient loads and siltation increase significantly during storm events.

The goal of the project is to improve the management of stormwater runoff and thereby reduce the nutrient loading, turbidity, and siltation/sedimentation caused by stormwater entering the Pond. A Diagnostic/Feasibility study and a TMDL analysis for phosphorus have been completed for the Pond, and project activities follow the recommendations of those reports. Tasks include design and installation of twenty Stormceptor-type units to be installed at every storm drain outlet entering Dorothy Pond and other Millbury outlets that empty into Broadmeadow Brook, and outreach/education through activities of the Dorothy Pond Watershed Association, Massachusetts Audubon Society, and others.

Tasks:
1. Development of a Quality Assurance Project Plan;
2. Pre- and post-construction water quality monitoring to document project results;
3. Design and installation of twenty Stormceptor or similar units;
4. Development and implementation of a long-term operation and maintenance plan to ensure continued effectiveness of the BMPs; and
5. Public outreach and education for watershed stakeholders.

Cost: $189,000

Funding: $113,400 by the U.S. EPA
$75,600 by Town of Millbury

Duration: 2003 - 2006

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-05/319

03-05/319: Bare Hill Pond Noxious Aquatic Plant Reduction

NPS Category: Resource Restoration
Investigator: Town of Harvard
Location: Nashua

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

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

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

Cost: $329,850

Funding: $195,000 by the U.S. EPA
$134,850 by the Town of Harvard and its Bare Hill Pond Watershed Management Committee

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-06/319

03-06/319: Pittsfield Water Supply: Stormwater Remediation Project

NPS Category: Urban Runoff
Investigator: City of Pittsfield
Location: Housatonic Watershed

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

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

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

Cost: $105,900

Funding: $63,540 by the U.S. EPA
$42,360 by the City of Pittsfield

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-07/319

03-07/319: Connecticut River Watershed Restoration Phase III

NPS Category: Resource Restoration
Investigator: Franklin Regional Council of Governments
Location: Connecticut Watershed

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

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

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

Cost: $642,196

Funding: $270,716 by the U.S. EPA
$371,480 by Northeast Generation Services

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-08/319

03-08/319: Powow River Stormwater Management Program

NPS Category: Urban Runoff
Investigator: Town of Amesbury
Location: Merrimack Watershed

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

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

Tasks:

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

Cost: $224,100

Funding: $124,720 by the U.S. EPA
$99,380 by the Town of Amesbury

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-09/319

03-09/319: Clark and Cobbs Pond Stormwater Management Program

NPS Category: Urban Runoff
Investigator: Town of Walpole
Location: Neponset Watershed

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

Based on recommendations from a previous report, BMPs have been selected to capture and remove pollutants in stormwater runoff that currently discharges into the ponds. The BMPs will consist of four baffled sediment tanks, and eight deep sump/ off-line leaching catch basins with a grassed infiltration strip. Anticipated pollutant load removal from the BMP installation is 6,670 lbs. of sediment (TSS) per year, and 50.3 lbs. of phosphorus per year.

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

Cost: $206,720

Funding: $123,720 by the U.S. EPA
$82,308 by the Town of Walpole

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2003
03-10/319: SECTION 319 NPS PROJECT 03-10

Spy Pond Stormwater Management Program

NPS Category: Urban Runoff
Investigator: Town of Arlington
Location: Boston Harbor/Mystic Watershed

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

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

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

Cost: $298,100

Funding: $177,520 by the U.S. EPA
$120,580 by the Town of Arlington

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-11/319

03-11/319: Billington Sea Stormwater Remediation Project

NPS Category: Urban Runoff
Investigator: Town of Plymouth Engineering Department
Location: South Coastal Watershed

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

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

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

Cost: $280,292

Funding: $167,773 by the U.S. EPA
$112,519 by the Town of Plymouth

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2003
SECTION 319 NPS PROJECT 03-12/319

03-12/319: Stormwater BMPs for Peppermint Brook and Lily Pond

NPS Category: Urban Runoff
Investigator: Cohasset Board of Water Commissioners
Location: South Coastal Watershed

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

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

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

Cost: $425,000

Funding: $255,000 by the U.S. EPA
$170,000 by the Cohasset Board of Water Commissioners

Duration: 2004 – 2007

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-01/319

04-01/319: Operation and Maintenance of the Massachusetts Alternative Septic System Test Center

NPS Category: Land Disposal
Investigator: Barnstable County Dept. of Health and the Environment
Location: Statewide

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

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

Tasks:
8. Development of a Quality Assurance Project Plan;
9. Conducting facility operations,
10. Synthesizing data derived from testing new systems,
11. Reporting on test results, and
12. Outreach and education through published articles and facility tours.

Cost: $228,025

Funding: $135,775 by the U.S. EPA
$92,250 by various onsite system vendors

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-02/319

04-02/319: Innovative Stormwater Technology Transfer and Evaluation Project

NPS Category: Urban Runoff/Technology Transfer
Investigator: UMass/Amherst
Location: Statewide

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

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

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

Cost: $336,827

Funding: $202,096 by the U.S. EPA
$18,376 by EOEA
$116,355 by the University of Massachusetts, Amherst

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-03/319

04-03/319: Low Impact Development Training and Technical Assistance for Local Decision Makers

NPS Category: Outreach and Education, Technology Transfer
Investigator: North and South Rivers Watershed Association
Location: South Coastal Watershed

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

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

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

Cost: $126,600

Funding: $84,550 by the U.S. EPA
$42,050 by the North and South Rivers Watershed Association

Duration: 2004 - 2007

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-04/319

04-04/319: Upper Charles River Watershed Total Maximum Daily Load

NPS Category: Resource Restoration
Investigator: Charles River Watershed Association
Location: Charles Watershed

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

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

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

Cost: $426,067

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

Duration: 2005 – 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-05/319

04-05/319: Phosphorus and Sediment Load Reduction at Quaboag and Quacumquasit Ponds

NPS Category: Resource Restoration
Investigator: Town of Brookfield
Location: Chicopee Watershed

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

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

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

Cost: 270,833

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-06/319

04-06/319: Enhancing Implementation of Nutrient Management on Massachusetts Crop/Livestock Farms

NPS Category: Outreach/Education
Investigator: UMass/Amherst
Location: Statewide

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

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

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

Cost: $179,388

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-07/319

04-07/319: Stormwater BMP Implementation for Route 28 to Bass River Subwatershed

NPS Category: Resource Restoration
Investigator: Town of Yarmouth
Location: South Coastal Watershed

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

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

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

Cost: $295,000

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-09/319

04-09/319: Stormwater Management Retrofits for the Samoset Street Outfall to Plymouth Harbor

NPS Category: Resource Restoration
Investigator: Town of Plymouth Engineering Division
Location: South Coastal Watershed

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

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

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

Cost: $208,050

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-10/319

04-10/319: Pontoosuc Lake Watershed Planning Program

NPS Category: Watershed-Based Plan
Investigator: Berkshire Regional Planning Commission
Location: Housatonic Watershed

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

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

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

Cost: $110,350

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-11/319

04-11/319: Cold Spring Brook Watershed Remediation

NPS Category: Resource Restoration
Investigator: Town of Wellesley
Location: Charles Watershed

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

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

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

Cost: $197,800

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-12/319

04-12/319: Demonstration Boat Bottom Wash Water System

NPS Category: Urban Runoff
Investigator: Manchester Marine
Location: Statewide/Coastal

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

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

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

Cost: $195,596

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-14/319

04-14/319: Development of Watershed-Based Plans

NPS Category: n/a
Investigator: BETA Group, Inc.
Location: Statewide

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

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

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

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

Cost: $970,283

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

Duration: 2005 – 2007

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-15/319

04-15/319: Dudley Pond Comprehensive Water Quality Improvement Project

NPS Category: Resource Restoration
Investigator: Town of Wayland
Location: SuAsCo Watershed

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

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

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

Cost: $70,458

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-16/319

04-16/319: Tree Box Filters as a Tool for Implementing the Neponset Bacteria TMDL

NPS Category: Urban Runoff
Investigator: Neponset River Watershed Association
Location: Boston Harbor Watershed/Neponset

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

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

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

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

Cost: $221,309

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-17/319

04-17/319: Erosion and Sediment Control and Stormwater Management at Construction Sites using Soils- and Compost-Based Best Management Practices

NPS Category: Urban Runoff
Investigator: Patriot Resource Conservation and Development Area Council, Inc.
Location: Charles River Watershed

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

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

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

Cost: $440,492

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

$2,160 WeCare Organics	$2,050 Kuhn-Knight
$9,255 Apple D'Or Tree, Inc.	$2,000 BioCycleMagazine
$101,778 Lena New Boston	$5,180 Patriot RC&D
$9,085 New Ecology Inc.	$5,000 Roto-Mix
$4,600 Vanasse Hangen Brustlin, Inc	$2,050 Pro-Bark, Inc.

$19,930 City Soil and Greenhouse Co.
$18,000 Boston Public Works Department
$9,965 Soil and Water Quality Alliance
$9,703 Massachusetts Audubon
$8,910 Suffolk Conservation District
$525 Boston Parks and Recreation Department
$420 Boston Conservation Commission

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2004
SECTION 319 NPS PROJECT 04-18/319

04-18/319: 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 and 08-04, 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.

Cost: $497,463

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

Duration: 2010 – 2013

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-01/319

05-01/319: Operation and Maintenance of the Massachusetts Alternative Septic System Test Center

NPS Category: Land Disposal
Investigator: Barnstable County Dept. of Health and the Environment
Location: Statewide

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

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

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

Cost: $265,805

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-03/319

05-03/319: Windsor Reservoir Restoration Project

NPS Category: Resource Restoration
Investigator: Dalton Fire District
Location: Housatonic Watershed

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

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

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

Cost: $150,000

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

Duration: 2005 - 2008

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-04/319

05-04/319: Operation and Maintenance of the Massachusetts Alternative Septic System Test Center and Investigation into Onsite Treatment of Endocrine-Disrupting Compounds

NPS Category: Land Disposal
Investigator: Barnstable County Dept. of Health and the Environment
Location: Statewide

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

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

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

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

Cost: $256,361

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-05/319

05-05/319: Drumlin Farm Nonpoint Source Stormwater Management Project

NPS Category: Agricultural Runoff
Investigator: Massachusetts Audubon Society
Location: Charles River Watershed

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

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

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

Cost: $49,990

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-06/319

05-06/319: Pembroke LID Retrofit Implementation Project

NPS Category: Urban Runoff
Investigator: North and South Rivers Watershed Association
Location: South Coastal Watershed

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

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

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

Anticipated pollutant load removals per year:
- 18,730 lbs. of total suspended solids
- 2 lbs. total phosphorus
- 17 lbs. nitrogen
- 5 lbs. metals
- 100% bacteria removal

Cost: $271,924

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-07/319

05-07/319: Kingston Elementary School LID Retrofit Implementation Project

NPS Category: Urban Runoff
Investigator: North and South Rivers Watershed Association
Location: South Coastal Watershed

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

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

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

Anticipated pollutant load removals per year:
- 31,501 lbs. of total suspended solids
- 23 lbs. total phosphorus
- 180 lbs. nitrogen
- 55 lbs. metals
- 100% bacteria removal

Cost: $254,732

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-08/319

05-08/319: Children's Wharf Project: Growing the Next Generation of Environmental Stewards

NPS Category: Urban Runoff
Investigator: Boston Children's Museum
Location: Boston Harbor

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

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

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

Cost: $833,334

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-09/319

05-09/319: Old Oaken Bucket Pond Watershed NPS Improvements

NPS Category: Urban Runoff, Water Supply Protection
Investigator: Town of Scituate
Location: South Coastal Watershed

Description:

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

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

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

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

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

Cost: $250,128

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-10/319

05-10/319: Lake Shirley Low Impact Development Stormwater Improvement Project

NPS Category: Urban Runoff
Investigator: Town of Lunenburg
Location: Nashua Watershed

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

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

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

Tasks:

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

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

Cost: $148,030

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-11/319

05-11/319: Congamond Lakes FY 06

NPS Category: Urban Runoff
Investigator: Pioneer Valley Planning Commission
Location: Westfield Watershed

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

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

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

Cost: $354,480

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2005
SECTION 319 NPS PROJECT 05-12/319

05-12/319: Manchaug Pond NPS Improvement Project

NPS Category: Resource Restoration
Investigator: Manchaug Pond Association
Location: Blackstone Watershed

Description:

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

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

Tasks:

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

Cost: $219,370

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-01/319

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

NPS Category: Urban Runoff
Investigator: Town of Orange
Location: Millers Watershed

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

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

The site is a 0.72-acre former brownfield parcel adjacent to the Millers River that is being developed into a Riverfront Park. Interpretive signs will be installed to inform visitors about the LID features and functions and will be used as a demonstration site to encourage others to implement similar LID practices in other areas.

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

Cost: $376,388

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-04/319

06-04/319: Oak Hill Tributary Improvement Project

NPS Category: Resource Restoration
Investigator: City of Pittsfield
Location: Housatonic Watershed

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

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

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

Cost: $474,600

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-05/319

06-05/319: First Herring Brook Low Impact Development Stormwater Enhancements

NPS Category: Resource Restoration
Investigator: Town of Scituate
Location: South Coastal Watershed

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

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

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

Cost: $429,700

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-06/319

06-06/319: Herring River Coastal Low Impact Development Project

NPS Category: Resource Restoration
Investigator: Town of Scituate
Location: South Coastal Watershed

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

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

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

Cost: $183,274

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-07/319

06-07/319: Reducing NPS from Equine Facilities

NPS Category: Agriculture
Investigator: UMass Amherst
Location: Statewide

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

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

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

Cost: $256,480

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-08/319

06-08/319: Bedford NPS Project

NPS Category: Urban Runoff
Investigator: Town of Bedford
Location: Shawsheen Watershed

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

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

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

Cost: $159,653

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-09/319

06-09/319: River Street Best Management Practice Implementation

NPS Category: Urban Runoff
Investigator: Town of Ludlow
Location: Chicopee Watershed

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

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

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

Cost: $131,792

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-10/319

06-10/319: 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., gravel-less chambers, pipe-media matrices) to support MassDEP by providing a rational basis for approving various sizing or vertical setback credits.

Cost: $210,531

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

Duration: 2007 – 2010

FEDERAL FISCAL YEAR 2006
SECTION 319 NPS PROJECT 06-11/319

06-11/319: 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.

Cost: $210,581

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-01/319

07-01/319: Stormwater and Low Impact Development Technology Transfer

NPS Category: Urban Runoff
Investigator: UMass Amherst
Location: Statewide

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

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

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

Cost: $375,006

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-02/319

07-02/319: 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.

Cost: $213,441

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

Duration: 2006 – 2009

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-03/319

07-03/319: Rockwell Pond Source Reduction Pilot Project

NPS Category: Urban Runoff
Investigator: Massachusetts Watershed Coalition
Location: Nashua Watershed

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

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

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

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-04/319

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

NPS Category: Urban runoff
Investigator: Pioneer Valley Planning Commission
Location: French & Quinebaug Watershed

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

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

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

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

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-05/319

07-05/319: Franklin Stormwater Retrofit Improvement Project

NPS Category: Urban runoff
Investigator: Town of Franklin
Location: Charles Watershed

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

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

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

Cost: $229,762

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

Duration: 2007 – 2010

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-06/319

07-06/319: Stormwater BMP Implementation for Little Harbor

NPS Category: Urban Runoff
Investigator: Town of Cohasset
Location: South Coastal Watershed

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

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

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

Cost: $250,000

Funding: $150,000 by the U.S. EPA
$100,000 by the Town of Cohasset

Duration: 2007 – 2010

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-07/319

07-07/319: Jackson Square LID Program

NPS Category: Urban Runoff
Investigator: Jackson Square Partners LLC
Location: Charles Watershed

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

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

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

Cost: $350,000

Funding: $200,000 by the U.S. EPA
$150,000 by Jackson Square Partners

Duration: 2007 – 2010

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-08/319

07-08/319: Onota Lake Preservation Project

NPS Category: Resource Restoration
Investigator: City of Pittsfield
Location: Housatonic Watershed

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

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

Tasks:
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. 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.
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.

Cost: $456,200

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

Duration: 2007 – 2010

FEDERAL FISCAL YEAR 2007
SECTION 319 NPS PROJECT 07-09/319

07-09/319: James Brook Urban Stormwater Improvements

NPS Category: Urban runoff
Investigator: Town of Groton
Location: Nashua Watershed

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

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

Tasks:
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.

Cost: $223,910

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

Duration: 2007 – 2010

FEDERAL FISCAL YEAR 2008
SECTION 319 NPSPROJECT 08-01/319

08-01/319: Eel River Headwaters Restoration

NPS Category: Resource Restoration
Investigator: Plymouth DPW
Location: South Coastal Watershed

Description:
The Eel River Headwaters Restoration project will convert abandoned cranberry bogs to wetland habitat, removing flow structures to restore the river channel thereby creating cold water 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 cold water 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.

Cost: $666,666

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

Duration: 2007 – 2010

FEDERAL FISCAL YEAR 2008
SECTION 319 NPS PROJECT 08-02/319

08-02/319: Lake Waushakum LID BMP Implementation Project

NPS Category: Urban runoff
Investigator: Town of Ashland
Location: Concord (SuAsCo) Watershed

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

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

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

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

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

FEDERAL FISCAL YEAR 2008
SECTION 319 NPS PROJECT 08-03/319

08-03/319: 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 being proposed 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.

Tasks:
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.

Cost: $578,000

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2008
SECTION 319 NPS PROJECT 08-04/319

08-04/319: Bare Hill Pond Noxious Aquatic Plant Reduction

NPS Category: Implementation
Investigator: Town of Harvard
Location: NashuaBasin

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, and 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.

Tasks:
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.

Cost: $493,345

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2008
SECTION 319 NPS PROJECT 08-05/319

08-05/319: 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.

Tasks:
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.

Cost: $104,000

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2008
SECTION 319 NPS PROJECT 08-06/319

08-06/319: 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 (*Potamageton 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 BMPs 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 proposed stormwater BMPs and of project progress. This program will also educate and encourage residents to participate in the reduction of NPS pollution by using innovative LID treatment systems.

Tasks:
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.

Cost: $86,000

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2008
SECTION 319 NPS PROJECT 08-07/319

08-07/319: 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.

Tasks:
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.

Cost: $1,420,000

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2008
SECTION 319 NPS PROJECT 08-08/319

08-08/319: 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.

Tasks:
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

Cost: $23,450

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

Duration: 2009 – 2010

FEDERAL FISCAL YEAR 2008
SECTION 319 NPS PROJECT 08-09/319

08-09/319: 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.

Cost: $157,225

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

Duration: 2010 – 2013

FEDERAL FISCAL YEAR 2009
SECTION 319 NPS PROJECT 09-01/319

09-01/319: 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 catch basins 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 catch basin 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.

Tasks:
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.

Cost: $505,100

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2009
SECTION 319 NPS PROJECT 09-02/319

09-02/319: 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.

Tasks:
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.

Cost: $706,000

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2009
SECTION 319 NPS PROJECT 09-03/319

09-03/319: 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.

Tasks:
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.

Cost: $512,333

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2009
SECTION 319 NPS PROJECT 09-04/319

09-04/319: 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.

Tasks:
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.

Cost: $463,500

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2009
SECTION 319 NPS PROJECT 09-05/319

09-05/319: 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), 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.

Tasks:
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

Cost: $49,576

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

Duration: 2009 – 2012

FEDERAL FISCAL YEAR 2009
SECTION 319 NPS PROJECT 09-06/319

09-06/319: 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; and
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.

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

FEDERAL FISCAL YEAR 2010
SECTION 319 NPS PROJECT 10-01/319

10-01/319: 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.

Cost: $83,333

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

Duration: 2010 – 2013

FEDERAL FISCAL YEAR 2010
SECTION 319 NPS PROJECT 10-02

10-02/319: 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.

Cost: $236,025

Funding: $39,175 by the US EPA
$54,350 by Barnstable County
150,000 by participating home owners

Duration: 2010 – 2013

FEDERAL FISCAL YEAR 2010
SECTION 319 NPS PROJECT 10-03/319

10-03/319: 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, 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.

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

FEDERAL FISCAL YEAR 2010
SECTION 319 NPS PROJECT 10-04/319

10-04/319: 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, Ellms 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".

Cost: $300,000

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

Duration: 2010 – 2013

FEDERAL FISCAL YEAR 2010
SECTION 319 NPS PROJECT 10-05/319

10-05/319: 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, 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.

Tasks:
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.

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

FEDERAL FISCAL YEAR 2010
SECTION 319 NPS PROJECT 10-06/319

10-06/319: 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 Class 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) 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.

Tasks:
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

Cost: $430,000

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

Duration: 2010 – 2013

FEDERAL FISCAL YEAR 2010
SECTION 319 NPS PROJECT 10-07/319

10-07/319: 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 mi^2 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.

Cost: $394,987

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

Duration: 2010 – 2013

FEDERAL FISCAL YEAR 2010
SECTION 319 NPS PROJECT 10-08/319

10-08/319: 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.

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

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-01/319

11-01/319: 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 drain fields) 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.

Cost: $111,164

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-02/319

11-02/319: 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.

Cost: $389,994

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-03/319

11-03/319: 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 sewering 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 (25) 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.

Cost: $450,000

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-04/319

11-04/319: 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.

Cost: $75,600

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-05/319

11-05/319: 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.

Cost: $448,330

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-06/319

11-06/319: 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.

Cost: $146,250

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-07/319

11-07/319: 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:
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

Cost: $234,990

Funding: $136,040 by the US EPA
$98,950 by the

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-08/319

11-08/319: 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 rainstorms. 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.

Cost: $832,325

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-09/319

11-09/319: 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.

Tasks:
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.

Cost: $180,614

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-10/319

11-10/319: 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.

Cost: $148,510

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-11/319

11-11/319: 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 southwestern 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.

Tasks:
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.

Cost: $674,700

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2011
SECTION 319 NPS PROJECT 11-12/319

11-12/319: 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.

Cost: $40,000

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

Duration: 2011 – 2014

FEDERAL FISCAL YEAR 2012
SECTION 319 NPS PROJECT 12-01/319

12-01/319: 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 leach fields 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.

Cost: $99,964

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

Duration: 2012 – 2015

FEDERAL FISCAL YEAR 2012
SECTION 319 NPS PROJECT 12-02/319

12-02/319: 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.

Cost: $668,767

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

Duration: 2012 – 2015

FEDERAL FISCAL YEAR 2012
SECTION 319 NPS PROJECT 12-03/319

12-03/319: Minimizing Non-Point Source Pollution from Two Horse Facilities Through Installation and Demonstration of Best Management Practice

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.

Cost: $338,415

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

Duration: 2012 – 2015

FEDERAL FISCAL YEAR 2012
SECTION 319 NPS PROJECT 12-04/319

12-04/319: 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.

Cost: $92,956

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

Duration: 2012 – 2015

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-01/319

13-01/319: 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 know to have endocrine disrupting characteristics. The influence of hydraulic loading rate on removal efficiencies will also be investigated.

Tasks:
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

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

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-02/319

13-02/319: 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 goals are: 1) This project will 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.

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

Cost: $1,000,000

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

Duration: 2013 – 2016

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-03/319

13-03/319: 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 riverbank 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.

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

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

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-04/319

13-04/319: Reducing Stormwater Pollution in the Western Millers River Watershed with Low Impact Development

NPS Category: Urban Runoff
Investigator: Franklin Regional Council 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) 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 goals are: 1) The goal of the project 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.

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

Cost: $58,333

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

Duration: 2013 – 2016

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-05/319

13-05/319: 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 lalso 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.

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

Cost: $208,525

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

Duration: 2013 – 2016

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-06/319

13-06/319: Massachusetts Nonpoint Source Pollution Management Manual, Update, and Enhancement

NPS Category*:* Urban Runoff
Investigator: Geosyntec
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-base 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.

Tasks:
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 Grant Project Summaries
6. Convert NPS Manual to HTML format and Host on Website

Cost: $179,150

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

Duration: 2013 – 2016

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-07/319

13-07/319: 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 discharge volumes of stormwater infiltrating and/or discharging to the combined sewer systems in the area of the proposed alley retrofit; 2) Reduce nonpoint source pollutant (NPS) contributions to water bodies by decreasing the stormwater runoff volumes and treatment via permeable pavement and subgrade materials; 3) Increase the recharge of water in the City's Groundwater Conservation Overlay District; 4) Evaluate the potential for using permeable pavements in alleys as a standard practice for improving stormwater management in the City of Boston; 5) Quantify the benefits of the project with a monitoring program; 6) Develop design recommendations for the use of permeable pavements for retro-fitting alleys in the City of Boston; and 7) Identify areas for suggested additional research and investigation.

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

Cost: $532,320

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

Duration: 2013 – 2016

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-08/319

13-08/319: 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 the 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.

Tasks:
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.

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

FEDERAL FISCAL YEAR 2013
SECTION 319 NPS PROJECT 13-09/319

13-09/319: 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.

Goals:
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

Cost: $207,400

Funding: $203,348 by the US EPA
$4,052 by Geosyntec Consultants

Duration: 2013 – 2014

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-01/319

14-01/319: 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 publicly 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.

Project Goals:
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.

Tasks:
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.

Cost: $146,184

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

Duration: 2014-2017

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-02/319

14-02/319: 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.

Project Goals:
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.

Tasks:
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.

Cost: $437,010.09

Funding: $260,232 by the US EPA
$176,779 by the Town of Plymouth and project participants

Duration: 2014 – 2017

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-03/319

14-03/319: 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 amounts 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.

Project Goals:
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.

Tasks:
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.

Cost: $515,000

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

Duration: 2014 – 2017

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-04/319

14-04/319: Using Low Impact Development Techniques to Manage Stormwater Runoff in Greenfield

NPS Category: Urban Runoff
Investigator: Franklin Regional Council of Governments
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.

Project Goals:
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.

Tasks:
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.

Cost: $495,600

Funding: $218,600 by the US EPA
$277,000 by the Town of Greenfield and project participants

Duration: 2014 – 2017

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-05/319

14-05/319: 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.

Project Goals:
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 amounts 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.

Tasks:
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.

Cost: $278,360

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

Duration: 2014 – 2017

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-06/319

14-06/319: Ipswich River Watershed BMP Implementation at Farley Brook

NPS Category: Resource Restoration
Investigator: Town of Ipswich
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.

Project Goals:
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.

Tasks:
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.

Cost: $438,782

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

Duration: 2014 – 2017

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-07/319

14-07/319: 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.

Project Goals:
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.

Tasks:
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.

Cost: $79,960

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

Duration: 2014 – 2017

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-08/319

14-08/319: Assessing the Potential Effects of Climate Change on Stormwater Best Management Practices (BMPs) in Coastal Communities

NPS Category: Resource Restoration
Investigator: EEA/ Coastal Zone Management
Location: Coastal

Description:
Climate change is predicted to bring about hydrologic changes including sea level rise, altered rainfall patterns, and groundwater fluctuations that will affect stormwater management in coastal communities. This project will provide an evaluation of stormwater BMPs in coastal communities to assess current and future performance through direct inspection and climate change scenario testing, including, but not limited to, the effects of salt water, flooding, expected design longevity of the treatment systems, and other factors.

Project Goals:
This project will develop recommendations for technologies or design elements to increase resiliency of stormwater Best Management Practices. In addition, it will include recommendations for improvements to BMP design and operation and maintenance activities.

Tasks:
1. Assist state and municipal efforts to better protect coastal resources from potential impacts from climate change and will support the advancement of robust adaptation strategies and suitable policy change.
2. Evaluations of currently employed BMPs and any potential new technologies will be conducted, as well as an evaluation of operation and maintenance activities and requirements.
3. The analysis will include examination of BMP design life and continued effectiveness in the face of impacts from climate change.
4. Summarize climate change impacts to stormwater management, design and operation recommendations, evaluation of current BMPs at risk, and recommendations to improve resiliency, as described above.

Cost: $75,000

Funding: $50,000 by the U.S. EPA
$25,000 by EEA/Coastal Zone Management (CZM)

Duration: 2014 – 2015

FEDERAL FISCAL YEAR 2014
SECTION 319 NPS PROJECT 14-09/319

14-09/319: Revision of Massachusetts Watershed-based Plans

NPS Category: Program
Investigator: Geosyntec Consultants Inc.
Location: Statewide

Description:
EPA's revised Nonpoint Source Program and Grants Guidelines for States and Territories (the "NPS Guidelines") issued on April 12, 2013, apply to all § 319-funded grant activities beginning in fiscal year 2014. These guidelines are requirements that apply to recipients of grants made with funds appropriated by Congress under § 319 of the Clean Water Act. These guidelines emphasize the use of § 319 funds for the implementation of WBPs to restore impaired waters and require states to set aside at least 50% of the § 319 funds for watershed projects that implement WBPs.

WBPs provide a watershed-specific roadmap to guide cost-effective, well-informed restoration and protection efforts. The EPA Guidance lists nine elements that are required to be included in WBPs. EPA continues to require that watershed projects funded under § 319 directly implement a WBP addressing the nine elements.

Project Goals:
Development of a template-based tool to be used by agencies and stakeholders to develop the elements necessary to form the basis of good watershed-based projects.

Tasks:
1. Quality Assurance Program Plan ("QAPP") and Evaluation
2. Develop WBP Website
3. Prepare Information for Watersheds Statewide
4. Prepare WBP Guidance
5. WBP Technical Support
6. WBP Pilot Projects
7. Public Outreach
8. Reporting and Project Oversight

Cost: $496,411

Funding: $485,883 by the U.S. EPA
$10,528 by Geosyntec Consultants, Inc.

Duration: 2014 – 2017

FEDERAL FISCAL YEAR 2015
SECTION 319 NPS PROJECT 15-01/319

15-01/319: Franklin Phase II of Stormwater BMP Retrofits

NPS Category: Resource Restoration
Investigator: Town of Franklin
Location: Charles River Watershed

Description:
Mine Brook, a major tributary to the Charles River within Franklin, is listed as impaired for thermal modifications and other habitat alterations in the Massachusetts Integrated Waters Reports MassDEP 2012 Integrated List of Waters. The Mine Brook subwatershed is the largest and most urbanized subwatershed within Franklin, encompassing the majority of the downtown area, and is a significant contributor to the Charles River. Reducing the pollutant loading to Mine Brook is anticipated to be an important step in improving the condition of the water quality.

Project Goals:
Reduce the NPS that impairs Mine Brook and the Upper Charles River through the design and installation of BMPs and an outreach and training program. Decreasing the nonpoint source pollution impacts will ultimately improve the water quality in Mine Brook and the Upper Charles River. This project will retrofit three existing BMPs at the Jefferson Elementary and Remington Middle Schools, add bioretention areas and tree box filters along Cottage Street and Union Street, and install a bioretention area along Panther Way.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. Design and construct a bioretention area along Panther Way
4. Install vegetation in the bioretention area along Panther Way to enhance pollutant removal.
5. BMP Operation and Maintenance Plan
6. Public Education and Outreach
7. Reporting and Project Oversight

Cost: $234,500

Funding: $117,650 by the US EPA
$116,850 by the Town of Franklin

Duration: 2015 – 2017

FEDERAL FISCAL YEAR 2015
SECTION 319 NPS PROJECT 15-02/319

15-02/319: Dedham Mother Brook BMP Implementation Project

NPS Category: Resource Restoration
Investigator: Town of Dedham
Location: Boston Harbor Watershed

Description:
Mother Brook, located in the Town of Dedham, is listed as "impaired for pathogens and nutrients in the MassDEP 2012 Integrated List of Waters". Mother Brook is a tributary to the Neponset River (Boston Harbor watershed); both are listed as a Category 5 waterbody for pathogens. Reducing the loading to Mother Brook is anticipated to be a major step in improving water quality in both waterbodies.

Project Goals:
Reduce pathogens, phosphorus, and sediment that impairs the Mother Brook and the Neponset River by constructing structural stormwater BMPs at the top three sites recommended through Dedham BMP Development 604b Project 2010-02/604, and by implementing an outreach and training program. Decreasing the nonpoint source pollution impacts will ultimately improve the water quality in Mother Brook and the Neponset River.

This project will construct a bioretention cell with a sediment forebay on Colburn Street, a subsurface infiltration system and water quality swale on Avery Street, and a bioretention cell on Sawmill Lane.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Public Education and Outreach
5. Reporting and Project Oversight

Cost: $148,124

Funding: $88,113 by the US EPA
$60,011 by the Town of Dedham

Duration: 2015 – 2017

FEDERAL FISCAL YEAR 2015
SECTION 319 NPS PROJECT 15-03/319

15-03/319: Upper Caroline Brook Restoration Project

NPS Category: Resource Restoration
Investigator: Town of Wellesley
Location: Charles River Watershed

Description:
The project will address water quality impairments in the Fuller Brook, listed as a Category 5 for impaired for physical substrate habitat, alterations, pathogens, nutrients, and sedimentation, by designing, installing, and maintaining BMPs to reduce pollutant loading from stormwater runoff and streambank erosion in the upper Caroline Brook, and BMPs improving habitat within the stream corridor. Reducing the loading to the headwaters of the upper Caroline Brook is anticipated to be a major step in improving the condition of the water quality in upper Caroline Brook and Fuller Brook.

Project Goals:
Reduce pollutant loads from stormwater runoff currently entering the brook with no treatment and from eroding streambanks. Proposed BMPS include bioretention retrofits, disconnecting a discharge from an unpaved road, hard and soft steam stabilization practices (cross vanes, vegetative stabilization), and relocating the streambed below the Forest Street culvert to protect an undermined sewer main.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Public Education and Outreach
5. Reporting and Project Oversight

Cost: $561,792

Funding: $337,048 by the US EPA
$224,744 by the Town of Wellesley

Duration: 2015 – 2017

FEDERAL FISCAL YEAR 2015
SECTION 319 NPS PROJECT 15-04/319

15-04/319: A Watershed-Based Plan to Maintain the Health and Improve the Resiliency of the Deerfield River Watershed

NPS Category: Healthy Watersheds
Investigator: Franklin Regional Council of Governments
Location: Deerfield River Watershed

Description:
The Deerfield River Watershed contains high quality water resources and large blocks of contiguous habitat. The development and implementation of a comprehensive watershed management plan will protect the high water quality of the Watershed, increase its resiliency to climate change, and restore the water quality and degraded fluvial geomorphic and habitat functions of impaired areas of the watershed.

Project Goals:
Develop a comprehensive Watershed-Based Plan for the Watershed that integrates the statewide Watershed-Based Plan strategy, the EPA's Healthy Watersheds Initiative, and climate change adaptation strategies. The plan will characterize the watershed conditions, identify, investigate, and address the current and emerging issues facing the watershed, and include specific, measurable actions to protect and improve water resource conditions and climate change resiliency. It will result in on-the-ground change within the watershed by recommending specific, measurable actions to protect and improve water resource conditions, and will proceed simultaneously with the development of the statewide strategy and may be amended accordingly.

Tasks:
1. Quality Assurance and Project Evaluation
2. Build Partnerships
3. Compile Baseline Watershed Conditions Data [Element A of a Watershed-Based Plan]
4. Issue Request for Responses for Consultant Services for Tasks 5, 6, and 7
5. Estimate Pollutant Loads [Element A]
6. Comparative Subwatershed Analysis
7. Watershed Field Inventories [Elements A and C]
8. Land Use Regulatory Review [Element C]
9. Green Infrastructure Assessment and Climate Change Vulnerability Analysis [Element C]
10. Deerfield River Watershed Plan [Elements C, D, F, G, H, and I]
11. Issue Request for Responses for Consultant Services for Task 10.
12. Public Education and Outreach [Element E]
13. Climate Pilot Study for the Deerfield River Watershed

Cost: $305,971

Funding: $182,250 by the US EPA
$123,721 by the Franklin Regional Council of Governments

Duration: 2015 – 2017

FEDERAL FISCAL YEAR 2015
SECTION 319 NPS PROJECT 15-05/319

15-05/319: Small Farm BMP Guidance & Statewide NPS Outreach Project

NPS Category: Agriculture
Investigator: Comprehensive Environmental Inc.
Location: Statewide

Description:
This project will produce a statewide guidance document specifically geared towards the smaller farmer along with a series of quick read fact sheets to provide the needed information for them to manage their backyard hobby farms while reducing nonpoint source pollution entering nearby waterbodies. This project will also focus on outreach to organizations that can provide insight on what challenges small farmers face and who are in a position to distribute the resulting educational material to individual hobby farmers and remain a local source of support to them.

Project Goals:
Develop a set of easily understood educational materials to address the nonpoint source pollution challenges that small or hobby farmers face. Provide outreach to stakeholders, watershed associations, board of health offices, and other groups to obtain information on hobby farmer needs in their community to help define and distribute final content in the manual and fact sheets.

Tasks:
1. Establish Advisory Committee
2. Integrating Small Farms into Watershed Management – Initial Outreach
3. Small Farm Guidance Manual
4. Small Farming Topic Specific Fact Sheets
5. Distribution of Small Farm Material & Survey
6. Reporting and Project Oversight

Cost: $166,186

Funding: $99,686 by the US EPA
$66,500 by Comprehensive Environmental Inc.

Duration: 2015 – 2017

FEDERAL FISCAL YEAR 2015
SECTION 319 NPS PROJECT 15-06/319

15-06/319: Stockbridge Bowl Management Project – Phase II

NPS Category: Resource Restoration
Investigator: Town of Stockbridge
Location: Housatonic River Watershed

Description:
Stockbridge Bowl is impaired by Eurasian water-milfoil which inhibits flow and facilitates sedimentation. A drawdown of 4' to inhibit growth had historically been achieved but accumulated sediments and aquatic plant growth have choked the outlet so that the maximum drawdown is not enough to control the non-native plant growth. A diversion pipe was installed underneath a gas pipeline set in a berm (with support of previous 319 Grant, project number 09-02/319). The diversion pipe has the potential to divert enough water past the berm to achieve the ideal drawdown. However, the effectiveness of the diversion pipe is severely limited due to widespread sediment deposition upstream of the pipe.

This project will create effective drawdown by digging a channel upstream of the diversion pipe, through accumulated sediments, to hydraulically connect the pipe to open waters of the lake. This connection will also reduce the amount of sediment and turbidity that will be transported downstream during drawdown activities.

Project Goals:
Achieve the desired drawdown to control non-native, invasive aquatic macrophyte growth. This project will create a channel that will hydraulically connect the diversion pipe to deeper waters of the lake, thus maximizing the functionality of the pipe needed to achieve the 5.5' drawdown target. The pipe channel will also minimize transport of sediment and turbidity downstream during autumn drawdown activities.

Tasks:
1. Quality Assurance and Project Evaluation
2. Engineering and Permitting
3. Construct Trapezoidal Channel and Upland Disposal of Sediment
4. BMP Operation and Maintenance Plan
5. Aquatic Plant Harvesting
6. Education Program; technology transfer
7. Reporting and Project Oversight

Cost: $3,049,470

Funding: $672,920 by the US EPA
$2,376,550 by the Town of Stockbridge and project participants

Duration: 2015 – 2017

FEDERAL FISCAL YEAR 2015
SECTION 319 NPS PROJECT 15-07/319

15-07/319: Investigation of Passive Nitrogen Removal Strategies for Onsite Septic Systems at the Massachusetts Alternative Septic System Test Center

NPS Category: Groundwater protection
Investigator: County of Barnstable
Location: Statewide

Description:
This project continues the work of Project 14-01/319. It builds upon the findings from the publicly financed Florida Passive Nitrogen Removal Project, the State of Washington Project, Waquoit Bay National Estuary Research Reserve (WBNERR) Project and other publicly funded information sources and endeavors, to determine elements from those studies that are successful, applicable, and transferable to our area. This investigation is important to assuring wastewater planners and managers that all decentralized options are properly evaluated and to perhaps provide another tool for the management of wastewater nitrogen. Early results from Project 14-01/319 indicate high potential for nitrogen removal using these systems.

Project Goals:
- Determine whether the passive denitrification strategies investigated in various publicly funded efforts nationwide have relevance to our geographical area.
- Continue to allow the research, development and testing of commercially available products that remove contaminants from wastewater.

Tasks:
1. Quality Assurance and Project Evaluation
2. Continue to monitor installed systems and evaluate for effectiveness
3. Education Program; technology transfer
4. Reporting and Project Oversight

Cost: $83,333

Funding: $50,000 by the US EPA
$33,333 by the County of Barnstable

Duration: 2015 – 2017

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-01/319

16-01/319: Upper Charles River Regional Stormwater Finance Phase II Feasibility Study

NPS Category: Stormwater Utility
Investigator: Town of Franklin
Location: Charles River Watershed

Description:
Based on the 2014 draft MS4 permit and the new pollutant load reductions presented, the Town of Franklin expects that it may need to increase its stormwater management budget significantly. The effects of this increased investment in infrastructure, water quality, and public education will benefit local constituents and positively impact the Charles River Watershed, which is impaired in part from the impacts of discharge of stormwater from urban and suburban land use.

Project Goals:
Compare stormwater programs implemented by a single municipality versus various regional structures. If comparison reveals that a regional stormwater utility offers substantial benefits then this project will document the compelling case that supports the development of a regional stormwater utility, outlines a road map towards specific elements of a regional stormwater utility that can be implemented by Franklin and its immediate neighbors, provides more efficient water quality services, and demonstrates how the road map for regional implementation of stormwater services could be applied to downstream communities in the watershed, and across the Commonwealth.

Tasks:
1. Inventory of Stormwater Program Activities and Costs for Franklin, Medway, and Milford
2. Analysis of Future Stormwater Program Activities and Costs for Franklin, Medway, Milford
3. Assess Benefits, Challenges, and Funding Sources for Regional Stormwater Management
4. Evaluate and Develop a Preliminary Legal Framework for Regional Stormwater Management
5. Engage Select Representative Stakeholders to Participate on a Stakeholder Advisory Committee
6. Engage the Public through a Public Education Plan Focused on Municipal Stormwater Responsibilities and Options for Stormwater Program Implementation
7. Reporting and Project Oversight

Cost: $126,607

Funding: $76,000 by the US EPA
$50,607 by the Town of Franklin

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-02/319

16-02/319: Steep Hill Brook BMP Retrofit Project

NPS Category: Resource Restoration
Investigator: Town of Stoughton
Location: Boston Harbor Watershed

Description:
Steep Hill Brook is the primary tributary to the Neponset (Boston Harbor) in Stoughton. The Neponset River and Steep Hill Brook are all listed as impaired for pathogens, nutrients and/or a variety of other causes in the MassDEP 2012 Integrated List. Steep Hill Brook and its tributaries are subject to the Neponset River Watershed Bacteria TMDL. Also, the Sustainable Water Management Initiative identifies the Steep Hill Brook system as a groundwater and biological category five with net groundwater depletion of greater than 25%.

Project Goals:
This project will reduce pollutant loading to Woods Pond and Steep Hill Brook, increase groundwater recharge and stream base flow, and increase public awareness of the need to reduce stormwater pollution and available methods to reduce pollutant loads. It will construct the recommended stormwater BMP retrofits at the top three sites identified through the earlier 604b grant (#2009-12/ARRA 604). The BMPs include an infiltration basin with sediment forebay that will treat runoff from the side and rear of the Gibbons School; a large bioretention cell with sediment forebay and underdrain that will treat runoff from the parking area in front of the School; and a smaller bioretention cell that will treat runoff from nearby Morton Street. The project will include a comprehensive outreach and education campaign, including press releases, web and social media content, signage at the BMPs, and a town-wide mailing on the project.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Technology Transfer
5. Reporting and Project Oversight

Cost: $236,486

Funding: $137,046 by the US EPA
$99,440 by the Town of Stoughton

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-03/319

16-03/319: Keeping Roadway Stormflow out of Arcadia Lake

NPS Category: Resource Restoration
Investigator: Town of Belchertown
Location: Connecticut River Watershed

Description:
Arcadia Lake, located in the Town of Belchertown, is shown on the Integrated List of Waters as impaired, Category 5, waters requiring a TMDL, for non-native aquatic plants and nutrient/eutrophication biological indicators. This project will design and construct BMPs to capture and infiltrate roadway stormflow that currently goes directly into Arcadia Lake. The project will also promote a lake-based Soak up the Rain campaign to draw attention to the new facilities and to promote residential practices around the lake for stormwater capture and infiltration. This works follows on a successful 604b grant.

Project Goals:
- Replace the two existing conventional catch basins on Federal and Metacomet streets with pre-cast deep sump catch basin with a hood, and connect to an infiltration catch basin
- Intercept direct run-off from the roadway to the lake with a bioswale

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Conduct Public Outreach and Education
5. Reporting and Project Oversight

Cost: $69,780

Funding: $41,868 by the US EPA
$27,912 by the Town of Belchertown

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-04/319

16-04/319: Lower Huckleberry Brook Stormwater Treatment and Wetland Park

NPS Category: Resource Restoration
Investigator: Town of Milford
Location: Charles River Watershed

Description:
The project is located in the Huckleberry Brook sub-watershed, which is in the headwaters of the Charles River watershed. Although Huckleberry Brook is not currently on the 303(d) list, this highly channelized stream is directly connected to and immediately upstream of Milford Pond on the Charles River, which is listed for multiple impairments. The Charles River is listed as impaired for pathogens and nutrients.

The project addresses water quality impairments in the Charles River Watershed by designing and installing a constructed stormwater wetland to reduce pollutant loading from stormwater runoff into Lower Huckleberry Brook and the adjacent Milford Pond/Charles River. The project site was identified as part of a Sustainable Water Management Initiative project.

Project Goals:
- Reduce pollutant loading from stormwater runoff currently entering Lower Huckleberry Brook and the adjacent Milford Pond/Upper Charles River without treatment.
- Educate the public about stormwater issues and how they can reduce the pollutant loading in the Lower Huckleberry Brook Sub-watershed and Charles River Watershed.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Conduct Public Outreach and Education
5. Reporting and Project Oversight

Cost: $376,038

Funding: $225,290 by the US EPA
$150,748 by the Town of Milford

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-05/319

16-05/319: Edenfield Avenue Green Street Demonstration Project, Watertown

NPS Category: Resource Restoration
Investigator: Charles River Watershed Association
Location: Charles River Watershed

Description:
This project will improve stormwater management and reduce NPS to the Charles River which is listed for multiple impairments in the Integrated List of Waters. Evidence provided by river and outfall monitoring shows that stormwater flows from Watertown are contributing non-point source pollution loads to the river. Changing precipitation patterns driven by climate change will only compound runoff volumes, high peak flows and flood risks for the Town. Extensive private redevelopment and an aggressive plan for repair of the Town's roads both offer valuable opportunities for improvement. This project will implement structural and nonstructural BMPs to reduce NPS pollution impacts to the Charles River.

Project Goals:
- Reduce impervious surface as a source of non-point source pollution
- Develop a standard process for incorporating green infrastructure (GI) into road reconstruction and improvement projects that can be used by the Town and other municipalities in the greater Boston area
- Increase Watertown's capacity to make effective future investments in GI on its roadways and sidewalks in conjunction with a pending 604(b) project to identify GI opportunities in the Town
- Increase understanding of the sources and impacts of non-point source pollution and the potential benefits that GI can provide among Watertown residents
- Install BMPs on Edenfield Avenue

Tasks:
1. Quality Assurance Project Plan (QAPP) Development and Project Monitoring
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Education
5. Project Evaluation
6. Reporting and Project Oversight

Cost: $1,011,548

Funding: $194,648 by the US EPA
$816,900 by the CRWA and Project Partners

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-06/319

16-06/319: Feasibility of a Stormwater Utility for Agawam

NPS Category: Urban Runoff
Investigator: Pioneer Valley Planning Commission
Location: Connecticut and Westfield River Watersheds

Description:
This project will study the possibility of establishing a stormwater utility in Agawam. It will identify major needs and costs for a municipal stormwater program and evaluating billing, unit, rate, and other financial considerations. Goals for the project including a robust public engagement process to promote deep understanding of the challenges as well as full engagement in exploring a sustainable source of funding for the stormwater program.

Project Goals:
Engage a citizen's advisory group to learn about needs, costs, and options in establishing a sustainable funding source for Agawam's stormwater program. The other goals are:

- Identify stormwater program needs and costs in terms of compliance with the forthcoming permit and priority infrastructure repairs and improvements
- Evaluate fee models/rate methodologies and identify which would work best for Agawam
- Describe costs for implementation and define a strategy for moving forward.

Tasks:

1. Hire consulting firms that are qualified to help with more technical aspects of project.
2. Identify major needs, priorities and costs for Agawam's municipal stormwater program.
3. Engage a citizen advisory task force that will learn about stormwater funding needs in Agawam, explore possible funding options, and make recommendations.
4. Conduct other public outreach and education to help promote understanding about stormwater funding needs.
5. Conduct parcel analysis and calculate equivalent residential unit
6. Define rate structure options, projected income growth, evaluate willingness/ability to pay, possible set up for credits program, and capacity of the Town to logistically support each option
7. Reporting and Project Oversight

Cost: $111,500

Funding: $66,900 by the US EPA
$44,600 by the Town of Agawam and other project participants

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-07/319

16-07/319: Protecting a Healthy and Resilient Taunton Watershed: Green Infrastructure Prioritization, Implementation, and Training

NPS Category: Healthy Watersheds
Investigator: The Nature Conservancy
Location: Boston Harbor Watershed

Description:
The region of the Taunton Watershed in and adjacent to the Three Mile River, Canoe River, and Hockomock Swamp Areas of Critical Environmental Concern (ACEC) includes healthy aquatic habitat that is being stressed by the impacts of climate change and development. A pathogen TMDL has been established for reaches within the Taunton River (Boston Harbor Watershed), and portions of the watershed have waters requiring a TMDL for low dissolved oxygen, phosphorus, and turbidity. The Taunton River Watershed Management Plan describes the ecological implications of altered hydrology for wetlands and other aquatic resources and calls for improved stormwater management and restoration of natural hydrology. The goal of this project is to enable municipalities and others to improve the resiliency of these aquatic systems through green infrastructure projects.

Project Goals:
- Implement two projects that result in important environmental benefits and demonstrate how municipalities can improve resiliency and climate change adaptation.
- Assess and prioritize green infrastructure project opportunities that will have the most impact on water quality and resiliency.
- Conduct outreach to municipalities and other stakeholders on how to incorporate green infrastructure options, resiliency, and water quality concerns into planning efforts.

Tasks:
1: Quality Assurance and Project Evaluation
2: Design and Construct Stormwater Management BMPs
3: BMP Operation and Maintenance Plan
4: Green Infrastructure Prioritization
5: Municipality and Stakeholder Outreach and Education
6: Reporting and Project Oversight

Cost: $136,837

Funding: $82,102 by the US EPA
$54,735 by The Nature Conservancy and project partners

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-08/319

16-08/319: Water Street Stormwater Implementation to Improve Water Quality in Plymouth Harbor

NPS Category: Resource Restoration
Investigator: Town of Plymouth
Location: South Coastal Watershed

Description:
Plymouth Harbor is a Category 5 waterbody listed for fecal coliform, nutrient/eutrophication biological indicators. Based on the Nitrogen Loading in Plymouth Harbor Watershed Cumulative Nitrogen Loading Determination (SMAST 2013) 7% of the nitrogen loading to the embayment system is from impervious surface runoff. At the project site on Water Street, the untreated runoff currently enters Town Brook at the Water Street Bridge and continues to Plymouth Harbor.

The project will improve water quality in Town Brook, Plymouth Harbor (Category 5 Water) and adjacent Plymouth Bay by mitigating stormwater pollution through the implementation of BMPs on Water Street.

Project Goals:
The goal of this project is to control and treat untreated stormwater runoff by implementing BMPs on Water Street, and mitigating bacterial contamination toward de-listing Plymouth Harbor from the 303(d) list. The BMPs will treat bacteria and nutrients in the first flush 1" runoff thus reducing non-point source pollution impacts to Plymouth Harbor. This will improve the water quality of Plymouth Harbor and Plymouth Bay and help protect, enhance, and restore the natural resources that have previously been degraded due to poor water quality. The BMPs specifically selected for this project are a series of deep sump catch basins with eliminators, one hydrodynamic separator, and 360 linear feet of perforated pipe to induce infiltration.

Project Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Reporting and Project Oversight

Cost: $390,195

Funding: $234,117 by the US EPA
$156,078 by the Town of Plymouth

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2016
SECTION 319 NPS PROJECT 16-09/319

16-09/319: Reducing Nonpoint Source Pollution from Two Livestock Facilities through Implementation, Remediation, and Education of Selected BMPs

NPS Category: Agriculture
Investigator: UMass - Amherst
Location: Connecticut River Watershed

Description:
Portions of the Mill and Fort Rivers in the Connecticut River watershed are impaired by pathogens, some of which are related to agricultural activities. This project will minimize NPS from two equine/livestock facilities located in critical watersheds and conduct on-site and off-site educational training for community livestock owners. This will be accomplished with farm conservation plans and the implementation of various BMPs. This project will provide hands on learning opportunities to various livestock communities throughout the state of Massachusetts, including the general public as well as commercial stables and riding facilities. Outreach will be provided through several complimentary hands-on workshops and field days throughout the year.

Project Goals:
- Generate conservation plans for at least two livestock facilities,
- Install BMPs
- Conduct hands-on workshops and demonstrations.
- Provide technical assistance to livestock owners wanting to install similar BMPs at their facilities through farm visits and educational materials. The BMPs can include manure storage, controlling runoff water from elevated areas to vegetated buffer strips, installing sacrifice lots to keep off animals from wet fields and pastures, installing low cost aerated composting systems, fencing off animals from wetlands and streams, and installing drainage swales, gutters and downspouts for reducing mud formation and runoff.

Tasks:
1. Quality Assurance and Project Evaluation
2. Establish Expert Guidance Team
3. Develop and Implement Farm Conservation Plans
4. Assessment, Installation, and Implementation of BMPs on Two Farms
5. Provide Technical Support
6. Educational Workshops, Meetings, Tours for Industry and Community Livestock Owners
7. Reporting and Project Oversight

Cost: $315,300

Funding: $189,019 by the US EPA
$126,281 by UMass - Amherst

Duration: 2016 – 2018

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-01/319

17-01/319: Wendell Brook BMPs

NPS Category: Resource Restoration
Investigator: Town of Milton
Location: Boston Harbor Watershed

Description:
The specific target waterbody is Wendell Brook which drains into Pine Tree Brook which is listed for dissolved oxygen, turbidity, and aquatic plants, and pathogens. Under existing conditions, runoff is discharged directly to the brook with no treatment. Stormwater is the sole source of water pollution entering Wendell Brook and wet weather sampling conducted at outfalls along Wendell Brook found a geometric mean for E. coli of 10,181 MPN. Furthermore, ammonia and surfactant levels were minimal indicating that illicit discharges are not an issue. These E. coli concentrations are 81 times the applicable load allocation established in the Neponset Bacteria TMDL and significantly higher than the values observed at other sites in the study.

Project Goals:
Implement selected recommendations from the "Milton Stormwater BMP Retrofit Development Project" which was funded through the 604b grant program (11-02/604). It will also complement and reinforce previous investments along Pine Tree Brook by the Town of Milton, MassDEP and EPA through two earlier 319 grants. The project will construct structural BMPs at a site recommended by the 604b study, specifically along Wendell Brook, a tributary of Pine Tree Brook in the Neponset River watershed (Boston Harbor).

The goals are to implement the Neponset Bacteria TMDL, address other sources of water quality impairments in Wendell Brook and areas downstream, and ultimately to achieve full attainment of designated uses in these waterbodies. The project also seeks to raise awareness throughout the Town about the need and opportunity to reduce stormwater pollution and to encourage adoption of behaviors such as proper pet waste and yard waste management that will support achievement of these objectives.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Technology Transfer
5. Reporting and Project Oversight

Cost: $149,110

Funding: $87,030 by the US EPA
$62,080 by the Town of Milton

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-02/319

17-02/319: Farm Pond Green Infrastructure BMPs

NPS Category: Resource Restoration
Investigator: Town of Framingham.
Location: Farm Pond sub-basin in Concord (SuAsCo) watershed

Description:
Farm Pond, an 860-acre sub-basin located in historic downtown Framingham is listed on the 2014 Integrated List of Waters as a Category 5 Waters, "Waters requiring a TMDL," for turbidity and excess algal growth. Stormwater runoff was identified in the Town's Stormwater Master Plan as the main contributor of pollutant loading and inability to meet water quality standards. As such, the Town will retrofit existing drainage features at Farm Pond Park, and add BMPs at the corner of Winter Street and Fountain Street.

Project Goals:
Reduce sediment and nutrient loading to Farm Pond through the installation of stormwater BMPs at two sites. The secondary goal is to increase public awareness of the benefits of green infrastructure.

This project will install green infrastructure BMPs to reduce sediment and nutrient loading into Farm Pond. The project will focus on improving water quality at two of the eight stormwater outfalls that discharge directly to Farm Pond. The Fountain Street BMPs focus on the drainage system that discharges into the lower southwest corner of Farm Pond. A combination of bioretention swales, rain gardens, and a pervious pavement sidewalk will be installed at the corner of Winter Street and Fountain Street near the entrance of the Keefe Regional Technical High School. The Farm Pond Park BMPs focus on the drainage system around Farm Pond Park and its future skatepark on the western shore of Farm Pond. Existing stormwater BMPs will be retrofitted to bioretention features in conjunction with the installation of a new skatepark, with the potential to incorporate BMPs within the skatepark itself.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Education
5. Reporting and Project Oversight

Cost: $310,000

Funding: $185,000 by the US EPA
$125,000 by the Town of Framingham

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-03/319

17-03/319: Development of a Best Management Practice for Passively Removing Nitrogen from Onsite Septic Systems

NPS Category: Groundwater Disposal
Investigator: County of Barnstable
Location: Statewide Application

Description:
This project builds upon previous and successful efforts to identify potential means to remove nitrogen from septic system wastewater sources in a passive manner (Projects 14-01/319 and 15-07/319). The project draws upon broader collaboration with regional efforts (notably Long Island Sound and the newly formed New York State Center for Clean Water Technology) to further develop and prove a cost-effective non-proprietary means of enhancing nitrogen removal with a passive soils-based treatment system using lignocellulosic material (sawdust and wood chips) incorporated into the soil treatment area of a septic system to facilitate the removal of nitrogen, in onsite septic systems and to develop Best Management Practice guidelines for potential allowance in state environmental codes.

Project Goals:
Further the development of a non-proprietary cost-effective BM for the installation of septic system soil treatment areas (STA or soil absorption systems) that enhance nitrogen removal. This project will provide data necessary to formulate standardized design features that can be allowed by the Environmental Codes of the Commonwealth. The goals include the identification of those questions posed by regulators and system design practitioners, the design of experiments to answer those concerns and installation, and testing of up to three new promising non-proprietary candidate designs.

Tasks:
1. Revision of QAPP to accommodate sampling of non-proprietary passive nitrogen removal septic systems
2. Construct three prototype non-proprietary passive nitrogen removal septic systems
3. Monthly monitoring of installed non-proprietary systems
4. Conduct soil column experiments (including analyses) to validate and confirm treatment processes and use the analyses to alter designs and/or operational parameters
5. Outreach and Education
6. Reporting and Project Oversight

Cost: $246,505

Funding: $135,335 by the US EPA
$111,170 by the County of Barnstable

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-04/319

17-04/319: ACPP Technical Providers for the Palmer River Watershed-Part 2

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 when farmers implement conservation practices and other nonpoint source BMPs.

Project Goals:
Dedicate technical and financial resources to address impairments under the National Water Quality Initiative. Through the Accelerated Conservation Planning Program (ACPP) it will deploy field staff to work with Palmer River watershed farmers to develop and implement conservation planning practices and nonpoint source BMPs to address NWQI goals. It will provide one conservation planner and one implementation contractor to serve as field staff dedicated to undertake the tasks and produce the deliverables as outlined herein. The goals of the project include completing as many farm conservation plans as possible and fully implementing as many of the completed plans as possible.

Project Tasks:
1. Quality Assurance and Project Evaluation
2. Develop and Implement Farm Conservation plans
3. Provide technical and regulatory support
4. Outreach and education
5. Access to Resources
6. Next National Water Quality Initiative Watershed
7. Evaluation for Regulatory Certainty Initiative
8. Reporting and Project Oversight

Cost: $549,400

Funding: $330,900 by the US EPA
$218,500 by the MACD and project participants

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-05/319

17-05/319: West Monponsett Pond Nutrient Management Project

NPS Category: Resource Restoration
Investigator: Town of Halifax
Location: Taunton River Watershed

Description:
The Monponsett Ponds, consisting of West Monponsett Pond and East Monponsett Pond, are located in Halifax and Hanson. The ponds are relatively shallow water bodies that serve several public interests including drinking water supply, agricultural (cranberry) water supply and discharge, fisheries and wildlife habitat (including habitat for three state-listed species), flood control and recreation. The shallow waters in the ponds combined with the warm water temperatures and high nutrient content make them very susceptible to cyanobacteria toxin blooms which have resulted in multiple beach closures and serious health concerns. Since 2008 the Massachusetts Department of Public Health has issued many public health advisories for the pond, forcing the Town to close the beaches to swimming and boating.

West Monponsett Pond is listed on the 2014 Integrated List of Waters as a Category 5 water body impaired for phosphorus, excess algal growth, and proliferation of non-native aquatic plants. This project will undertake in-lake sequestration of phosphorus as part of the remediation strategy to restore water quality to meet water quality standards.

Project Goals:
Sequester the phosphorus in the lake sediment and reduce the concentration cyanobacteria that produce dangerous toxins through aluminum sulfate (alum) treatment. Ultimately the goal is to move West Monponsett Pond from the 303d list of impaired waters by addressing a major contributor of total phosphorus, internal sediment.

Tasks:
1. Quality Assurance and Project Evaluation
2. Permitting
3. First Phase Buffered Alum Treatments
4. Second Phase Buffered Alum Treatments
5. Outreach and Education
6. Reporting and Project Oversight

Cost: $619,705

Funding: $331,500 by the US EPA
$288,205 by the Town of Halifax

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-06/319

17-06/319: Using the Science of Fluvial Geomorphology to Develop River Corridor Management Tools to Project the Health and Improve the Resiliency of the Deerfield Watershed

NPS Category: Healthy Watersheds
Investigator: Franklin Regional Council of Governments
Location: Deerfield River

Description:
This project will identify river corridors using fluvial geomorphology and take advantage of relatively inexpensive opportunities to protect river corridors using tools like the River Corridor Protection Overlay District and River Corridor Easement. Protecting these areas will help to avoid further degradation and destabilization that comes from floodplain and corridor encroachment and create opportunities for future restoration. The river corridor maps developed as part of this project will provide municipalities, riverine landowners, land trusts, and others with a powerful tool to improve ecological function, increase flood resiliency, reduce downstream flooding and sediment loading, better protect infrastructure against erosion, and increase watershed resiliency to future climate change.

Project Goals:
Develop a *River Corridor Mapping and Management Toolkit* for river corridors that provide strategies for limiting encroachment along rivers; identify areas susceptible to channel migrations; and help prioritize river and floodplain restoration projects and river corridor protection opportunities. The BMPs include: A cost-effective, scientifically defensible river corridor mapping protocol that is based on the science of fluvial geomorphology, and two management tools to accompany the mapping: a River Corridor Protection Overlay Zoning District Bylaw and a River Corridor Easement.

Tasks:
1. Quality Assurance and Project Evaluation
2. Finalize the Draft Model River Corridor Protection Overlay Zoning District Bylaw
3. Provide Technical Assistance to the Ashfield and Conway Planning Boards to Adopt the River Corridor Protection Overlay District
4. Develop a Model River Corridor Easement Tool for Massachusetts and List of Prioritized Projects for Implementation in the South and North River Watersheds
5. Develop Cost-effective Corridor Mapping Protocol for Massachusetts and Pilot it in the North River Watershed.
6. Install Stormwater BMP in Parking Lot Retrofit
7. Climate Pilot Study for the Deerfield River Watershed
8. Public Education and Outreach
9. Reporting and Project Oversight

Cost: $273,281

Funding: $155,000 by the US EPA
$118,281 by the Franklin Regional Council of Governments

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-07/319

17-07/319: Egerton Road Green Infrastructure Demonstration Project

NPS Category: Resource Restoration
Investigator: Mystic River Watershed Association
Location: Alewife Brook which is an important tributary to the Mystic River

Description:
The Mystic River Watershed is a heavily urbanized watershed that suffers from nonpoint source pollution, a long history of industrial pollution and sanitary and combined sewer overflows. Stormwater pollution from the Alewife Brook and Mill Brook sub-watersheds play a strong role in determining the water quality and recreational value of the Mystic River. Both Alewife Brook and the Mystic River are Category 5 impaired water bodies.

Project Goals:
- Install green infrastructure that will reduce nutrient and other nonpoint source pollution inputs from stormwater runoff to Alewife Brook and the Mystic River.
- Increase community knowledge of the problem of stormwater pollution and the benefits of green infrastructure.
- Increase the Town's capacity and experience in green infrastructure installations, increasing the likelihood of future efficiencies and success.
- Increase public support in Arlington for future green infrastructure investments.

Implement a green infrastructure retrofit at a site previously identified as best meeting technical criteria and community needs by a 604b-funded study. The Egerton Road site was identified as the most feasible location for a green infrastructure retrofit in the *Alewife and Mill Brook: Mystic Headwaters Project* (13-01/604b) after a process of GIS feasibility analysis, phosphorus modeling, site prioritization and stakeholder engagement. The site is located at the intersection of Egerton and Herbert Road. This project will divert runoff into two curb extensions on either side of the street, each containing a sediment forebay and bioretention basin. This project will also install a pre-treatment structure at Coral and Park Streets to capture sediment that otherwise eventually drains into the Mystic River.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. Installation of Pre-Treatment Structure at Coral and Park Streets
4. BMP Operation and Maintenance Plan
5. Outreach and Education
6. Reporting and Project Oversight

Cost: $91,985

Funding: $54,834 by the US EPA
$37,151 by the Mystic River Watershed Association and project partners.

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-08/319

17-08/319: Mitigation of Erosion Impacts at Bartholomew's Cobble and Naumkeag

NPS Category: Healthy Watersheds
Investigator: The Trustees of Reservations
Location: Housatonic River

Description:
Bartholomew's Cobble (Sheffield) and Naumkeag (Stockbridge) are suffering from severe erosion and sedimentation into high quality wetland resources which appear to be triggered by poor stormwater management practices exacerbated by climate change. Increased storm intensity and frequency has caused existing sizes and configurations of swales and pipes used to collect and convey water to become overwhelmed, resulting in water flowing in concentrated patterns across the fragile soils on steep slopes. Erosion and sedimentation affect sensitive wetland habitats and state-listed rare species, both at the site where water cuts through land, and where it deposits the resulting sediments.

Project Goals:
Implement a set of preventative and restorative measures which will reduce the ongoing erosion and runoff problems that have been exacerbated by the change in storm frequency and intensity due to climate change at two properties within the Housatonic Watershed. This project will restore valuable rare wetland species and wetland habitats at both sites. It will implement measures that are suitable for the natural landscapes in the area and are effective, yet low cost, methods that public works departments and private organizations (particularly those with limited financial resources) could replicate with their own staff and equipment. In addition, measures will take into account the projected changes in storm frequency and intensity under the projected future climate. The primary approach to managing erosion and sedimentation depends on reducing runoff and managing it near its source through infiltration, storage, and evapotranspiration. This will be achieved by identifying and addressing source control of rainfall and groundwater before it begins to channelize and cause erosion across the steep slopes of the individual properties.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs- Bartholomew's Cobble
3. Design and Construct Stormwater Management BMPs- Naumkeag
4. BMP Operation and Maintenance Plan
5. Outreach and Education
6. Reporting and Project Oversight

Cost: $271,214

Funding: $162,800 by the US EPA
$108,414 by the Trustees of Reservations

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2017
SECTION 319 NPS PROJECT 17-09/319

17-09/319: Stormwater BMPs: Sevenmile River Watershed

NPS Category: Resource Restoration
Investigator: Town of Spencer
Location: Sevenmile River in the Chicopee River Watershed

Description:
This project will protect the Category 2 listing of the Sevenmile River (Chicopee River Watershed) in Spencer along with the Town's public water supply aquifer through the design and construction of stormwater BMPs for drainage areas predominantly along Meadow Road from Pleasant Street (Route 31) to West Main Street (Route 9). Stormwater management in these tributary areas generally consists of piped drainage infrastructure that discharges to Sevenmile River without treatment. The BMPs will be sited on Town land and will receive flow from existing stormwater collection systems that have concentrated the runoff. The stormwater controls will be designed to treat runoff prior to discharge into Sevenmile River and the Town's Aquifer Protection District and, where feasible, to intercept, treat and recharge stormwater.

Project Goals:
Construct stormwater BMPs to protect the high-quality water resource of the Sevenmile River such as bioretention/rain gardens, infiltration basins and constructed vegetated wetlands. A public outreach and education program will inform residents of the stormwater BMPs and of project progress and educate and encourage them to participate in reducing nonpoint source pollution.

The project will utilize a mixture of structural and non-structural BMPs. They will promote treatment, storage/detention and infiltration (where possible) prior to discharge into Sevenmile River. BMPs may include bioretention/rain gardens, infiltration and constructed vegetated wetlands that will capture first-flush stormwater runoff contaminants. Soil investigations will be performed to determine site-specific suitability for infiltration BMPs.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Technology Transfer
5. Reporting and Project Oversight

Cost: $177,500

Funding: $106,500 by the US EPA
$71,000 by the Town of Spencer

Duration: 2017 – 2019

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-01/319

18-01/319: Internal Phosphorus Load Inactivation for Lake Attitash

NPS Category: Resource Restoration
Investigator: City of Amesbury
Location: Merrimac River Watershed

Description:
Lake Attitash is a secondary drinking water supply that experiences frequent cyanobacteria or Harmful Algal Blooms (HABs) caused by excess phosphorus. The EPA, CDC, WHO and MADPH all agree that drinking water containing toxins from a HAB have adverse health risks including; liver, kidney and neurological damage. The MA DPH monitored the lake from 2009-2012 and issued more than a dozen health advisories during this period. Frequent blooms result from excess internal loading, and they threaten Amesbury's drinking water supply and the public. It is not possible to avoid having water from Lake Attitash being sent to Amesbury's drinking water intake during high flow conditions. Efforts by EPA, MassDEP, Amesbury, Merrimac and the Lake Attitash Association (LAA) to lower inputs of nutrients have been implemented over the past 30 years. Nearly all drainage within the watershed of the lake has been improved through a 2002 demonstration grant and two 319 grant projects (01-20/319 and 11-07/319). Large scale public education efforts have been implemented as part of these efforts and continue, and restrictive ordinances have been implemented to reduce phosphorus inputs to the lake. Agriculture was a major source of phosphorus loading in the past. Through the efforts of LAA and MADAR these inputs have been drastically reduced. The source of continued high levels of phosphorus has been identified as the lake sediment.

Project Goals:
Sequester the phosphorus in the lake sediment over the 194 acres of Lake Attitash where anoxia occurs. Treatment of surficial sediment will lead to decreased cyanobacteria abundance, which in turn, will increase water clarity and deep water oxygen levels. Achieving this goal will reduce the risk to Amesbury's drinking water supply and the public encountering Lake Attitash. Aluminum compounds will be applied to an area of 194 acres at a dose of at least 40 g/m^2. The application of aluminum treatment will remove phosphorus from the water column. Treatments will be applied to the pond with application rates and timing to be determined following review by local and state government staff.

Tasks:
1. Quality Assurance and Project Evaluation
2. Watershed Based Plan
3. Permitting
4. Aluminum Treatment
5. Outreach and Education
6. Reporting and Project Oversight

Cost: $587,000

Funding: $352,000 by the US EPA
$235,000 by the City of Amesbury and Project Partners

Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-02/319

18-02/319: Revision of Massachusetts Watershed-based Plans

NPS Category: Outreach and Education
Investigator: Geosyntec Consultants Inc.
Location: Statewide

Description:
This project will build on the success of the Massachusetts Watershed Based Plans (WBP) web-based tool with two tasks designed to (1) support MassDEP partners in completing technically robust completed WBPs, and (2) provide technical and programmatic support to the MassDEP NPS Program for the WBP tool.

Project Goals:

- Provide field engineering support to complete WBPs: Working with MassDEP's partner organizations, provide targeted science and engineering support as needed to complete WBPs for ten watersheds. This task is designed based on lessons learned from the 2016 WBP pilot projects, and will focus on providing the engineering and planning technical assistance identified as most needed by partner organizations for completion of WBPs, including field assessment of BMP locations, selection, sizing, etc.
- Provide NPS Program Support: Promote successful and increased use of the WBP tool by supporting MassDEP NPS Program staff through (1) ongoing website hosting and technical support and (2) development of a WBP Review Criteria and Scoresheet that NPS Program staff can use for evaluation of completed WBPs and to provide constructive feedback to project partners.

Tasks:

1. BMP Engineering and Design Assistance to Complete WBPs
    a. Compile and Review Existing Data, Prepare WBP Element A and B
    b. Watershed Field Investigations
    c. Recommend Watershed Improvements, Element C
    d. Complete WBP Elements D-I
    e. Complete WBPs
2. MassDEP NPS Program and User Support for WBP Tool
    a. Develop WBP Checklist, Review Criteria and Scoresheet
    b. Update WBP Element C Guidance
    c. Continued Website Hosting, Public Outreach Support and Technical Support for WBP Users and NPS Staff
    d. Meetings & Communication

Reporting and Project Oversight

Cost: $259,892

Funding: $155,935 by the US EPA
$103,957 by Geosyntec Consultants, Inc. and Project Partners

Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-03/319

18-03/319: Public-Private Partnership for Stormwater Green Infrastructure

NPS Category: Resource Restoration
Investigator: Town of Franklin
Location: Charles River Watershed

Description:
Franklin lies at the headwaters of the Charles River for which stormwater runoff has been identified as the main contributor of pollutant loading and inability to meet water quality standards. The Charles River is listed as impaired due to flow alteration, mercury, nutrients, noxious aquatic plants, organic enrichment/low DO and turbidity. Nutrients and pathogens TMDLs have been completed for the Upper Charles River watershed. Tributaries of the Charles River within Franklin have been listed as impaired on the Integrated List and require a TMDL study to restore water quality. Mill River is classified as Category 5 (TMDL required) for thermal modifications and other habitat alterations.

Project Goals:
Improve water quality in the impaired waters of the Upper Charles River watershed, specifically the Mill River subwatershed in the Town of Franklin. This goal will be achieved by: reducing pollutant loading in the Mill River subwatershed by continuing BMP retrofits and enhancements to maximize the water quality benefits with available resources.

This project will continue the implementation of a watershed-wide water quality improvement strategy and build upon the success of publicly funded, previously implemented projects within the watershed. The strategy includes incorporating structural and non-structural BMPs within the Mill River subwatershed:

- Four bioretention areas at the proposed Fairfield condominiums at Dean Avenue
- Removal of unnecessary pavement and installation of a rain garden at end of Griffin Road.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Education
5. Reporting

Cost: $210,220

Funding: $125,000 by the US EPA
$85,220 by the Town of Franklin

Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-04/319

18-04/319: Stormwater Fee Development for Westford's Stormwater Management Master Plan

NPS Category: Stormwater Utility
Investigator: Town of Westford
Location: Merrimack River and SuAsCo Watersheds (Assabet and Concord Rivers)

Description:
Over the past five years, the Town of Westford has demonstrated its commitment to stormwater management through development of a long-term Stormwater Management Master Plan (SWMMP). One element of the plan, completed in 2016, was an in-depth funding study which recommended that the Town pursue development of a fee-funded stormwater utility. The Town Board of Selectmen voiced its support to move forward with the next phase of utility development with a vote in May 2017 that approved $72,000 in funding for this effort.

Project Goals:
- Propose a rate structure that generates sufficient revenue to cover stormwater management program costs;
- Prepare a detailed plan specific to the Town's existing administrative structure that will allow for a seamless implementation of the proposed stormwater utility; and
- Bring the proposed stormwater utility to the Board of Selectmen and ultimately Town Meeting for approval and adoption.

The goals of the SWMMP for watershed protection, water quality monitoring and improvements, and proactive drainage system operation and maintenance cannot be achieved without a long-term funding source. Through implementation of a utility, the Town of Westford seeks to ensure the execution of projects identified in its SWMMP and ongoing proactive stormwater management.

Tasks:
1. Refine Stormwater 5-Year Program Costs
2. Develop Rate Structure, Rates, Billing Mechanics
3. Obtain Input and Support from Town Leadership and Stakeholders
4. Finalize Utility Structure & Management
5. Prepare for Billing
6. Post Go-Live Support
7. Public Education & Outreach
    a. Phase 1: Stormwater Management Master Plan Outreach
    b. Stormwater Fee Outreach
8. Reporting and Project Oversight

Cost: $178,522

Funding: $99,982 by the US EPA
$78,540 by the Town of Westford
Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-05/319

18-05/319: Phase 1 Implementation of Bellingham's Subwatershed Management Plan

NPS Category: Resource Restoration
Investigator: Town of Bellingham
Location: Charles River Watershed

Description:
This project consists of the final design and construction of two infiltration basins and one infiltration trench, along with creation of a landscaped park that reduces 0.36 acres of directly connected impervious cover, at the Town's Municipal Center. The BMPs are a high-priority recommendation from work completed in 2011 under a 604(b) grant titled "Subwatershed Management Plan for Bellingham, MA". Currently, stormwater runoff from the Municipal Center parking area discharges without treatment to the Charles River Watershed which results in the discharge of pollutants including nutrients, pathogens, and sediments. As documented in the Massachusetts 2014 Integrated List of Waters, the segment of the Charles River (MA72-04) near the proposed project is listed as a Category 5 Water impaired by E. coli and other pollutants. In addition, there is a final TMDL for Nutrients in the Upper/Middle Charles River and a final TMDL for pathogens.

Project Goals:
1) Substantially reducing the loading of nutrients, sediment, pathogens, oil, and other contaminants from entering the river through treatment and reduction of stormwater runoff. 2) Increasing groundwater recharge in the Watershed. 3) Providing highly visible demonstration BMPs at a site widely used by Town citizens that will provide education to residents about stormwater runoff, steps they can take to reduce pollution, and unique water quality and ecological issues of the Charles River in Bellingham. 4) Providing outreach and education regarding stormwater pollution and treatment strategies to the general public, in a manner to motivate individual pollution reduction actions. 5) Enhancing local knowledge and expertise within the Bellingham Public Works Department in the design, construction and maintenance of infiltration BMPs for stormwater treatment, as the Town continues to implement its pollution reduction plans.

Tasks:
1. Quality Assurance and Project Evaluation
2. Watershed Based Plan
3. Design and Construct Stormwater Management BMPs
4. BMP Operation and Maintenance Plan
5. Outreach and Education
6. Reporting and Project Oversight

Cost: $163,770

Funding: $97,895 by the US EPA
$65,875 by the Town of Bellingham

Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-06/319

18-06/319: Pequit and Beaver Meadow Brook BMP Retrofit Project

NPS Category: Resource Restoration
Investigator: Town of Canton
Location: Boston Harbor Watershed

Description:
Pequit and Beaver Meadow Brooks, which drain into the East Branch of the Neponset River (Boston Harbor watershed), are listed as a Category 5 for dissolved oxygen and Category 4a for pathogens. Reducing the loading is anticipated to be a major step in improving water quality in both waterbodies. This project implements recommendations from the FY2016 SWMI Grant "Mitigation and Minimization Alternatives to Improve Streamflow in the Neponset River Watershed" BRP 2016-06 and also draws on lessons learned during an earlier 604b grant (2009-01/604).

Project Goals:
Partially implement the Neponset Bacteria TMDL, address other sources of water quality impairments in Beaver Meadow and Pequit Brooks and areas downstream, and ultimately to achieve full attainment of designated uses in these waterbodies. The project also seeks to raise awareness throughout the Town about the need and opportunity to reduce stormwater pollution and to encourage adoption of behaviors such as proper pet waste and yard waste management that will support the achievement of these objectives. The project will construct structural BMPs at the Dean S. Luce School and Devoll Field in Canton. At the Devoll Field a constructed water quality swale will capture, cleanse and convey runoff from a snow storage field to a raingarden prior to discharge into environmental resources. Rain gardens are proposed at four highly-visible Dean S. Luce School locations. Installation of concrete steps to remediate an existing erosion problem behind the school and will include a LID cascading swale. The structural BMPs will be complemented by a comprehensive outreach and education campaign using a combination of an initial press release, a mailing to all town residents, and interpretive signage on site, as further detailed in the scope of services below.

Tasks:
1. Quality Assurance and Project Evaluation
2. Engineering and Permitting
3. BMP Construction
4. BMP Operation and Maintenance Plan
5. Outreach and Technology Transfer
6. Reporting and Project Oversight

Cost: $241,992

Funding: $144,784 by the US EPA
$97,208 by the Town of Canton

Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-07/319

18-07/319: Crosby Lane Stormwater Treatment and Salt Marsh Restoration Project

NPS Category: Resource Restoration
Investigator: Town of Brewster
Location: Cape Cod Watershed

Description:
The project will address pollutant loads to Namskaket Creek and a tidal restriction on Crosby Lane in Brewster. The site is located in the western end of the Inner Cape Cod Bay Area of Critical Environmental Concern (ACEC) where Crosby Lane crosses a restricted tidal creek which flows into the Namskaket Creek estuary located to the east. This area of the ACEC contains high-quality waters and coastal resources including: an Outstanding Resource Water (ORW); brackish wetlands that connect to the Namskaket salt marsh (which provides important habitat and serves as a nitrogen sink to protect coastal water quality).

The road and a parking lot for the Crosby Landing Beach drain into the Crosby Lane tidal creek that connects to the Namskaket estuary: the estuary is a category 4A water body with a TMDL for fecal coliform bacteria. The stormwater treatment will reduce the pathogen load to the estuary. Replacing an undersized culvert on Crosby Lane will greatly improve tidal flow to a tidally-restricted salt marsh that drains to Namskaket Marsh to the east.

Project Goals:
1) treat stormwater runoff from Crosby Lane and Crosby Landing Beach parking lot through installation of green stormwater infrastructure (bioretention basin, sediment forebay and vegetated swales); and 2) restore tidal flow and restore salt marsh by replacing the undersized 12" culvert under the road with a 5'x5' culvert. The larger tidal culvert will also accommodate changing precipitation and groundwater elevations as climate change and sea level rise occur, thus enhancing coastal resilience.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Education
5. Reporting and Project Oversight

Cost: $463,500

Funding: $105,000 by the US EPA
$358,500 by the Town of Brewster and Project Partners

Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-08/319

18-08/319: Knob Hill Road Stormwater Improvements

NPS Category: Resource Restoration
Investigator: Town of Great Barrington
Location: Housatonic River Watershed

Description:
Lake Mansfield is impaired and listed under category 4c due to invasive macrophyte (aquatic plant) species. Nonpoint source runoff pollutes the lake with sediment, leading to shallower and warmer waters, and thereby making it easier for invasive plants to grow. In addition to physical problems associated with sediment deposition, sediment particles readily transport pollutants such as metals, nutrients, and pathogens.

Project Goals:
Address the storm drainage from Knob Hill Road as there are no catch basins on the road and sediment-laden stormwater flows directly into the southern end of Lake Mansfield and develop construction plans for a lake outlet control structure to allow high water to flow out of the lake reducing erosion and water level drawdowns to control invasive weeds.

Knob Hill Road will be reconstructed with a new drainage system, curbing and new pavement, and will include deep sump catch basins with oil hoods that will capture sediment and pollutants. In addition, a hydrodynamic separator unit will be installed to further remove suspended sediments and pollutants. In addition to the 604(b)-related work the boat ramp will be reconstructed to reduce erosion and will include the installation of a BMP to capture stormwater runoff from the parking lot, road, and adjacent hillside. This project will also include the design and permitting of a lake outlet water-level control structure to control invasive plants and decrease erosion in the buffer zone.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. Boat Launch Reconstruction with a BMP
4. Outlet Control Structure Design and Permitting
5. BMP Operation and Maintenance Plan
6. Outreach and Education
7. Reporting and Project Oversight

Cost: $479,000

Funding: $288,925 by the US EPA
$190,075 by the Town of Great Barrington and Project Partners

Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2018
SECTION 319 NPS PROJECT 18-09/319

18-09/319: Armory Village Green Infrastructure Project

NPS Category: Resource Restoration
Investigator: Town of Millbury
Location: Blackstone River Watershed

Description:
In Millbury the Blackstone River is classified as a Category 5 Water due to up to 17 different causes of impairment including trash, chronic aquatic toxicity, excessive algal growth, phosphorous, foam/scum/oil slicks, and turbidity, all of which are exacerbated by stormwater flowing directly into the river. The intersection of Main and Elm Streets forms the heart of the downtown area and is situated approximately 500 feet up from the Blackstone River.

Project Goals:
(1) reduce sediment and nutrient loads as well as the quantity/velocity of stormwater flows to the Blackstone River through the use of green infrastructure features including bioretention bump outs and rain gardens, tree box filters, flow-through planters, tree planting, expansion of open space areas, and selective application of permeable paving surfaces; (2) provide education and outreach on the types and benefits of Green Infrastructure features to community members and public officials; and (3) demonstrate the use of infiltration-based green infrastructure within the public right-of-way to promote stakeholder support for their use within other areas of the Town that contribute considerable stormwater flows into the Blackstone River.

This project will bring Low Impact Development (LID) and green infrastructure practices to the intersection of Main and Elm Streets, Upper and Lower Commons, and a portion of South Main Street. This targeted area has the potential to address stormwater issues in that portion of Millbury Center that is highly visible, upslope of and in closest proximity to the Blackstone River.

Tasks:
1. Quality Assurance and Project Evaluation
2. Engineering and Permitting
3. Construct Stormwater Management BMPs
4. BMP Operation and Maintenance Plan
5. Outreach and Education
6. Reporting and Project Oversight

Cost: $250,000

Funding: $150,000 by the US EPA
$100,000 by the Town of Millbury and Project Partners

Duration: 2018 – 2020

FEDERAL FISCAL YEAR 2019
SECTION 319 NPS PROJECT 19-01/319

19-01/319: Stormwater Management and Stream Restoration for Water Quality in Lower Abbey Brook

NPS Category: Resource Restoration
Investigator: City of Chicopee
Location: Connecticut River Watershed

Description:
Abbey Brook is impaired and listed under Category 5 for E. coli and total suspended solids. Abbey Brook drains a small, but highly urbanized watershed in Springfield and Chicopee and flows 1.5 miles to join the Chicopee River. Sampling done under a 2016 604b grant found high E.coli levels in lower Abbey Brook attributable to the Canada geese that congregate at Lower and Upper Bemis Ponds in Szot Park. This project will improve water quality in Abbey Brook and transform the landscape around the two ponds in Szot Park. Stormwater BMPs for the shoreline will discourage year-round geese that are habituated to using the Park and address the bacteria issues identified in the 604b grant study. The brook emerged as a priority location for stormwater management improvements as a result of this study. The stormwater work coincides with plans to remove the lower dam and efforts to advance both a feasibility study for removal of the upper dam and public understanding about water quality and a restored Abbey Brook.

Project Goals:
(1) Install BMPs to discourage congregation of geese, providing for decentralized treatment of stormwater runoff impacts, reducing sediment loading from the nearby roadway, and slowing flows along the slopes that drain to Bemis Pond/Abbey Brook. (2) Reduce stormwater flow volumes with infiltration to make the areas around Abbey Brook more resilient to climate change. (3) Advance full restoration of Abbey Brook with an investigation at the upper dam (4) Support public understanding of what Szot Park could look like with restoration of Abbey Brook.

Tasks:
1. Quality Assurance and Project Evaluation
2. Survey, Design, Permit, and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Study feasibility of Upper Bemis Pond Dam removal
5. Develop presentation size, quality renderings from different vantage points to illustrate before and after conditions and potential benefits of dam removal
6. Outreach and Education
7. Reporting and Project Oversight

Cost: $203,400

Funding: $122,000 by the US EPA
$81,400 by City of Chicopee and project participants

Duration: 2019 – 2021

FEDERAL FISCAL YEAR 2019
SECTION 319 NPS PROJECT 19-02/319

19-02/319: Reducing Phosphorus Impacts from Septic Systems Near Freshwater Lakes and Ponds-Defining Best Management Practices

NPS Category: Groundwater Disposal
Investigator: County of Barnstable
Location: Statewide Application

Description:
This project will validate cost-effective BMPs for protecting freshwater resources from phosphorus inputs from onsite septic systems. Phosphorus inputs to our region's freshwater lakes and ponds are often responsible for harmful algae blooms, anoxic events that cause fish kills, and reduced ecologically-stabilizing diversity. The project will pilot at least two advanced-treatment technologies to address the issue and in addition to demonstrate the efficacy of applying two shallow soils-based treatment technologies, which currently have General Use Approval, to attenuate phosphorus from onsite septic systems. As a result, the project will develop both a Best Management Strategy for protection of freshwater watersheds that depend on septic systems, and guidelines for BMP implementation. This project will also install available and DEP-approved shallow-based systems in native shallow soil horizons and demonstrate the efficacy of this simple more-passive means of phosphorus attenuation. Education efforts will target boards of health and the engineering/design community to encourage this strategy for the protection of freshwater resources.

Project Goals:
The goals are to install at least four advanced onsite systems that purport to remove phosphorus and two to four shallow native-soil systems in watersheds of freshwater ponds in Barnstable County and demonstrate their efficacy in removing phosphorus. In addition, this project will encourage the community of engineers and system designers to consider the successful technologies in situations where their clients have septic systems near freshwater resources that may be impacted by phosphorus loading.

Tasks:
1. QAPP
2. Compile information for the public and prospective program participants
3. Install six onsite septic systems
4. Continue to monitor installed systems and evaluate for effectiveness
5. Education Program; technology transfer
6. Reporting and Project Oversight

Cost: $208,923

Funding: $96,603 by the US EPA
$112,320 by the County of Barnstable and project participants

Duration: 2019 – 2021

FEDERAL FISCAL YEAR 2019
SECTION 319 NPS PROJECT 19-03/319

19-03/319: Stormwater Mitigation at Aberjona River in Winchester

NPS Category: Resource Restoration
Investigator: Mystic River Watershed Association
Location: Aberjona River which is an important tributary to the Mystic River

Description:
The Mystic River Watershed is a heavily urbanized watershed that suffers from nonpoint source pollution, a long history of industrial pollution and combined sewer overflows. The Aberjona River is the only major tributary to Upper Mystic Lake. Both the Aberjona River and the Mystic Lakes are Category 5 impaired water bodies that drain into the Mystic River. This project is a follow-up to an earlier 604b grant (project number 11-01/604). It will implement a green infrastructure retrofit on residential streets in a drainage to the Aberjona River. It will divert runoff into multiple stormwater tree trenches (bioswales). The stormwater tree trenches will significantly improve stormwater management, reduce nonpoint source pollution, and contribute to reduction of localized flooding.

Project Goals:
1)Construct green infrastructure that will reduce nutrient and other pollutant inputs from stormwater runoff to the Aberjona River, Mystic Lakes and the Mystic River. 2) Develop a practice in the Town of Winchester for routine retrofitting of streets with an established set of practices. 3) Increase the Town's capacity and experience in green infrastructure installations and maintenance, increasing the likelihood of future efficiencies and success. 4) Increase community knowledge of the problem of stormwater pollution and of the benefits of green infrastructure as a solution. 5) Increase public support in Winchester for future green infrastructure investments.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. Construct Infiltration Chamber
4. BMP Operation and Maintenance Plan
5. Outreach and Education
6. Reporting and Project Oversight

Cost: $490,645

Funding: $190,645 by the US EPA
$300,000 by the Mystic River Watershed Association and project participants

Duration: 2019 – 2021

FEDERAL FISCAL YEAR 2019
SECTION 319 NPS PROJECT 19-04/319

19-04/319: Beaver Meadow Brook BMP Retrofit Project

NPS Category: Resource Restoration
Investigator: Town of Stoughton
Location: Boston Harbor Watershed

Description:
Beaver Meadow Brook drains into Bolivar Pond, the East Branch of the Neponset, and ultimately the Neponset River (in the Boston Harbor watershed). The brook is listed in the MassDEP 2014 Integrated List for dissolved oxygen and pathogen impairments. Stormwater is highlighted as a priority concern in MassDEP's past watershed-based plans for the Neponset River Watershed, in EEA's Boston Harbor Watershed Assessment and Action Plan, and in MassDEP's Pathogen TMDL for the Neponset River Watershed.

The proposed project will implement the top recommendation from the FY2017 SWMI Grant "Charles-Neponset Water Conservation and Groundwater Recharge Project". The project will construct a large infiltration basin at the Joseph R Dawe Jr. Elementary School within the Beaver Meadow Brook watershed. This site was selected for ease of construction, its large contributing drainage area, potential for major groundwater recharge, and its value as a highly visible educational project. The outreach program will include a press release, a mailing to all town residents, and interpretive signage on site, regular blogs and articles to be posted. Finally, a school education program will be undertaken in the Stoughton Public School system and at the Dawe School students will visit the BMP and learn how it works as a field component of a classroom lesson about stormwater and water conservation.

Project Goals:
The goals of the project include reducing pollutant loading to Beaver Meadow Brook as important first steps towards attaining designated uses for Beaver Meadow Brook and Neponset River and increasing public awareness of the need to reduce stormwater pollution and available methods to reduce pollutant loads.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Education
5. Reporting and Project Oversight

Cost: $161,406

Funding: $96,836 by the US EPA
$64,570 by Town of Stoughton and project participants

Duration: 2019 – 2021

FEDERAL FISCAL YEAR 2019
SECTION 319 NPS PROJECT 19-05/319

19-05/319: Avon Town Hall Green Infrastructure Demonstration Project

NPS Category: Resource Restoration
Investigator: Town of Avon
Location: Taunton River Watershed

Description:
This project will design and construct BMP's at Avon's Town Hall to reduce pollution from stormwater runoff discharging to Trout Brook. It is a priority location identified through an EPA Southeast New England Program (SNEP) grant titled "Identification and Assessment of Causes of Impairment: Trout Brook (MA62-07_2008(5))". More than 65% of the Town's water supply is drawn from the Trout Brook aquifer, through which the brook flows. Trout Brook is listed as a Category 5 waterbody on the 2014 Integrated List for fecal coliform, dissolved oxygen, total suspended solids and turbidity. There is also a final TMDL to address pathogens in this brook in the portion downstream from Avon. Impervious cover and discharge of untreated stormwater from Avon is strongly suspected as the cause of the impairment in Trout Brook and the source of the total and fecal coliform detected in a public water supply well. Runoff from the Town Hall parking lot currently enters Trout Brook without treatment via the storm drain network. The implementation of stormwater treatment by installing a gravel wetland, tree box filters, and a rain garden at the Town Hall parking lot will significantly reduce the loading of these pollutants. In addition, this project will be supported by a robust education and outreach program.

Project Goals:
1)Reduce the loading of sediment, pathogens, nutrients and other contaminants from entering Trout Brook through treatment of stormwater runoff, as a step towards attaining designated uses for this and downstream waterbodies. 2) Provide outreach and education regarding stormwater pollution and treatment strategies, in a manner to spur implementation of specific municipal and individual pollution reduction actions. 3) Continue to implement its pollution reduction plans, enhance local knowledge and expertise within the Avon Public Works Department in the design, construction and maintenance of BMPs such as gravel wetlands, tree box filters, and rain gardens, and possibly porous asphalt/concrete and day-lighted drainage swales.

Tasks:
1. Quality Assurance and Project Evaluation
2. Design and Construct Stormwater Management BMPs
3. BMP Operation and Maintenance Plan
4. Outreach and Education
5. Reporting and Project Oversight

Cost: $131,996

Funding: $79,107 by the US EPA
$52,889 by Town of Avon and project participants

Duration: 2019 – 2021

FEDERAL FISCAL YEAR 2019
SECTION 319 NPS PROJECT 19-06/319

19-06/319: Westport River Agricultural Nonpoint Source Program

NPS Category: Agriculture
Investigator: Massachusetts Association of Conservation Districts (MACD)
Location: Westport River Watershed located within the Buzzards Bay watershed.

Description:
The Westport River is impaired by pathogens and nutrients, some of which are related to agricultural activities. Pollutants from farms can effectively be mitigated when farmers implement conservation practices and other nonpoint source BMPs. This project will encourage agricultural operations to take voluntary actions to minimize impacts on water quality through the development and implementation of NRCS designed and engineered BMPs such as manure management.
The project will assess the problem, design solutions, implement BMPs, develop NRCS approved conservation plans outlining BMPs to reduce pollutant runoff; assist landowners in obtaining access to financial resources; implement BMPs; and, ensure farmers prepare operation and maintenance plans, and adjust to help achieve proposed outcomes as a cooperative effort among governmental agencies, private organizations, and the public. The project will focus on the following Westport River segments, as appropriate, MA95-40, MA95-41, MA95-44, MA95-59 and gradually conduct outreach in other segments such as MA95-37 and MA95-54. These segments are classified as Category 4a and 5 impaired waters due to pathogens, and nitrogen with large percentages coming from agricultural operations.

Project Goals:
The goals of the project include 1) complete as many farm conservation plans as possible and 2) implement completed conservation plans containing BMPs to reduce contaminant runoff and help improve water quality in the Westport River watershed.

Tasks:
1. Quality Assurance and Project Evaluation
2. Conduct Outreach and Education
3. Develop and Implement Farm Conservation Plans
4. Assist Farmers Obtain Access to Financial Resources
5. Prepare Operation and Maintenance Plans
6. Reporting and Project Oversight

Cost: $292,700

Funding: $174,700 by the US EPA
$118,000 by the MACD and project participants

Duration: 2019 – 2021

FEDERAL FISCAL YEAR 2019
SECTION 319 NPS PROJECT 19-07/319

19-07/319: Update and Revision of 2014-2019 Massachusetts Nonpoint Source Management Program Plan

NPS Category: Outreach and Education
Investigator: Eastern Research Group (ERG)
Location: Statewide

Description:
This project will revise and update the Commonwealth of Massachusetts 2014-2019 Massachusetts Nonpoint Source Management Program Plan, which is administered and implemented by MassDEP, to reflect plans and priorities for 2020-2025. This includes updating annual milestones and the schedule for program implementation, so that they remain current and oriented toward achieving water quality goals. The Plan outlines a strategy for addressing nonpoint source problems in accordance with April 2013 EPA guidelines. The EPA Guidelines require each state to revise and update its Plan every five years.

Project Goals:
An updated Massachusetts Nonpoint Source Management Program Plan to reflect MassDEP's plans and priorities for 2020-2025. The new plan will include a five-year timeline and will build upon the 2014-2019 Plan. The 2020 Plan will be consistent with both the April 2013 EPA Guidelines and with the EPA's outline for NPS Management Plans.

Tasks:
1. Administration and Reporting
2. Project Kick-Off Meeting
3. Develop a Work Plan
4. Revise and Update the Plan

Cost: $84,484

Funding: $79,382 by the US EPA
$5,102 by ERG and project participants

Duration: 2019 – 2021

FEDERAL FISCAL YEAR 2020
SECTION 319 NPS PROJECT 20-01/319

20-01/319: Regional Nonpoint Source Coordinator Initiative: A Proposal for Franklin County

NPS Category: Outreach and Education/Resource Restoration
Investigator: Franklin Regional Council of Governments
Location: Connecticut, Deerfield, and Millers Watersheds

Description:
This project will support the Massachusetts Nonpoint Source (NPS) Program and carry out nonpoint source pollution mitigation focused work. The grantee will develop watershed-based plans and high-quality project proposals to be funded through the 319-grant program, conduct outreach and education work to enhance the NPS Program message and support of the NPS Program.

Project Goals:
The project goals are to provide services in support of the Nonpoint Source Program by assigning Grantee's staff to serve as Regional Coordinators to conduct work that is focused on NPS. It will include a collaborative watershed-based planning approach across subwatersheds, outreach and education efforts, identification and prioritization of regional NPS priorities, development of watershed-based plans, development and submittal of high-quality proposals for funding under the 319 competitive grant program, and any other activities that will further the goals of the Nonpoint Source Program especially objectives and milestones identified in the 2020-2024 Massachusetts Nonpoint Source Management Program Plan.

Tasks:
1. Quality Assurance and Project Evaluation
2. Assemble Local Implementation Committee
3. Development of Watershed-Based Plans
4. Identify Priorities
5. Development and Submittal of Proposals for Funding
6. Town of Deerfield Floodplain Restoration Project
7. Outreach and Education
8. Participate in MassDEP Trainings and Monthly Meetings
9. Project Evaluation
10. Reporting and Project Oversight

Cost: $166,667

Funding: $100,000 by the US EPA
$66,667 by the Franklin Regional Council of Governments

Duration: 2020 – 2024

FEDERAL FISCAL YEAR 2020
SECTION 319 NPS PROJECT 20-02/319

20-02/319: Fearing Brook Floodplain Creation Project

NPS Category: Resource Restoration
Investigator: Town of Amherst
Location: Fort River and Fearing Brook/Connecticut River Watershed

Description:
This project proposes to improve water quality, river processes and habitat by restoring and reconnecting Fearing Brook to its historic floodplain as a first phase of a strategic restoration effort for this urban stream. Recent studies have documented water quality issues in Fearing Brook which is tributary to the Fort River, impaired for pathogens. The floodplain restoration will increase nutrient and sediment retention which should reduce bacteria concentrations while also reducing erosive forces associated with the disrupted hydrologic regime associated with 'urban stream syndrome'.

Project Goals:
The project goal is to improve water quality in Fort River by remediating stormwater-related pollution in the Fearing Brook. Currently Fearing Brook's visible stream channel has been straightened and dredged with the dredged material cast next to the stream creating high, steep banks. The goal is to remove a segment of the built-up bank, regrade to recreate a functioning floodplain, undertake in-stream bioengineering to reduce erosion, create more complex habitat and work to eradicate invasive species along the river corridor. The restoration would involve lowering approximately 375 linear feet of the sidecast berms/banks and regrading to recreate a functioning floodplain. Post restoration, Fearing Brook will be able to access a healthy, stable vegetated floodplain which would allow stream flow to disperse across and infiltrate into the floodplain creating a sink for sediment and phosphorus. Bank and channel stabilization is the companion piece to the floodplain recreation. Instream features will increase channel diversity and roughness reducing erosive forces against the stream banks and channel. The restoration area will be stripped of invasive plants and replanted with native species.

Project Tasks:
1. QAPP
2. Watershed-Based Plan
3. Preliminary 60% Design
4. Final Design & Bid Package
5. Construction of Stormwater Management BMPs
6. BMP Operation and Maintenance Plan
7. Outreach and Education
8. Reporting and Project Oversight

Cost: $464,834

Funding: $276,549 by the US EPA
$188,285 by the Town of Amherst

Duration: 2020 – 2022

FEDERAL FISCAL YEAR 2020
SECTION 319 NPS PROJECT 20-03/319

20-03/319: Stormwater BMPs: Sevenmile River Watershed – Phase 2

NPS Category: Resource Restoration
Investigator: Town of Spencer
Location: Sevenmile River in the Chicopee River Watershed

Description:
This project will protect the Sevenmile River in Spencer along with the Town's public water supply aquifer through the design and construction of stormwater BMPs for drainage areas predominantly along Meadow Road from Pleasant Street to Olde Main Street, and along North Spencer Road (Route 31) south of Alta Crest Road. Stormwater management in these tributary areas generally consists of piped drainage infrastructure that discharges to Sevenmile River without treatment. Sevenmile River (MA36-11, MA36-12) is listed as impaired for bacteria on the 2016 Integrated List of Waters.

Project Goals:
Design and construct stormwater BMPs to protect the high-quality water resource of the Sevenmile River such as bioretention/rain gardens, infiltration basins and constructed vegetated wetlands. A public outreach and education program that will inform residents of the stormwater BMPs and of project progress and educate and encourage them to participate in reducing nonpoint source pollution.

Strategy: The project will utilize a mixture of structural and non-structural BMPs. They will promote treatment, storage/detention and infiltration (where possible) prior to discharge into Sevenmile River. BMPs may include bioretention/rain gardens and bioswales, and infiltration chambers that will capture first-flush stormwater runoff contaminants. Soil investigations will be performed to determine site-specific suitability for infiltration BMPs. Field survey will be conducted to gain details necessary for construction drawings with respect to existing drainage structures, utilities, property lines, easements, and wetlands resource areas.

Tasks:
1. Quality Assurance and Project Evaluation
2. Watershed Based Plan - COMPLETED
3. Design and Construction of Stormwater Management BMPs
4. BMP Operation and Maintenance Plan
5. Outreach and Technology Transfer
6. Reporting and Project Oversight

Cost: $148,500

Funding: $88,200 by the US EPA
$60,300 by the Town of Spencer

Duration: 2020 – 2022

FEDERAL FISCAL YEAR 2020
SECTION 319 NPS PROJECT 20-04/319

20-04/319: Berkshire County Regional Nonpoint Source Coordinator

NPS Category: Outreach and Education/Resource Restoration
Investigator: Berkshire Regional Planning Commission
Location: Hudson/Hoosic River, Housatonic, Farmington, and Westfield River Watersheds

Description:
This project will support the Massachusetts Nonpoint Source (NPS) Program and carry out nonpoint source pollution mitigation focused work. The grantee will develop watershed-based plans and high-quality project proposals to be funded through the 319-grant program, conduct outreach and education work to enhance the NPS Program message and support of the NPS Program.

Project Goals:
The project goals are to provide services in support of the Nonpoint Source Program by assigning Grantee's staff to serve as Regional Coordinators to conduct work that is focused on NPS. It will include a collaborative watershed-based planning approach across subwatersheds, outreach and education efforts, identification and prioritization of regional NPS priorities, development of watershed-based plans, development and submittal of high-quality proposals for funding under the 319 competitive grant program, and any other activities that will further the goals of the Nonpoint Source Program especially objectives and milestones identified in the 2020-2024 Massachusetts Nonpoint Source Management Program Plan.

Tasks:
1. Quality Assurance and Project Evaluation
2. Assemble Local Implementation Committee
3. Development of Watershed-Based Plans
4. Identify Priorities
5. Development and Submittal of Proposals for Funding
6. Outreach and Education
7. Participate in MassDEP Trainings and Monthly RC Meetings
8. Project Evaluation
9. Reporting and Project Oversight

Cost: $166,667

Funding: $100,000 by the US EPA
$66,667 by the Berkshire Regional Planning Commission

Duration: 2020 – 2024

FEDERAL FISCAL YEAR 2020
SECTION 319 NPS PROJECT 20-05/319

20-05/319: Massachusetts Nonpoint Source Grant Guidebook

NPS Category: Outreach and Education
Investigator: Comprehensive Environmental Inc.
Location: Statewide

Description:
This project will develop a suite of materials and support services to support and enhance the work of the Nonpoint Source Pollution (NPS) Program staff and NPS Regional Coordinators. It will provide a wide range of NPS public education/outreach materials and resources that will strengthen the capacity for MassDEP project partners to develop competitive s.319 grant projects. This project will develop support materials organized around a primary document, the Nonpoint Source Pollution Grant Guidebook (Guidebook), that will comprehensively guide s.319 applicants from "concept to implementation" in a way that builds upon MassDEP NPS Program efforts. The Guidebook will be fully compatible with and complementary to existing MassDEP NPS public outreach resources such as the Massachusetts Clean Water Toolkit, BMPs Cost Catalog, and the Massachusetts Watershed Based Plans (WBP) website. As such, the Guidebook will reference and link to these materials to guide potential s.319 grantees from project concept to submittal of a highly competitive s.319 grant application that includes a nine-element Watershed Based Plan.

Project Goals:
1) Significantly facilitate and enhance the education/outreach efforts of MassDEP NPS Program staff and NPS Regional Coordinators. 2) Provide comprehensive education and outreach materials and resources that will strengthen local capacity for MassDEP project partners to develop competitive s.319 grant projects. 3) Develop the Nonpoint Source Pollution Grant Guidebook to comprehensively guide s.319 applicants from "concept to implementation" supporting the MassDEP NPS Program.

Tasks:
1. Quality Assurance
2. Establish Expert Guidance Team
3. Develop Draft Outline of NPS Grant Guidebook
4. Develop NPS Guidebook Sections
5. Develop Supporting Guidance and Outreach Materials
6. Train-the-Trainer Sessions
7. Project Evaluation
8. Reporting and Project Oversight

Cost: $85,575

Funding: $75,285 by the US EPA

$10,290 by Comprehensive Environmental Inc.

Duration: 2020 – 2022

FEDERAL FISCAL YEAR 2020
SECTION 319 NPS PROJECT 20-06/319

20-06/319: A Regional Nonpoint Source Coordinator: Collective Action in the Pioneer Valley for Water Quality Improvement and Greater Community Resilience

NPS Category: Outreach and Education/Resource Restoration
Investigator: Pioneer Valley Planning Commission
Location: Chicopee River Watershed

Description:
This project will support the Massachusetts Nonpoint Source (NPS) Program and carry out nonpoint source pollution mitigation focused work. The grantee will develop watershed-based plans and high-quality project proposals to be funded through the 319-grant program, conduct outreach and education work to enhance the NPS Program message and support of the NPS Program.

Project Goals:
The project goals are to provide services in support of the Nonpoint Source Program by assigning Grantee's staff to serve as Regional Coordinators to conduct work that is focused on NPS. It will include a collaborative watershed-based planning approach across subwatersheds, outreach and education efforts, identification and prioritization of regional NPS priorities, development of watershed-based plans, development and submittal of high-quality proposals for funding under the 319 competitive grant program, and any other activities that will further the goals of the Nonpoint Source Program especially objectives and milestones identified in the 2020-2024 Massachusetts Nonpoint Source Management Program Plan.

Tasks:
1. Quality Assurance and Project Evaluation
2. Assemble Local Implementation Committee
3. Development of Watershed-Based Plans
4. Identify Priorities
5. Development and Submittal of Proposals for Funding
6. Outreach and Education
7. Participate in MassDEP Trainings and Monthly RC Meetings
8. Project Evaluation
9. Reporting and Project Oversight

Cost: $166,667

Funding: $100,000 by the US EPA
$66,667 by the Pioneer Valley Planning Commission

Duration: 2020 – 2024

FEDERAL FISCAL YEAR 2020
SECTION 319 NPS PROJECT 20-07/319

20-07/319: Reducing Nonpoint Source Pollution from Two Equine Facilities through Implementation, Remediation, and Education of Selected BMPs

NPS Category: Agriculture
Investigator: UMass – Amherst
Location: Fort River, Mill River, and Lake Warner/Connecticut River Watershed

Description:
Portions of the Mill and Fort Rivers are impaired by pathogens, some of which are related to agricultural activities. This project will minimize nonpoint source pollution from two equine facilities located in critical watersheds and conduct educational training for community livestock owners. This will be accomplished with NRCS-approved farm conservation plans and the implementation of various BMPs. NRCS approval of farm conservation plans is subject to the availability of the NRCS. Outreach will be provided through several complimentary hands-on workshops and field days throughout the year. The project will reinforce USDA nutrient management programs and NRCS standards for nutrient management practices while reducing non-point source pollution.

Project Goals:
This project will 1) generate farm conservation plans for at least two livestock facilities, 2) install BMPs, 3) educate horse owners to recognize good management practices utilizing the two pilot farms for several hands-on workshops and demonstrations, and 4) provide technical assistance to horse owners wanting to install similar BMPs at their facilities through farm visits and fact sheets, as well as other educational materials.

Tasks:
1. Quality Assurance and Project Evaluation
2. Watershed Based Plan - COMPLETED
3. Establish Expert Guidance Team
4. Develop and Implement Farm Conservation Plans
5. Assessment, Installation, and Implementation of BMPs on Two Farms
6. Educational Workshops, Meetings, Tours for Equine Industry and Community Horse Owners:
7. Reporting and Project Oversight

Cost: $478,064

Funding: $286,670 by the US EPA
$191,394 by the UMass - Amherst

Duration: 2020 – 2022

FEDERAL FISCAL YEAR 2021
SECTION 319 NPS PROJECT 21-01/319

21-01/319: Distributed Small-Scale Trenches for Phosphorous Load Reduction

NPS Category: Operation and Maintenance Plans
Investigator: Mystic River Watershed Association
Location: Mystic

Description:
This project aims to reduce phosphorous loads in the Mystic River which have been designated Category 5 impaired by phosphorous. It is thought that the primary cause of impairments are nutrients and pathogens from a 25-mile spread of the river that appear on the 303(d) list as impaired from those stressors. In the Mystic, reduction of nutrient pollution has been a priority for US- EPA Region 1, in May 2020, the EPA released TMDL development for phosphorous management for the Mystic after several years of data collection and analysis. This report stated that inadequate control of stormwater runoff was the predominate source of nutrient loads in the watershed. This project is designed to replicate a larger scale TMDL report which called for implementation of distributed, small-scale green infrastructure as the means of nutrient reductions where large-scale BMPs are limited.

Tasks:

1. Implement this modular trench design that can be replicated in large numbers and can reduce engineering and construction costs for the most cost-effective approach to reduce nutrient loads.
2. Reduce phosphorus loads to Mystic River water bodies by implementing the recommendation in the Alternative TMDL report for distributed, cost-effective green infrastructure.
3. Serve as a regional model for the benefits of distributed small-scale GI.
4. Transfer knowledge and build capacity in municipalities to continue this work into the future, taking advantage of future road work to make street trenches at catch basins a routine occurrence.
5. Educate residents and key stakeholders on the mechanisms and importance of nutrient pollution controls and describe these installations in the larger frame of need for investment in stormwater infrastructure.

Cost: $868,715

Funding: $498,715 US 319 Grant,

$370,000 match from Mystic River Associates

Duration: 2021 - 2023

FEDERAL FISCAL YEAR 2021
SECTION 319 NPS PROJECT 21-03/319

21-03/319: Manchaug Pond Water Quality Improvements and Agricultural Outreach

NPS Category: Operation and Maintenance Plan
Investigator: Manchaug Pond Foundation
Location: Blackstone

Description:
Manchaug Pond located in Sutton and Douglas is a 380-acre great pond that is a headwater to the Mumford and Blackstone River. Listed as Category 5 for low dissolved oxygen and non-native plants on the 2016 Mass DEP's integrated list of waters, this pond flows to Steven's Pond which is the start of the Mumford River, as Tributary to the Blackstone River. This project aims to improve water quality in the pond employing BMPs that include structural and non-structural agricultural BMPs to address the hobby farm and horse keeping activities throughout the watershed, to control stormwater quantity and improve water quality. The BMPS will be constructed in 5 locations in the drafted 2020 Watershed-Based Plan in addition to the boat ramp and along steep driveway.

Tasks:
1. Design and construct infiltration based BMPs (Green Infrastructure/Low Impact Development) with a design focus on climate resiliency at 7 locations within the watershed including the boat ramp with multiple BMPs. These will decrease the input of sediment, nutrients (phosphorus/nitrogen) and bacteria/pathogens into Manchaug Pond.
2. At one of these 7 locations install water bar BMPs designed as a demonstration project for homeowners with steep slope unpaved driveways. Include a technology transfer component with a goal to reduce erosion and sediment with similar installations throughout the watershed.
3. Implement a comprehensive agricultural education and outreach program. Based on guidance developed under a previous s319 grant completed by others (Small Farm BMP Guidance - Hobby Farming with Water Quality in Mind: A Guide to Successful Backyard Farming While Protecting Our Water Resources, 2017), publish a series of newsletters and pre-recorded webinars. Educate watershed residents with backyard farms and farm animals and horses, include several days of one-on-one assistance from a nonpoint source expert with experience in agricultural BMP design and site assessment resulting in site-specific recommendations. Install kiosk and educational material at the Overlook property. Implement watershed wide events and cleanup/weed removal efforts along with outlined project survey to document task success.

Cost: $375,712

Funding: $225,190 319 Grant,
$150,522 Manchaug Pond Foundation

Duration: 2021 - 2023

FEDERAL FISCAL YEAR 2021
SECTION 319 NPS PROJECT 21-04/319

21-04/319: Essex County Nonpoint Source Coordinator

NPS Category: Outreach and Education
Investigator: Merrimack Valley Planning Commission
Location: Essex County

Description:
This project will support the Massachusetts Nonpoint Source Program by conducting mitigation efforts on nonpoint source pollution. The Merrimack Valley Planning Commission will assemble a local NPS committee, develop watershed-based plans, identify areas impacted by NPS pollution and facilitate project proposals to be funded through the 319-grant program. The grantee will also conduct outreach and education work to enhance the NPS program message and support the NPS program by targeting all communities in Essex County.

Project Goals:
1. Fund locally led projects and increase program efficacy
2. Address urban/rural sources of NPS pollution
3. Establish geographic focus areas
4. Promote/assist development of complete Watershed-Based Plans (WBPs) to guide NPS watershed projects
5. Engage local partners on climate change adaptation, resiliency planning, and protection of healthy waters
6. Educate the public and increase the capacity of NPS partners
7. Investigate potential 319 implementation projects which enhance groundwater recharge and protection of critical surface and subsurface water supplies, potentially using Sustainable Water Management Initiative (SWMI) grants as match

Cost: $166,668

Funding: $100,000 US 319 Grant,
$66,667 Merrimack Valley Planning Commission

Duration: 2021 - 2023

FEDERAL FISCAL YEAR 2021
SECTION 319 NPS PROJECT 21-05/319

21-05/319: Hamilton Reservoir Watershed Improvement Project

NPS Category: Operation and Maintenance Plan
Investigator: Town of Holland
Location: Quinebaug

Description:
The town of Holland located in south; central Massachusetts is impaired listed under category 4c due to invasive, non-native plants. Sediment loading and addition of nutrients is accelerating the eutrophication of the lake, increasing nuisance plants and algae, increasing erosion, water temperatures and lowering dissolved oxygen.
This project addresses the storm water drainage from the top of Mountain Road and Old County Road, which is left unchecked flow down the steep terrain carrying gravel, sediment, and other chemicals into the reservoir. At this time there are no catch basins or any sections of the roads where the gravel, sediment or other chemicals can be caught, and the sediment- laden storm water flows directly into the south basin of Hamilton Reservoir.

Project Goals:
1. Quality Assurance and Project Evaluation
2. Develop a Watershed- Based Plan
3. Engineering, Preliminary and Final Designs
4. Create a Bid Package
5. Construction of Stormwater Management BMPs
6. BMP Operation and Maintenance Plan
7. Outreach and Education
8. Reporting and Project Oversight

Cost: $428,119

Funding: $256,871 US 319 Grant,
$171,248 Town of Holland

Duration: 2021 - 2024

FEDERAL FISCAL YEAR 2021
SECTION 319 NPS PROJECT 21-06/319

21-06/319: Western Massachusetts Agricultural Nonpoint Source Program

NPS Category: Operation and Maintenance Plan
Investigator: Massachusetts Association of Conservation Districts
Location: Connecticut, Deerfield, Westfield Watersheds

Description:
The grantee will work with farmers to develop conservation plans and implement Best Management Practices (BMPs) to reduce contaminant runoff to impaired water bodies. This project will address the issue of impaired water bodies related to agriculture in the western portion of the state. The grantee will focus on impaired water body segments in the Connecticut River, Westfield River and Deerfield River Watersheds. Targeted waterbodies are inclusive of, but not limited to, the following: Fort River (MA34-27), Mill River (MA34-25), Moose Meadow Brook (MA32-41), East Branch North River (MA33-19) and Hinsdale Brook (MA33-21).

Project Goals:
1. Quality Assurance and Project Evaluation
2. Outreach and Education
3. Development of a Watershed Based Plan
4. Facilitate Development and Implementation of Farm Conservation Plans
5. Assistance in Obtaining Access to Financial Resources for Farmers
6. BMP Operation and Maintenance Plan
7. Reporting and Project Oversight

Cost: $432,000

Funding: $259,000 US 319 Grant
$173,000 Massachusetts Association of Conservation Districts

Duration: 2021 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-01/319

22-01/319: Watershed-Scale Zoning to Reduce Nonpoint Source Pollution and Protect Healthy Watersheds

NPS Category: Healthy Watersheds
Grantee: Franklin Regional Council of Governments (FRCOG)
Location: Deerfield

Project Goals:
To update and align the land use regulations of Greenfield, Bernardston, and Shelburne to protect shared healthy waterbodies and reduce pollutant loadings to impaired waters from new development and redevelopment projects. River corridors will be mapped for the Fall River and two tributaries in Bernardston. The project is consistent with priorities in the 2020-2024 Massachusetts NPS Management Program Plan and partially implements the following priority recommendation from the Deerfield watershed-based plan (15-04/319): update and align land use regulations across the 14 watershed towns, with a focus on mapping and managing the river corridor.

Tasks:
1. Build support for inter-municipal land use regulation alignment among residents and private property owners via the development of outreach material, including the sharing of success stories, and identification of concerns that could represent barriers to the project goals,
2. Utilize the River Extent Assessing Landforms (REAL) river corridor mapping methodology, developed as part of Project 17-06/319 *Using the Science of Fluvial Geomorphology to Develop River Corridor Management Tools*, to map the river corridor for the Fall River and two of its tributaries for the Town of Bernardston,
3. Adapt the previously developed Model River Corridor Protection Zoning Overlay District (Project 17-06/319) to the needs of Greenfield and Bernardston,
4. Utilize the Zoning and Subdivision Regulations Scorecard developed as part of A *Watershed-Based Plan to Maintain the Health and Improve the Resiliency of the Deerfield River Watershed (Project 15-04/319* to identify examples of good regulations to inform this project, and
5. Draft updates to the Zoning and Subdivision Regulations that focus on stormwater management for development in urbanized areas and appropriate uses, prohibited uses, stormwater management, land conservation and performance standards for development within river corridors and floodplains.

Cost: $139,750

Funding: $78,450 from the US EPA
$52,300 from Franklin Regional Council of Governments

Duration: 2022-2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-02/319

22-02/319: Agricultural Nonpoint Source Regional Coordinators for Franklin, Hampshire, Hampden Counties

NPS Category: Agricultural Nonpoint Source Regional Coordinator
Investigator: The Massachusetts Association of Conservation Districts (MACD)
Location: Connecticut, Chicopee, Deerfield, Millers, and Westfield Watersheds

Description:
Franklin, Hampshire, and Hampden Counties are home to some of the most productive farmland in the region, comprising 36% of the agricultural land-base in Massachusetts and accounting for over $140 million in sales. Improper farm management can cause water quality pollution in the form of excess nutrients, fecal coliform bacteria, and suspended sediment. The Massachusetts Association of Conservation Districts will hire two Agricultural Nonpoint Source Regional Coordinators to bring water quality stakeholders together to develop a more comprehensive approach to prioritizing agricultural water quality improvement projects. This project will prioritize subbasins for both restoration and protection, complete Watershed-Based Plans, conduct outreach to agricultural producers, and design Best Management Practice (BMP) implementation projects to reduce contaminant runoff to impaired waterbodies leading to the development of a strategy to reduce agricultural NPS sources within high priority subbasins.

Project Goals:
This project aligns with the Nonpoint Source Management Program Plan (2020-2024) goal to "work to collaboratively address NPS pollution from agricultural sources through program coordination, increased communication, and technical support to producers," and will facilitate greater coordination between partners, prioritize subbasins for agricultural BMP implementations, and garner farmer support.

Tasks:
1. Recruit and retain two (2) Agricultural Nonpoint Source Regional Coordinators for Franklin, Hampshire, and Hampden Counties to develop and lead the partner collaborative,
2. Leverage existing ties between Conservation Districts and the local agricultural communities to engage farmers in project planning and implementation, and
3. Convene stakeholders (including, but not limited to, municipalities, conservation commissions, boards of health, non-profit organizations, agricultural commissions, agriculture producers, conservation districts, regional planning agencies, and state and federal agencies) to:
    a. Develop a comprehensive database of priority subbasins, and identify/target 3-5 priority subbasins for development of EPA Nine-Element Watershed-Based Plans,
    b. Upon completion of the Watershed-Based Plans, identify projects in priority subbasins, develop implementation projects, and conduct outreach to agriculture producers in high-priority subbasins to garner project support, and
    c. Develop a prioritization plan to guide future BMP implementation actions, well-vetted conceptual designs, and complete funding proposals for high-priority agricultural BMP projects.

Cost: $403,080

Funding: $241,848 from the US EPA
$161,232 from The Massachusetts Association of Conservation Districts (MACD)

Duration: 2022 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-03/319

22-03/319: Encouraging the Use of Lignocellulose (Wood) Based Onsite Septic Systems for Nitrogen-Sensitive Environments by Demonstrating Concurrent Contaminant Removal That Justifies More Economical Means for Effluent Disposal

NPS Category: Outreach and Education/ Healthy Watersheds
Investigator: The Barnstable County Department of Health and the Environment
Location: Statewide

Description:
The discharge of nitrogen and other pollutants such as pathogens and Contaminants of Emerging Concern (CEC) from decentralized wastewater management systems into groundwater in coastal areas represents a significant threat to both public health and the aquatic environment. Marine estuary studies conducted under the Massachusetts Estuaries Project (MEP) and similar efforts continue to confirm the role of wastewater-derived nitrogen in accelerating eutrophication in marine coastal embayments. In Barnstable County and many other coastal communities, it is likely that onsite wastewater treatment systems (or septic systems) will remain as part of the solution into the foreseeable future. The Barnstable County Department of Health and the Environment will support the Massachusetts Nonpoint Source (NPS) Program by testing the efficacy of lignocellulose-based denitrification septic systems for the removal of wastewater-associated pollutants on small (<10,000 sq. ft.) lots.

Project Goals:
To demonstrate the treatment efficacy of lignocellulosic (wood-based) denitrification systems for pathogens and selected Contaminants of Emerging Concern so that effluent disposal means that reduce costs and area requirements can be implemented with an overall benefit to public health and the environment.

Tasks:
1. Address information gaps associated with lignocellulose-based systems by testing the effectiveness of a system to reduce or eliminate bacteria and viruses and CECs prior to the discharge of effluent to the soil treatment area (STA), and
2. Demonstrate ability of leaching pits designed and constructed in accordance with the pre-1995 version of Massachusetts CMR 15.000 - Title 5 regulations to adequately dispose of wastewater, reducing the system cost and required soil treatment area.

Cost: $122,663

Funding: $72,385 from the US EPA
$50,278 from

Duration: 2022 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-04/319

22-04/319: Collicot/Cunningham Stormwater BMP

NPS Category: Watershed Restoration
Investigator: Town of Milton
Location: Neponset Watershed

Description:
Unquity Brook is the major freshwater tributary to Gulliver's Creek, and is culverted for part of its length, passing through residential areas and accumulating stormwater runoff. The Brook is listed on the 2016 Massachusetts Department of Environmental Protection Integrated Waters List as impaired for several causes including E. coli, fecal coliform, dissolved Oxygen, low pH, total Phosphorus, and Sedimentation. The Unquity Brook BMP Planning Project, funded by the Massachusetts Coastal Zone Management (CZM), led the town to prioritize BMP retrofits to treat stormwater runoff before it reaches the brook, reducing nonpoint source pollution.

Project Goals:
The goal of this project is to improve the water quality of Unquity Brook through the implementation of structural infiltration basin focused on nutrient, sediment, and bacteria reduction, and address the sources of pollution in the subwatershed.

Tasks:
1. Complete and distribute the watershed-based plan developed for the watershed for Unquity Brook in Milton to inform watershed residents and to help ensure project success.
2. Install an infiltration basin with water quality structure where pretreatment will occur before the stormwater is conveyed to the infiltration basin to collect and treat the runoff before it travels to the brook.
3. Develop and implement a long-term overall Operation and Maintenance Plan for all of the BMPs installed in Task 2, and to ensure that the systems function as designed. The O&M Plan will be consistent with the requirements of Standard 9 of the Massachusetts Stormwater Management Standards and should be in force for the life of the BMPs. The Plan should be developed with input from design engineers, equipment manufacturers, local DPW and conservation commissions.
4. Quarterly progress reports will be submitted to the 319 Project Officer.

Cost: $270,014

Funding: $158,500 from the US EPA
$111,514 from the town of Milton

Duration: 2022 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-05/319

22-05/319: Developing a Dirt Roads Stormwater Management Toolkit to Reduce Nonpoint Source Pollution and Improve Resiliency in Healthy Watersheds

NPS Category: Healthy Watersheds
Investigator: Franklin Regional Council of Governments
Location: Deerfield River Watershed

Description:
Although the Deerfield River Watershed is one the healthiest watersheds in the Commonwealth, in Franklin County dirt and gravel roads near sensitive environmental resources such as rivers, streams, upland tributaries and wetlands are vulnerable to erosion, which causes high levels of runoff and sedimentation into wetlands, Cold Fish Resources (CFR), and other sensitive habitats, and may result in water quality impairments. The Franklin Regional Council of Governments will develop a Dirt Roads Stormwater Management Toolkit to provide towns with a simple way to assess and classify unpaved roads and select sediment stormwater management Best Management Practices (BMPs) and appropriately size road drainage culverts for increasing stormwater flows due to climate change. The Toolkit will be a comprehensive, easy-to-use resource for communities as they work to improve the resiliency of their roadways and protect Coldwater Fish Resources in the Deerfield River Watershed. This Toolkit will bring together many past projects in the Deerfield River Watershed and leverages multiple sources of funding at both the state and federal level to protect water quality and infrastructure in a rural region of the state. Additionally, utilizing other funding sources, the Toolkit will be pilot-tested in two towns. Public outreach targeted to local municipal officials and interested parties will also be conducted.

Project Goals:
The goal of this project is to develop a Dirt Roads Stormwater Management Toolkit that will enable local communities to assess their unpaved roads for erosion and select appropriate stormwater BMPs and right-sized culvert drainage that match the classification of the vulnerability of the roadway, protect and improve the health and climate change resiliency of the Deerfield River Watershed, and be applicable for use across the Commonwealth.

Tasks:
1. Develop an assessment methodology that will examine unpaved roadways in a simple, clear way that measures a roadway's vulnerability to erosion and then classifies the roadways into various typologies.
2. Use roadway typology to provide the towns with guidance as to which stormwater management BMPs, maintenance techniques, and size of culvert drainage would be most effective to control nonpoint source pollution.
3. Review BMP choices, pollutant load reduction potential, and their optimal application in order to develop a selection of appropriate stormwater BMPs.
4. Apply a "right-sizing protocol" previously developed in the Deerfield Watershed under a Massachusetts MVP Action Grant to a larger town-wide scale to provide guidance to towns on selecting appropriately sized culvert drainage that will accommodate more frequent and intense storm flow events.

Cost: $174,053

Funding: $105,200 from the US EPA
$68,853 from Franklin Regional Council of Governments

Duration: 2022 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-06/319

22-06/319: Braintree Council on Elder Affairs Retrofit

NPS Category: Watershed Restoration
Investigator: Town of Braintree
Location: Boston Harbor, Weymouth-Weir, and Mystic Watersheds

Description:
The proposed project will address the Final Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds to control bacteria pollution to the Monatiquot River through construction of stormwater management BMPs at the Braintree Council on Elder Affairs property. The Monatiquot River is a 4.4-mile river in Braintree that empties into the Weymouth Fore River estuary. It is listed on MassDEP's 2016 Integrated List of Waters as Category 5 for E. coliform and low dissolved oxygen. The project is based on recommendations from the Braintree Sub-Watershed Assessment and Stormwater Retrofit Plan, which was funded by a 604b grant (2019-05/604). Construction of the proposed retrofits for stormwater treatment will provide significant nonpoint source pollution reduction to the Monatiquot River.

Project Goals:
The project will address the Final Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds to control bacteria pollution to the Monatiquot River through construction of stormwater management BMPs at the Braintree Council on Elder Affairs property. The project is based on recommendations from the Braintree Sub-Watershed Assessment and Stormwater Retrofit Plan, which was funded by a 604b grant (2019-05/604). The project will also include targeted public outreach to Braintree residents and seniors who will be frequent visitors to the site of the BMPs.

Tasks:
1. Distribute the Watershed-Based plan developed for the portion of the Weymouth-Weir Watershed located in the Town of Braintree. to inform watershed residents and to help ensure project success.
2. Design and install two landscaped strips and a grass swale that direct stormwater into an infiltration basin to treat the majority of stormwater. A supplementary sediment forebay will slow runoff from the upper parking lot as it enters the basin.
3. Develop and implement a long-term Operation and Maintenance Plan for all the BMPs installed in Task 2 to ensure that the systems function as designed. The Plan should be developed with input from design engineers, equipment manufacturers, local DPW and conservation commission.
4. Prior to construction, the grantee will meet with representatives and constituents of the Elder Affairs building to share information about the project with the regular users of the Council on Elder Affairs and the residents of Braintree. After construction, the grantee will design and distribute printed outreach materials to the public to inform them of the project and educate them on the importance of structural BMPS in their community.

Cost: $233,765

Funding: $138,250 from the US EPA
$95,515 from the Town of Braintree

Duration: 2022 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-07/319

22-07/319: Hupi Road Drainage Improvements to Reduce Sediment Inflow to Lake Garfield

NPS Category: Public Outreach, Education Plan and Technology Transfer
Investigator: Town of Monterey
Location: Lake Garfield

Summary:
Lake Garfield is a 255-acre Great Pond located in Monterey. It is listed on MassDEP's 2016 Integrated List of Waters as Category 5 for phosphorus, low dissolved oxygen and non-native aquatic plants. The Phosphorus Loading Assessment for Lake Garfield identified managing surface water runoff to best reduce phosphorus and sediment loading into the lake. This project will improve water quality in the Lake, employing BMPs that include structural and non-structural BMPs in the watershed to control stormwater quantity and improve water quality.

Project Goals:
The goal of the project is to reduce phosphorus and sediments in runoff through the implementation of both structural and non-structural BMPs focused on phosphorus and sediment reduction to improve the water quality of Lake Garfield and remove the lake for the Integrated List of Waters. Sediment and transported nutrients in stormwater runoff results in shallower near shore areas which provide enhance conditions for aquatic weed growth.

Tasks:
1. Design the watershed-based plan developed for removing phosphorus and other pollutants from stormwater discharge into Lake Garfield and distribute it to inform watershed residents and help ensure project success.
2. Design and install three sets of deep sump catch basins and oil hoods on either side of Hupi Road (for a total of six catch basins), four offline drain manholes, a vegetated swale, hydrodynamic stormwater treatment device and rain garden.
3. Develop and implement a long-term overall Operation and Maintenance Plan for all of the BMPs installed in Task 2 to ensure that the systems function as designed. The Plan should be developed with input from design engineers, equipment manufacturers, local DPW and conservation commission.
4. Develop an Outreach, Education and Technology Implementation Plan (OETIP) in coordination with local stakeholders to engage the public.

Cost: $236,000

Funding: $139,000 from the US EPA
$97,000 from the Town of Monterey

Duration: 2022 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-08/319

22-08/319: Quacumquasit Pond Phosphorus Inactivation Project

NPS Category: Resource Restoration
Investigator: Town of Sturbridge
Location: Chicopee Watershed

Description:
Quacumquasit Pond is a 223-acre pond located in Brookfield, East Brookfield, and Sturbridge. Quacumquasit Pond, which feeds into Quaboag Pond is listed on MassDEP's 2018/2020 Integrated List of Waters as Category 4a for Eurasian Water Milfoil and non-native aquatic plants. Quaboag Pond is a 319 Priority Waterbody for 2021 and Quaboag Pond is listed on the state's 303d list of impaired waters as Category 5 and suffers from algal blooms and excessive plant growth. Both ponds are impaired by phosphorus loading as established by the MassDEP in the TMDL. The source of continued high levels of phosphorus has been identified as the internal loading from sediments.

Goals:
The goal of this project is to reduce the impact of phosphorus on Quacumquasit Pond and to restore it through alum application and education of local residents. The project will significantly reduce internal phosphorus loading to achieve the TMDL goal for phosphorus and protect the pond from further water quality degradation due to internal recycling of nutrients. The project will also benefit Quaboag Pond and the downstream Chicopee River through the sequestration of phosphorus loading being generated from the sediments.

Tasks:
1. Develop a MassDEP and USEPA approved Quality Assurance Project Plan (QAPP) for the Town to accommodate sampling of pond sediment to refine the alum application program.
2. Distribute the Watershed-Based Plan developed for the watershed for the Quacumquasit Pond and Quaboag Pond to inform watershed residents and to help ensure project success.
3. The Grantee will prepare and file a Notice of Intent with the Brookfield, East Brookfield, and Sturbridge Conservation Commissions and apply for License to Apply Chemicals from MassDEP.
4. The Grantee will apply aluminum compounds to an area of at least 92 acres, in areas where the phosphorus levels are known to be most elevated and where the sediment is impacted by anoxic conditions, at a dose of at least 100 g/m2 of aluminum compounds to Quacumquasit Pond.
5. Work with the local lake association to provide information about the purpose and befits of alum treatment. Develop an informational workshop describing the alum treatment and other measures that watershed residents can take to improve water quality within the watershed.

Cost: $500,000

Funding: $300,000 from the US EPA
$200,000 from the Town of Sturbridge

Duration 2022 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-09/319

22-09/319: Watson Park BMP Implementation Project

NPS Category: Resource Restoration
Investigator: Town of Braintree
Location: Boston Harbor, Weymouth-Weir, Watersheds

Description:
The Monatiquot River (MA74-08) in Braintree is listed as a pathogen-impaired segment in the 2018 Final Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds. The 2016 IR includes the Monatiquot River in Category 5 (i.e., impaired by one or more pollutants) due to E. coli, fecal coliform, dissolved oxygen, benthic macroinvertebrates, physical substrate habitat alterations, fish passage barrier and curly-leaf pondweed. Currently, stormwater from the upland neighborhood enters the drainage system just north of the park and is conveyed, untreated, through pipes to outfalls at the confluence of the Monatiquot River and the Weymouth Fore River. This project will divert runoff from the existing street drainage into a bioretention basin and will complement the ongoing work funded by CZM to reduce potential stormwater impacts to the Fore River. Construction of the proposed retrofits will provide significant pollutant reduction to the receiving waters.

Goals:
The goals of this project are to implement the Boston Harbor Pathogen TMDL, address substrate habitat alterations in the Weymouth Fore River, and ultimately to achieve full attainment of designated uses in the Weymouth-Weir subwatershed. This project will include significant public outreach to Braintree families who use the Watson Park recreational area through targeted outreach and events. The project supports ongoing work to promote coastal resilience and nature-based solutions to flooding. The park is currently the subject of a shoreline restoration project partially funded by a CZM Coastal Resilience grant, as well as a related redesign of the park partially funded by the town through a Community Preservation Grant. The restoration and redesign will preserve some of the recreational uses of the park while allowing for salt marsh migration in the long term.

Cost: $264,967

Funding: $375,000 by the US EPA
$264,592 by the Town of Braintree and project participants

Duration: 2022 - 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-10/319

22-10/319: Lake Waushakum BMP Project

NPS Category: Resource Restoration
Investigator: City of Framingham
Location: Concord (SuAsCo) Watershed

Description:
Lake Waushakum (MA82112) is an 82-acre kettle pond located in Framingham and Ashland with approximately 145-acre catchment area in Framingham. It is currently listed on Massachusetts Integrated Lists of Waters as Category 5 for "Waters requiring a TMDL" for total phosphorus, turbidity, dissolved oxygen, and aquatic plants impairments. Framingham's public beach at Lake Waushakum is consistently closed due to high levels of E. coli, never even opening in the 2021 season due to poor water quality. Lake Waushakum has significant historic connections to the community and currently accommodates multiple recreational uses, economic support, and ecological and climate resiliency benefits. Historic development in the area has resulted in densely developed, largely impervious areas. Stormwater runoff has been identified as the main contributor of pollutant loading and inability to meet water quality standards. The poor water quality has intensified with more extreme rain events and impacts from climate change.

Goals:
The primary project goal is to reduce phosphorus, sediment, and E. coli loading to Lake Waushakum. The secondary goal is to increase public awareness of water quality impairments and encourage behaviors and actions to address these concerns. The project will take a strategic, watershed-based approach utilizing a combination of structural and non-structural BMPs to improve water quality. It will retrofit the public beach with green infrastructure, enhance the riparian buffer at the City's property with vegetation, and expand public outreach and education programs. It will finalize design plans, support permitting, and construct green infrastructure at the public beach.

Tasks:
1. Retrofit Lake Waushakum's public beach with BMPs designed for climate resiliency and changing precipitation.
2. Enhance the riparian buffers.
3. Expand public outreach and education programs, including improving outreach to Environmental Justice communities, with a focus on climate resiliency and improving access to open space.

Cost: $412,755

Funding: $249,980 by the US EPA
$162,775 by the City of Framingham and project participants

Duration: 2022 – 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-11/319

22-11/319: Massachusetts Watershed-Based Plans: Enhancement and Implementation Project

NPS Category: Technical Assistance
Investigator: Geosyntec Consultants
Location: Statewide

Description:
Watershed-Based Plans (WBP), a requirement for 319 implementation projects, are an important planning tool to guide water quality restoration. This project built on the earlier successes of the Massachusetts WBP web-based tool (http://prj.geosyntec.com/MassDEPWBP) by supporting MassDEP partners in completing technically robust, completed WBPs and provide technical and programmatic support to the MassDEP's Nonpoint Source Program for the WBP tool.

Goals:
This project will provide support to complete WBPs by working with MassDEP's partner organizations, and by providing targeted science and engineering support as needed to complete WBPs for identified 319 implementation projects. It will provide the technical assistance identified as most needed by partner organizations for completion of WBPs, including guiding the completion of watershed-based plans. It will update the WBP tool to include technical and programmatic updates.

Tasks:

1. Technical and programmatic support to the MassDEP NPS Program for the WBP tool.
2. Incorporate the 2018/2022 Integrated List and hyperlinks into the WBP tool, update pollutant load export rates (PLERS) and BMP performance curves for total nitrogen, total phosphorus, and total suspended solids, and the incorporate bacteria (E. coli) PLERS and BMP performance curves not currently available in the tool.
3. Support MassDEP partners with the completion of technically robust completed WBPs.

Cost: $232,900

Funding: $139,400 by the US EPA
$93,500 by Geosyntec Consultants, Inc. and project participants

Duration: 2023 – 2024

FEDERAL FISCAL YEAR 2022
SECTION 319 NPS PROJECT 22-12/319

22-12/319: Increasing the Pace of On-Farm Watershed Restoration in Berkshire County

NPS Category: Agriculture Capacity Building
Investigator: Housatonic Valley Association
Location: Housatonic and Hoosic Watersheds

Description:
Farm management of nutrients, bacteria, stream corridor modifications, and other elements of agricultural production can contribute to existing water quality impairments and threaten critical cold-water habitats. The grantee will work with farmers to develop conservation plans and implement Best Management Practices (BMPs) to reduce contaminant runoff to impaired water bodies. This project will address the issue of impaired water bodies related to agriculture in the Hoosic and Housatonic watersheds in Berkshire County.

Goals:
The project goal is to reduce agricultural nonpoint source pollution to remove existing water quality impairments. It will support an agricultural NPS coordinator to implement planning and outreach efforts in priority watersheds, build partnerships, develop Conservation Plans, identify NPS pollution reduction BMPs, and coordinate funding and technical support to further develop and implement projects and to remove existing water quality impairments. The project will provide outreach to agricultural producers to address agriculture-related impairments in the Hoosic and Housatonic watersheds in Berkshire County.

Tasks:
1. Formation of a Berkshire County Agricultural Nonpoint Source Pollution (AgNPS Advisory Committee which will include Core Partners as well as other key stakeholders, including but not limited to MassDEP, NRCS, Berkshire Regional Planning Commission, Berkshire Grown and key producers.
2. Hiring of an Agricultural NPS Coordinator and connect them with appropriate training to become a Certified Conservation Planner and attain Technical Service Provider (TSP) status facilitate on-farm Conservation Planning.
3. Identified priority subwatersheds for AgNPS reduction in both the Housatonic and Hoosic watersheds.
4. Development of a Producer Outreach Strategy and engaged farmers in priority subwatersheds.
5. Development and implementation of farm-scale Conservation Plans for willing landowners.
6. Development shovel-ready designs and implementation BMPs to help prevent and remediate agricultural nonpoint source pollution.

Cost: $166,006

Funding: $96,024 by the US EPA
$69,982 by Housatonic Valley Association and project participants

Duration: 2023 - 2024

APPENDIX

319 NONPOINT SOURCE PROGRAM PROJECTS 1990-2022

1990	
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 District
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 Association
1991	
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 Department
91-05/319	Hydrogeologic Evaluation of the Waquoit Bay Land Margin Ecosystem by Cape Cod Commission
1992	
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 EOEEA: DFWELE, Riverways Program
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
1993	
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 EOEEA: DFWELE, Riverways Program
93-03/319	Artificial Recharge Evaluation and Guidance to Municipalities by Pioneer Valley Planning Commission
93-04/319	H_2Ome 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
1994	
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.

1995

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
95-12/319	Rice City Pond Restoration by MassDEP

1996

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 EOEEA: 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

1997

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

1998	
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
98-07/319	Reducing Stormwater in an Ultra-Urban Watershed by City of Somerville
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

1999	
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

2000	
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 Program

2001	
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 the City of Worcester

2002	
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
02-13/319	Mill Creek Estuary Stormwater Mitigation by the Town of Sandwich

2003

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

2004

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 UMass, 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 y UMass, 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 Agency
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
04-18/319	Bare Hill Pond III by the Town of Harvard

2005

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

2006

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 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
06-10/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center by the Barnstable County Dept. of Health and the Environment
06-11/319	Operation and Maintenance of the Massachusetts Alternative Septic System Test Center by the Barnstable County Dept. of Health and the Environment

2007

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
07-03/319	Rockwell Pond Source Reduction Pilot Project by the Massachusetts Watershed Coalition
07-04/319	Improving Water Quality in the Hamilton Reservoir Watershed by the Pioneer Valley Planning Commission
07-05/319	Franklin Stormwater Retrofit Improvement Project by the Town of Franklin
07-06/319	Stormwater BMP Implementation for Little Harbor by the Town of Cohasset
07-07/319	Jackson Square LID Program by the Jackson Square Partners LLC
07-08/319	Onota Lake Preservation Project by the City of Pittsfield
07-09/319	James Brook Urban Stormwater Improvements by the Town of Groton

2008

08-01/319	Eel River Headwaters Restoration by the Plymouth DPW
08-02/319	Lake Waushakum LID BMP Implementation Project by the Town of Ashland
08-03/319	Brewster Stony Brook Road Stormwater Improvements by the Town of Brewster
08-04/319	Bare Hill Pond Noxious Aquatic Plant Reduction by the Town of Harvard
08-05/319	Restoration of Lake Wickaboag at Wickaboag Valley Road by the Town of West Brookfield Storm Water Authority
08-06/319	Stormwater BMPs: Implementation for Straits Pond at Richards Road and Pond Street by the Town of Hull
08-07/319	Boston Architectural College Green Alley & Roof Project by the Boston Architectural College
08-08/319	PCSWMM Evaluation by the UMass Amherst
08-09/319	Onsite Septic System Investigations at the Massachusetts Alternative Septic System Test Center in Support of Comprehensive Wastewater Management Planning Efforts by the Barnstable County Department of Health and the Environment

2009

09-01/319	Congamond Lakes FFY 09 by the Pioneer Valley Planning Commission
09-02/319	Stockbridge Bowl Management Project Phase I by the Town of Stockbridge
09-03/319	Stormwater BMPs in the Provincetown Harbor Watershed by the Town of Provincetown
09-04/319	Northern Fairhaven New Bedford Inner Harbor Drainage Area LID Stormwater Enhancements by the Town of Fairhaven

09-05/319	Phosphorus Mitigation Program for Cranberry Bogs on White Island Pond by the Cape Cod Cranberry Growers' Association
09-06/319	Massachusetts Regional Stormwater Management Training Seminar Series by the Vanasse Hangen Brustlin Inc. (VHB)

2010

10-01/319	MaSTEP 2010 by the UMass Amherst
10-02/319	Investigation of Blackwater Disposal as a Means of Nutrient Management in Watersheds of Nitrogen Sensitive Marine Embayments by the Barnstable County Department of Health and the Environment
10-03/319	Lower Monoosnoc Brook Remediation Project by the Massachusetts Watershed Coalition
10-04/319	Stormwater Best Management Practices: Little Harbor, Cohasset Cove, and Cohasset Harbor by the Town of Cohasset
10-05/319	North Reading Stormwater Infiltration Project: Reaching Out to Address Runoff (ROAR) by the Town of North Reading
10-06/319	Northern Fairhaven New Bedford Inner Harbor Drainage Area Phase II LID Stormwater Enhancements by the Town of Fairhaven
10-07/319	Stormwater Management BMPs for Unpaved Roads: Four Mile Brook Road in Northfield, MA by the Town of Northfield
10-08/319	Sawmill River Implementation Project: An Ecosystem Approach to Restoration by the Franklin Conservation District

2011

11-01/319	Investigating Means of Enhancing Onsite Septic System Attenuation for Emerging Contaminants by the Barnstable County Department of Health and the Environment
11-02/319	Westport Middle School Stormwater BMP Implementation Project by the Town of Westport
11-03/319	Long Pond Watershed Non-Point Pollution Abatement, Phase 1 BMP Implementation by the Town of Tewksbury
11-04/319	Farm Pond Stormwater BMP Implementation Project by the Town of Sherborn
11-05/319	Castle Hill Avenue Storm Drainage Improvements by the Town of Great Barrington
11-06/319	Stormwater Pollution Reduction Project in the Montachusett Region's Millers River Watershed by the Montachusett Regional Planning Agency
11-07/319	Lake Attitash Watershed Restoration by the Town of Amesbury
11-08/319	Water Quality Improvements of Vine Brook and Old Reservoir Recreational Beach by the Town of Lexington
11-09/319	Online Phosphorus Trading System by the Charles River Watershed Association
11-10/319	Sunset Lake Watershed Stormwater BMPs by the Town of Braintree
11-11/319	Improvement to Lake Wickaboag Sediment BMPs at Lakeview Avenue by the Town of West Brookfield
11-12/319	Water Quality Analysis Support for Massachusetts Volunteer Monitors by the UMass Water Resources Research Center

2012

12-01/319	Investigating Means of Improving Onsite Septic Systems for Removal of Contaminants of Emerging Concern by the Barnstable County Department of Health and the Environment
12-02/319	Decreasing Phosphorus in Cranberry Waters by Implementation of Best Management Practices by UMass - Amherst
12-03/319	Minimizing Non-Point Source Pollution from Horse Facilities through Installation and Demonstration of Best Management Practices by UMass - Amherst
12-04/319	Massachusetts Stormwater Outreach and Education Program 2012 by UMass – Amherst

2013

13-01/319	Continued Investigation of Contaminants of Emerging Concern Discharged from Onsite Systems with Emphasis on Endocrine Disrupting Compounds by the Barnstable County Department of Health and the Environment

13-02/319 Stormwater BMPs in the Provincetown Watershed by the Town of Provincetown
13-03/319 Sediment Management BMPs for the South River in Conway by the Franklin Regional Council of Governments and participating communities
13-04/319 Reducing Stormwater Pollution in the Western Millers River Watershed with Low Impact Development by the Franklin Regional Council of Governments and participating communities
13-05/319 Manchaug Pond Water Quality Improvement - Phase 2 by the Manchaug Pond Foundation
13-06/319 Massachusetts Nonpoint Source Pollution Management Manual, Update, and Enhancement by Geosyntec and project participants
13-07/319 City of Boston Porous Pavement Green Alley NPS Demonstration Project by the City of Boston
13-08/319 ACPP Technical Providers for the Palmer River Watershed by the Rehoboth Agricultural Commission by the Bristol County Conservation District by Participating Producers
13-09/319 Development of the 2014 Massachusetts Nonpoint Source Management Plan by Geosyntec Consultants

2014

14-01/319 Investigation of Passive Nitrogen Removal Strategies for Onsite Septic Systems at the Massachusetts Alternative Septic System Test Center by the Barnstable County Department of Health and the Environment
14-02/319 White Island Pond Phosphorus Inactivation Project by the Town of Plymouth
14-03/319 Monoosnoc Brook Renewal Project by the Massachusetts Watershed Coalition
14-04/319 Using Low Impact Development Techniques to Manage Stormwater Runoff in Greenfield by the Franklin Regional Council of Governments and participating communities
14-05/319 Lake Gardner & Powow River Nonpoint Source Improvement Project by the Town of Amesbury
14-06/319 Ipswich River Watershed BMP Implementation at Farley Brook by the Town of Ipswich
14-07/319 Tree Canopy Stormwater Implementation & Outreach Program by Comprehensive Environmental, Inc.
14-08/319 Assessing the Potential Effects of Climate Change on Stormwater Best Management Practices (BMPs) in Coastal Communities by the EEA/Coastal Zone Management
14-09/319 Revision of Massachusetts Watershed-based Plans by Geosyntec Consultants

2015

15-01/319 Franklin Phase II of Stormwater Retrofits by the Town of Franklin
15-02/319 Dedham Mother Brook BMP Implementation Project by the Town of Dedham
15-03/319 Upper Caroline Brook Restoration Project by the Town of Wellesley
15-04/319 A Watershed-Based Plan to Maintain the Health and Improve the Resiliency of the Deerfield River Watershed by Franklin Regional Council of Governments
15-05/319 Small Farm BMP Guidance & Statewide NPS Outreach Project by Comprehensive Environmental Inc.
15-06/319 Stockbridge Bowl Management Project – Phase II by the Town of Stockbridge
15-07/319 Investigation of Passive Nitrogen Removal Strategies for Onsite Septic Systems at the Massachusetts Alternative Septic System Test Center by the County of Barnstable

2016

16-01/319 Upper Charles River Regional Stormwater Finance Phase II Feasibility Study by the Town of Franklin
16-02/319 Steep Hill Brook BMP Retrofit Project by the Town of Stoughton
16-03/319 Keeping Roadway Stormflow out of Arcadia Lake by the Town of Belchertown
16-04/319 Lower Huckleberry Brook Stormwater Treatment and Wetland Park by the Town of Milford
16-05/319 Edenfield Avenue Green Street Demonstration Project, Watertown by the Charles River Watershed Association
16-06/319 Feasibility of a Stormwater Utility for Agawam by Pioneer Valley Planning Commission
16-07/319 Protecting a Healthy and Resilient Taunton Watershed: Green Infrastructure Prioritization, Implementation, and Training by the Nature Conservancy
16-08/319 Water Street Stormwater Implementation to Improve Water Quality in Plymouth Harbor by the Town of Plymouth
16-09/319 Reducing Nonpoint Source Pollution from Two Livestock Facilities through Implementation, Remediation, and Education of Selected BMPs by UMASS Amherst

2017	
17-01/319	Wendell Brook BMPs by the Town of Milton
17-02/319	Farm Pond Green Infrastructure BMPs by the Town of Framingham
17-03/319	Development of a Best Management Practice for Passively Removing Nitrogen from Onsite Septic Systems by the County of Barnstable
17-04/319	ACPP Technical Providers for the Palmer River Watershed-Part 2 by Massachusetts Association of Conservation Districts
17-05/319	West Monponsett Pond Nutrient Management Project by the Town of Halifax
17-06/319	Using the Science of Fluvial Geomorphology to Develop River Corridor Management Tools to Project the Health and Improve the Resiliency of the Deerfield Watershed by Franklin Regional Council of Governments
17-07/319	Egerton Road Green Infrastructure Demonstration Project by Mystic River Watershed Association
17-08/319	Mitigation of Erosion Impacts at Bartholomew's Cobble and Naumkeag by the Trustees of Reservations
17-09/319	Stormwater BMPs: Sevenmile River Watershed by the Town of Spencer

2018	
18-01/319	Internal Phosphorus Load Inactivation for Lake Attitash by the City of Amesbury
18-02/319	Revision of Massachusetts Watershed-based Plans by GeoSyntec Consultants
18-03/319	Public-Private Partnership for Stormwater Green Infrastructure by the Town of Franklin
18-04/319	Stormwater Fee Development for Westford's Stormwater Management Master Plan by the Town of Westford
18-05/319	Phase 1 Implementation of Bellingham's Subwatershed Management Plan by the Town of Bellingham
18-06/319	Pequit and Beaver Meadow Brook BMP Retrofit Project by the Town of Canton
18-07/319	Crosby Lane Stormwater Treatment and Salt Marsh Restoration Project by the Town of Brewster
18-08/319	Knob Hill Road Stormwater Improvements by the Town of Great Barrington
18-09/319	Armory Village Green Infrastructure Project by the Town of Millbury

2019	
19-01/319	Stormwater Management and Stream Restoration for Water Quality in Lower Abbey Brook by the City of Chicopee
19-02/319	Reducing Phosphorus Impacts from Septic Systems Near Freshwater Lakes and Ponds- Defining Best Management Practices by the County of Barnstable
19-03/319	Stormwater Mitigation at Aberjona River in Winchester by the Mystic River Watershed Association
19-04/319	Beaver Meadow Brook BMP Retrofit Project by the Town of Stoughton
19-05/319	Avon Town Hall Green Infrastructure Demonstration Project by the Town of Avon
19-06/319	Westport River Agricultural Nonpoint Source Program by the Massachusetts Association of Conservation Districts (MACD)
19-07/319	Update and Revision of 2014-2019 Massachusetts Nonpoint Source Management by the Eastern Research Group

2020	
20-01/319	Regional Nonpoint Source Coordinator Initiative: A Proposal for Franklin County by Franklin Regional Council of Governments
20-02/319	Fearing Brook Floodplain Creation Project by the Town of Amherst
20-03/319	Stormwater BMPs: Sevenmile River Watershed – Phase 2 by the Town of Spencer
20-04/319	Berkshire County Regional Nonpoint Source Coordinator by the Berkshire Regional Planning Commission
20-05/319	Massachusetts Nonpoint Source Grant Guidebook by Comprehensive Environmental Inc.
20-06/319	A Regional Nonpoint Source Coordinator: Collective Action in the Pioneer Valley for Water Quality Improvement and Greater Community Resilience by Pioneer Valley Planning Commission
20-07/319	Reducing Nonpoint Source Pollution from Two Equine Facilities through Implementation, Remediation, and Education of Selected BMPs by UMASS Amherst

2021	
21-01/319	Distributed Small-Scale Trenches for Phosphorous Load Reduction by the Mystic River Watershed Association
21-03/319	Manchaug Pond Water Quality Improvements and Agricultural Outreach by the Manchaug Pond Foundation
21-04/319	Essex County Nonpoint Source Coordinator by the Merrimack Valley Planning Commission
21-05/319	Hamilton Reservoir Watershed Improvement Project by the Town of Holland
21-06/319	Western Massachusetts Agricultural Nonpoint Source Program by the Massachusetts Association of Conservation Districts

2022	
22-01/319	Watershed-Scale Zoning to Reduce Nonpoint Source Pollution and Protect Healthy Watersheds by Franklin Regional Council of Governments
22-02/319	Agricultural Nonpoint Source Regional Coordinators for Franklin, Hampshire, Hampden Counties by the Massachusetts Association of Conservation Districts
22-03/319	Encouraging the Use of Lignocellulose (Wood) Based Onsite Septic Systems for Nitrogen-Sensitive Environments by Demonstrating Concurrent Contaminant Removal That Justifies More Economical Means for Effluent Disposal by Barnstable County of Health and the Environment
22-04/319	Collicot/Cunningham Stormwater BMP by the Town of Milton
22-05/319	Developing a Dirt Roads Stormwater Management Toolkit to Reduce Nonpoint Source Pollution and Improve Resiliency in Healthy Watersheds by Franklin Regional Council of Governments
22-06/319	Braintree Council on Elder Affairs Retrofit by the Town of Braintree
22-07/319	Hupi Road Drainage Improvements to Reduce Sediment Inflow to Lake Garfield by the Town of Monterey
22-08/319	Quacumquasit Pond Phosphorus Inactivation Project by the Town of Sturbridge
22-09/319	Watson Park BMP Implementation Project by the Town of Braintree
22-10/319	Lake Waushakum BMP Project by the City of Framingham
22-11/319	Massachusetts Watershed-Based Plans: Enhancement and Implementation Project by Geosyntec Consultants
22-12/319	Increasing the Pace of On-Farm Watershed Restoration in Berkshire County by the Housatonic Valley Association

PROJECTS BY WATERSHED:

Blackstone

91-03	Demonstration of Soil Bioengineering Streambank Protection Measures on the Blackstone and North Rivers
95-12	Rice City Pond Restoration
00-06	Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
00-12	Salisbury Pond Resource Restoration
01-21	Lake Quinsigamond and Lake Ripple Restoration Project
01-27	Beaver Brook Culvert Rehabilitation and Improvements to Beaver Brook Park
02-01	Indian Lake Watershed Resource Restoration
02-07	Lake Singletary Storm Drain Retrofit Program
03-04	Dorothy Pond Perimeter and Local Watershed Stormwater Management/Remediation Proposal
01-27	Beaver Brook Culvert Rehabilitation and Improvements to Beaver Brook Park
05-12	Manchaug Pond NPS Improvement Project
13-05	Manchaug Pond Water Quality Improvement - Phase 2
18-09	Armory Village Green Infrastructure Project
21-03	Manchaug Pond Water Quality Improvements and Agricultural Outreach

Boston Harbor

98-07	Reducing Stormwater Pollution in an Ultra-Urban Watershed
99-05	Telecom City: Malden, Medford, Everett
01-06	Memorial Pond Restoration, Phase I
01-24	Storm Water System Maintenance and Residuals Waste Handling
02-05	Neponset River Watershed Bacteria TMDL Implementation Project
03-09	Clark and Cobb's Pond Stormwater Management
03-10	Spy Pond Stormwater Management
04-16	Tree Box Filters as a Tool for Implementing the Neponset Bacteria TMDL
05-08	Children's Wharf Project: Growing the Next Generation of Environmental Stewards
11-10	Sunset Lake Watershed Stormwater BMPs
13-07	City of Boston Porous Pavement "Green Alley" Nonpoint Source Demonstration Project
15-02	Dedham Mother Brook BMP Implementation Project
16-02	Steep Hill Brook BMP Retrofit Project
16-07	Protecting a Healthy and Resilient Taunton Watershed: Green Infrastructure Prioritization, Implementation, and Training
17-01	Wendell Brook BMPs
18-06	Pequit and Beaver Meadow Brook BMP Retrofit Project
19-04	Beaver Meadow Brook BMP Retrofit Project
22-06	Braintree Council on Elder Affairs Retrofit
22-09	Watson Park BMP Implementation Project

Buzzards Bay

91-04	Investigation of Low-Input Cranberry Production
91-05	Hydrogeologic Evaluation of the Waquoit Bay Land Margin Ecosystem
92-01	Sprague's Cove Storm Water Remediation Project
93-01	Storm Water Remediation Project for the Broad Marsh River
95-03	Buttermilk Bay Storm Water Remediation Project
95-05	Demonstration of an Alternative On-Site Wastewater Disposal System at the Allen's Pond Wildlife Sanctuary, Dartmouth
95-09	Buzzards Bay Action Committee - Holmes Brook Restoration
97-07	Protecting Nitrogen Sensitive Coastal Embayments Through Land Conservation
99-01	Alternative Septic System Test Center Project Monitoring
99-04	Winsegansett Salt Marsh Restoration Project
00-02	Alternative Septic System Test Center Project Monitoring II

00-03 Development of a Rapid Field Test for the Quality of Stone Aggregate in Onsite Septic Systems
00-05 Atlas of Stormwater Discharges
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
00-09 Onset Bay, Wareham, MA, Nonpoint Source Pollution Remediation Project
01-02 Boat Waste Oil Recovery Program for New Bedford Harbor
01-05 Evaluation of Phosphorus Removal in Onsite Septic Systems
01-07 Wareham NPS Remediation Program: East River, Broad Cove, Muddy Cove
02-06 Head of Westport Stormwater Project
04-16 Tree Box Filters as a Tool for Implementing the Neponset Bacteria TMDL
05-08 Children's Wharf Project: Growing the Next Generation of Environmental Stewards
09-04 Northern Fairhaven New Bedford Inner Harbor Drainage Area LID Stormwater Enhancements
10-06 Northern Fairhaven New Bedford Inner Harbor Drainage Area Phase II LID Stormwater Enhancements
11-02 Westport Middle School Stormwater BMP Implementation
12-02 Decreasing Phosphorus in Cranberry Waters by Implementation of Best Management Practices
14-02 White Island Pond Phosphorus Inactivation Project
19-06 Westport River Agricultural Nonpoint Source Program

Cape Cod

94-05 Alternative On-Site Septic Systems - Encouraging Their Use In Environmentally Sensitive Areas of Barnstable County
94-06 Orleans Storm Water Remediation Project
95-02 A Demonstration Program to Mitigate Storm Drain Pollution Impacting Shellfish Beds
95-07 Title 5 Training for Boards of Health in Five Towns in Barnstable County
95-08 Swan Pond River Storm Water Remediation Project
97-02 Red Lily Pond Rejuvenation
97-03 Technical Outreach to Communities Regarding Alternative On-Site Septic Systems
97-05 Leak Prevention for Heating Oil Storage Systems
97-09 Three Bay Area - Ropes Beach Subwatershed
98-03 Coastal Embayment/Title 5 Training Video
99-01 Alternative Septic System Test Center Project Monitoring
93-05 Commercial Underground Storage Tank Compliance Project
93-10 Cape Cod Coastal Nonpoint Source Management Plan
02-13 Mill Creek Estuary Stormwater Mitigation 5
08-03 Brewster Stony Brook Road Stormwater Improvements
09-03 Stormwater BMPs in the Provincetown Harbor Watershed
09-05 Phosphorus Mitigation Program for Cranberry Bogs on White Island Pond
13-02 Provincetown Harbor Stormwater: Commercial Street Reconstruction - Phase 2
18-07 Crosby Lane Stormwater Treatment and Salt Marsh Restoration Project

Charles

97-08 Hall's Pond Wetlands Restoration Project
01-16 Plymouth Road Stormwater Treatment System
02-08 Hammond Pond Stormwater Management Plan Implementation Phase I
04-17 Erosion and Sediment Control and Stormwater Management at Construction Sites using Soils- and Compost-Based Best Management Practices
05-05 Drumlin Farm Nonpoint Source Stormwater Management Project
07-05 Franklin Stormwater Retrofit Improvement Project
07-07 Jackson Square LID Program
08-07 Boston Architectural College Green Alley & Roof Project
11-04 Farm Pond Stormwater BMP Implementation Program
11-09 Online Phosphorus Trading System
15-01 Franklin Phase II of Stormwater BMP Retrofits
15-03 Upper Caroline Brook Restoration Project

16-01 Upper Charles River Regional Stormwater Finance Phase II Feasibility Study
16-04 Lower Huckleberry Brook Stormwater Treatment and Wetland Park
16-05 Edenfield Avenue Green Street Demonstration Project, Watertown
18-03 Public-Private Partnership for Stormwater Green Infrastructure
18-05 Phase 1 Implementation of Bellingham's Subwatershed Management Plan

Chicopee

90-02 Milkroom Wastewater Treatment Demonstration Project
90-03 Pesticide Handling Demonstration Project
96-04 Demonstration of Urban Streambed Stabilization and Wetlands Function and Wildlife Habitat Improvement Using Soil Bioengineering Treatments at Hearthstone Quarry Brook, Chicopee
97-01 Development of Stormwater Utilities in Two Demonstration Communities: Chicopee & South Hadley
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
06-09 River Street Best Management Practice Implementation
08-05 Restoration of Lake Wickaboag at Wickaboag Valley Road
11-11 Improvement to Lake Wickaboag Sediment BMPs at Lakeview Avenue
15-01 Franklin Phase II of Stormwater BMP Retrofits
17-09 Stormwater BMPs: Sevenmile River Watershed
20-03 Stormwater BMPs: Sevenmile River Watershed – Phase 2
20-06 A Regional Nonpoint Source Coordinator: Collective Action in the Pioneer Valley for Water Quality Improvement and Greater Community Resilience
22-02 Agricultural Nonpoint Source Regional Coordinators for Franklin, Hampshire, Hampden Counties
22-08 Quacumquasit Pond Phosphorus Inactivation Project

Concord

98-04 Restoring Concord's Mill Brook: Nonpoint Source Pollution and Community Involvement
00-07 Town of Acton Nonpoint Source Control Program
00-08 Long Pond Restoration Project, Littleton, MA
01-01 Lake Cochituate, Snake Brook NPS Remediation, Phase I
02-10 Implementation of TMDL Recommendations at Lake Boon
08-02 Lake Waushakum LID BMP Implementation Project
17-02 Farm Pond Green Infrastructure BMPs
18-04 Stormwater Fee Development for Westford's Stormwater Management Master Plan
92-02 Demonstration Project for Control of Urban Runoff in the Connecticut, Merrimack, and Sudbury River Basins
22-10 Lake Waushakum BMP Project

Connecticut

95-01 Lake Lorraine and Fivemile Pond Nonpoint Source Project
95-06 Comprehensive Nonpoint Source Management in the Mill River Subwatershed, Hatfield, MA
96-03 Connecticut River Watershed Restoration Project
98-05 Nashawannuck Pond Watershed Restoration Project, Easthampton, MA
99-08 Mill River Watershed Restoration Project
00-04 Connecticut River Watershed Restoration - Phase II
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
00-16 Lake Wyola TMDL Implementation
01-09 Nashawannuck Pond Restoration, Phase II
03-07 Connecticut River Phase III
10-07 Stormwater Management BMPs for Unpaved Roads: Four Mile Brook Road in Northfield, Massachusetts
10-08 Sawmill River Implementation Project: An Ecosystem Approach to Restoration
16-03 Keeping Roadway Stormflow out of Arcadia Lake
16-06 Feasibility of a Stormwater Utility for Agawam
16-09 Reducing Nonpoint Source Pollution from Two Livestock Facilities through Implementation, Remediation, and Education of Selected BMPs

19-01 Stormwater Management and Stream Restoration for Water Quality in Lower Abbey Brook
20-01 Regional Nonpoint Source Coordinator Initiative: A Proposal for Franklin County
20-02 Fearing Brook Floodplain Creation Project
20-07 Reducing Nonpoint Source Pollution from Two Equine Facilities through Implementation, Remediation, and Education of Selected BMPs
21-06 Western Massachusetts Agricultural Nonpoint Source Program
22-02 Agricultural Nonpoint Source Regional Coordinators for Franklin, Hampshire, Hampden Counties
92-02 Demonstration Project for Control of Urban Runoff in the Connecticut, Merrimack, and Sudbury River Basins

Deerfield

91-03 Demonstration of Soil Bioengineering Streambank Protection Measures on the Blackstone and North Rivers
95-04 Demonstration of Urban Pollution Control in the Green River Watershed
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
13-03 Sediment Management BMPs for the South River in Conway
14-04 Using Low Impact Development Techniques to Manage Stormwater Runoff in Greenfield
15-04 A Watershed-Based Plan to Maintain the Health and Improve the Resiliency of the Deerfield River Watershed
17-06 Using the Science of Fluvial Geomorphology to Develop River Corridor Management Tools to Project the Health and Improve the Resiliency of the Deerfield Watershed
20-01 Regional Nonpoint Source Coordinator Initiative: A Proposal for Franklin County
21-06 Western Massachusetts Agricultural Nonpoint Source Program
22-01 Watershed-Scale Zoning to Reduce Nonpoint Source Pollution and Protect Healthy Watersheds
22-02 Agricultural Nonpoint Source Regional Coordinators for Franklin, Hampshire, Hampden Counties
22-05 Developing a Dirt Roads Stormwater Management Toolkit to Reduce Nonpoint Source Pollution and Improve Resiliency in Healthy Watersheds

Farmington

97-04 Alternative Septic Systems Technologies Workshop Program
98-06 NPS Pollution Correction in the Farmington Watershed - Dirt Roads BMP Handbook
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
01-04 Massachusetts Buffer Manual and Demonstration Projects
20-04 Berkshire County Regional Nonpoint Source Coordinator

French

No projects

Housatonic

94-03 Green River Soil Bioengineering Project
97-04 Alternative Septic Systems Technologies Workshop Program
99-03 Pontoosuc Lake Watershed Resource Restoration Project
00-01 Implementing the Diagnostic/Feasibility Study Recommendations for Onota Lake
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
01-04 Massachusetts Buffer Manual and Demonstration Projects
01-13 Lake Buel Implementation and Demonstration Project
01-14 Pontoosuc Lake Watershed Resource Restoration Project
01-15 Implementing a Stormwater Remediation Strategy at Ashmere Lake
02-04 NPS BMPs at Richmond Pond
03-06 Pittsfield Water Supply Stormwater Remediation Project
06-04 Oak Hill Tributary Improvement Project
07-08 Onota Lake Preservation Project
09-02 Stockbridge Bowl Management Project Phase I
11-05 Castle Hill Avenue Storm Drainage Improvements
15-06 Stockbridge Bowl Management Project – Phase II

17-08 Mitigation of Erosion Impacts at Bartholomew's Cobble and Naumkeag
18-08 Knob Hill Road Stormwater Improvements
20-04 Berkshire County Regional Nonpoint Source Coordinator
22-12 Increasing the Pace of On-Farm Watershed Restoration in Berkshire County

Ipswich

92-03 Ipswich River Nonpoint Source Prevention Project
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
01-17 North Green Stormwater Management Project
02-12 Martins Pond Shoreline Restoration and Sediment Reduction Project
10-05 North Reading Stormwater Infiltration Project: Reaching Out to Address Runoff (ROAR)
14-06 Ipswich River Watershed BMP Implementation at Farley Brook

Islands

94-08 Lake Tashmoo Storm Water Remediation Project
01-18 Lagoon Pond Runoff Renovation Project

Hudson (Hoosic, Kinderhook, BashBish)

No projects

Merrimack

92-02 Demonstration Project for Control of Urban Runoff in the Connecticut, Merrimack, and Sudbury River Basins
96-05 Spicket River Watershed Revitalization
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
01-20 Lake Attitash Stormwater Treatment Program
03-08 Powow River Stormwater Management
11-07 Lake Attitash Watershed Restoration
14-05 Lake Gardner & Powow River Nonpoint Source Improvement Project
18-01 Internal Phosphorus Load Inactivation for Lake Attitash
18-04 Stormwater Fee Development for Westford's Stormwater Management Master Plan
92-04 Technical Support for Developing and Implementing Urban Runoff Nonpoint Source Control Strategies in the Merrimack River Basin

Millers

01-03 Parker Pond Restoration, Gardner
06-01 Orange Riverfront Park: Using Low Impact Development Techniques to Manage Runoff
11-06 Storm Water Pollution Reduction in the Montachusett Region's Millers River Watershed Area
13-04 Reducing Stormwater Pollution in the Western Millers River Watershed with Low Impact Development
20-01 Regional Nonpoint Source Coordinator Initiative: A Proposal for Franklin County
22-02 Agricultural Nonpoint Source Regional Coordinators for Franklin, Hampshire, Hampden Counties

Mystic

17-07 Egerton Road Green Infrastructure Demonstration Project
19-03 Stormwater Mitigation at Aberjona River in Winchester
21-01 Distributed Small-Scale Trenches for Phosphorous Load Reduction

Narragansett Bay/Mt. Hope

13-08 ACPP Technical Providers for the Palmer River Watershed
17-04 ACPP Technical Providers for the Palmer River Watershed-Part 2

Nashua

91-02 Rehabilitation and Evaluation of the Sterling Filter Beds at Wachusett Reservoir
93-04 H2Ome Check Pilot Project
93-11 Wachusett Septic System Management Project
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
02-11 Wachusett Mountain NPS
03-05 Bare Hill Pond Noxious Aquatic Plant Reduction
04-18 Bare Hill Pond III
05-10 Lake Shirley Low Impact Development Stormwater Improvement Project
07-03 Rockwell Pond Source Reduction Pilot Project
07-09 James Brook Urban Stormwater Improvements
08-04 Bare Hill Pond Noxious Aquatic Plant Reduction
10-03 Lower Monoosnoc Brook Remediation Project
14-03 Monoosnoc Brook Renewal Project

Neponset

95-12 Neponset River Fishway Project
96-06 In-House Management Plan For Nonpoint Source Pollution in the Neponset River
22-04 Collicot/Cunningham Stormwater BMP

North Coastal

94-07 Mill River Watershed Management Project
95-02 A Demonstration Program to Mitigate Storm Drain Pollution Impacting Shellfish Beds
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
01-23 Demonstration of Innovative Stormwater Management Retrofit Systems

Parker

No projects

Quinebaug

01-22 Stormwater Management Plan at the Millyard Marketplace
07-04 Improving Water Quality in the Hamilton Reservoir Watershed
21-05 Hamilton Reservoir Watershed Improvement Project

Shawsheen

06-08 Bedford NPS Project
11-03 Long Pond Watershed NPS Abatement
11-08 Water Quality Improvements of Vine Brook and Old Reservoir Recreational Beach

South Coastal

90-05 North and South Rivers Storm Water Mitigation Project
94-09 Jones River/Billington Sea Nonpoint Source Pollution Control Project
98-08 Protection of First Herring Brook
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
00-17 Stormwater BMPs on Residential Property
01-08 Gray's Beach Park Restoration, Kingston
01-19 Oldham and Furnace Pond Stormwater Treatment
02-09 Stormwater Remediation for Plymouth Harbor and Plymouth Bay
03-03 South Coastal Inter-Municipal Water Quality Improvement Project
03-11 Billington Sea Stormwater Remediation
03-12 Stormwater BMPs at Peppermint Brook and Lily Pond
04-03 LID Training and Technical Assistance for Local Decision Makers
05-06 Pembroke LID Retrofit Implementation Project
05-07 Kingston Elementary School LID Retrofit Implementation Project
05-09 Old Oaken Bucket Pond Watershed NPS Improvements

06-05 First Herring Brook Low Impact Development Stormwater Enhancements
06-06 Herring River Coastal Low Impact Development Project
07-06 Stormwater BMP Implementation for Little Harbor
08-01 Eel River Headwaters Restoration
08-06 Stormwater BMPs: Implementation for Straits Pond at Richards Road and Pond Street
10-04 Stormwater BMPs: Little Harbor, Cohasset Cove, and Cohasset Harbor
16-08 Water Street Stormwater Implementation to Improve Water Quality in Plymouth Harbor

Taunton

90-01 Avon Industrial Park Storm Water Management Project
93-02 Sediment and Erosion Control in the Taunton River Basin
00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
00-10 Shaw's Plaza Drainage Nonpoint Source Pollution Management
17-05 West Monponsett Pond Nutrient Management Project
19-05 Avon Town Hall Green Infrastructure Demonstration Project

Ten Mile

02-02 Wall Street Highway Yard Stormwater Improvements Project

Westfield

00-14 Forestry Best Management Practices (BMP) Implementation Monitoring Protocol
02-03 Stormwater Management on the Middle Pond of the Congamond Lakes
05-11 Congamond Lakes FFY 06
09-01 Congamond Lakes FFY 09
16-06 Feasibility of a Stormwater Utility for Agawam
20-04 Berkshire County Regional Nonpoint Source Coordinator
21-06 Western Massachusetts Agricultural Nonpoint Source Program
22-02 Agricultural Nonpoint Source Regional Coordinators for Franklin, Hampshire, Hampden Counties

Statewide Projects

91-01 Soil Morphology as an Indicator for Maximum Groundwater Elevation Levels in Massachusetts
93-03 Artificial Recharge Evaluation and Guidance to Municipalities
93-12 Nitrogen Loading Computer Model Development Project
93-13 Development and Outreach of an Erosion and Sedimentation Control Guide for Massachusetts
94-01 Demonstration of Best Management Practices to Control Nonpoint Source Pollution from Forestry Operations
95-10 Developing and Conducting Training Workshops on the Revised Regulations for M.G.L. CH 132, The Forest Cutting Practices Act, and M.G.L. CH 131, the Wetlands Protection Act
96-01 Septic System Management 2000 Project
96-02 Monitoring Strategies for Innovative On-Site Sewage Disposal Technologies
98-01 Determining the Effectiveness of On-Site Septic Systems for the Removal of Viruses
98-03 Coastal Embayment/Title 5 Training Video
98-09 Manual of Innovative/Alternative On-Site Wastewater Treatment Technologies
98-11 Development and Demonstration of Protocols for Evaluating Greywater Disposal Systems in MA
98-12 Demonstrating the Use of Eelgrass Monitoring to Assess Coastal Nonpoint Source Pollution
99-01 Alternative Septic System Test Center Project Monitoring
99-06 Development of a Rational Basis for Designing Recharging Stormwater Control Structures and Flow and Volume Design Criteria
99-07 Design and Guidance for Shallow Trench Low Pressure Pipe Distribution Systems for the Massachusetts Title 5 Innovative/Alternative Septic System Program
99-09 Demonstration of Best Management Practices to Control Agricultural Nonpoint Source Pollution
99-11 Innovative Stormwater Technology Monitoring Initiative
00-02 Alternative Septic System Test Center Project Monitoring II
00-03 Development of a Rapid Field Test for the Quality of Stone Aggregate in Onsite Septic Systems

00-06 Management Strategies for Massachusetts Dairy Farms to Reduce the Risk of Nonpoint Source Pollution
00-13 Implementation of Nutrient Management Standards on Massachusetts Crop/Livestock Farms to Reduce the Risk of Nonpoint Source Pollution
00-14 Forestry Best Management Practices (BMP) Implementation Monitoring Protocol
00-15 Revision of the Massachusetts Nonpoint Source Management Manual
01-05 Evaluation of Phosphorus Removal in Onsite Septic Systems
01-10 Development and Demonstration of a Lake Watershed Survey Program
01-12 Cranberry Bog Phosphorus Dynamics for TMDL Development
01-25 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center
03-01 Operation of the Massachusetts Alternative Septic System Test Center
03-02 Comparison Of Virus Removal In Aggregate Free Chamber Leaching Systems Vs. Aggregate Laden Trenches
04-01 Operation and Maintenance of MASSTC
04-02 UMass/EOEA Innovative Stormwater Technology Transfer and Evaluation
05-04 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center and Investigation into Onsite Treatment of Endocrine-Disrupting Compounds
06-07 Reducing NPS from Equine Facilities
06-10 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center
06-11 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center
07-01 Stormwater and Low Impact Development Technology Transfer
07-02 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center
08-08 PCSWMM Evaluation
08-09 Onsite Septic System Investigations at the Massachusetts Alternative Septic System Test Center in Support of Comprehensive Wastewater Management Planning Efforts
09-06 Massachusetts Regional Stormwater Management Training Seminar Series
10-01 MaSTEP 2010
10-02 Investigation of Blackwater Disposal as a Means of Nutrient Management in Watersheds of Nitrogen Sensitive Marine Embayments
11-01 Operation and Maintenance of the Massachusetts Alternative Septic System Test Center
11-12 Water Quality Analysis Support for Massachusetts Volunteer Monitors
12-01 Investigating Means Of Improving Onsite Septic Systems For Removal Of Contaminants Of Emerging Concern
12-03 Minimizing Non-Point Source Pollution From Horse Facilities Through Installation And Demonstration Of Best Management Practices
12-04 Massachusetts Stormwater Outreach and Education Program 2012
13-01 Continuing Investigation of Contaminants of Emerging Concern Discharged from Onsite Systems with Emphasis on Endocrine Disrupting Compounds
13-06 Massachusetts Nonpoint Source Pollution Management Manual, Update and Enhancement
13-09 Development of the 2014 Massachusetts Nonpoint Source Management Plan
17-03 Development of a Best Management Practice for Passively Removing Nitrogen From Onsite Septic Systems
18-02 Revision of Massachusetts Watershed-based Plans
19-02 Reducing Phosphorus Impacts from Septic Systems Near Freshwater Lakes and Ponds-Defining Best Management Practices
19-07 Update and Revision of 2014-2019 Massachusetts Nonpoint Source Management
20-05 Massachusetts Nonpoint Source Grant Guidebook
22-03 Encouraging the Use of Lignocellulose (Wood) Based Onsite Septic Systems for Nitrogen-Sensitive Environments by Demonstrating Concurrent Contaminant Removal That Justifies More Economical Means for Effluent Disposal
22-11 Massachusetts Watershed-Based Plans: Enhancement and Implementation Project