

# Nonpoint Source Management 2013 Annual Report



New Hampshire  
Department of Environmental Services  
March 2014





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March 2014



**Front Cover:** *The NHDES Soak Up the Rain staff work with the Great Bay Stewards to install a rain garden in Greenland, NH. Photo by Rob Livingston, NH Department of Environmental Services.*

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# Introduction

This report describes the activities and accomplishments achieved in New Hampshire to protect and restore waterbodies during the year ending September 30, 2013 with funding appropriated under Section 319 of the Clean Water Act, including \$1,124,593 in 2013, slightly less than one percent decrease from 2012. During the year, 14 grants totaling nearly \$1 million were awarded to watershed organizations and municipalities to develop and implement watershed-based plans. These partnerships are integral to our success in protecting and restoring New Hampshire's waters.

The report also documents the results of five projects totaling more than \$700,000 that were completed during the year, including an excellent watershed-based plan for Mirror Lake in Tuftonboro and significant progress implementing stormwater best management practices (BMPs) at Cobbetts Pond in Windham. Both projects illustrate the focused dedication of local volunteers leading complex efforts to reverse long-term pollution trends in their watersheds. In many ways, these projects bring to life the kind of nonpoint source management initially envisioned in the Clean Water Act.

Expanding on this vision for the state's program is a recently released public comment draft update of the Nonpoint Source Management Program. For the first time in 15 years, NHDES produced a detailed action plan guiding efforts to address nonpoint sources through watershed-based planning and statewide actions to address priority pollution sources. The Program Plan is intended to meet new federal guidelines governing the use of 319 funds that more closely tie resources to outcomes.

A key component of our statewide effort is the Soak up the Rain program (SOAK NH). Following publication of the *Homeowners Guide to Stormwater Management* in 2011, NHDES conceived SOAK NH to facilitate rapid adaptation of lot-scale non-engineered practices designed to infiltrate stormwater. One SOAK NH installation was completed in Greenland in 2013 and much more is in store for 2014.

Significant new state laws addressing priority nonpoint source concerns were passed in 2013. To address nutrients from lawn fertilizer, HB 393 requires fertilizer sold at retail to comply with nitrogen application rate limits and to exclude phosphorus except for starter fertilizer or if a soil test shows the need. This important bill was sponsored by a seacoast legislator, Rep. Adam Schroeder of Newmarket, who recognized the need to comprehensively address all sources of nitrogen in the Great Bay watershed.

A second law, RSA 489-C, created the first in the nation state voluntary salt applicator certification program. The impetus for the bill was the chloride impairments in the southern I-93 corridor that came to light during the environmental impact analysis conducted for highway expansion in the early- to mid-2000s. When the chloride total maximum daily load (TMDL) studies documented that private sector salt application was responsible for more than 50% of the total chloride load in some watersheds, the I-93 Salt Reduction Work Group quickly determined that liability concerns were a primary driver of excess salting on private parking lots and roads. The new law affords liability protection to salt applicators, and landowners who hire them, who are trained and certified and follow BMPs.

2013 was a successful year for the New Hampshire Nonpoint Source Program, but much more work remains to be done.

# Nonpoint Source Management Program Update

In 2013, NHDES drafted an update to New Hampshire's Nonpoint Source Management Program Plan (Plan) which was last updated in 1999. The Plan serves as a non-regulatory road map to guide NPS program activities including outreach, planning, and implementation projects. NHDES worked with several focus groups to develop the draft which will serve as a "strawman" for further input by stakeholders. The 2013 draft Plan outlines New Hampshire's approach to addressing NPS pollution during years 2015 through 2019. The objectives of this Plan are to:

- Inform NH residents and NPS partners about the causes and impacts of NPS pollution in New Hampshire.
- Set broad priorities for addressing NPS pollution sources in New Hampshire.
- Identify long-term goals for protecting and restoring waters and watersheds from NPS pollution.
- Establish specific short-term objectives and measurable milestones to be accomplished over the next 5 years which will help attain long-term NPS Program goals.

The draft Plan identifies goals, objectives and milestones for major Nonpoint Source topics including watershed prioritization, partnerships, agriculture, chlorides and road maintenance, hydrologic and habitat modification, landscape and turf management, runoff from developed lands, and subsurface systems. The draft Plan is available on the NHDES website at <http://des.nh.gov/organization/divisions/water/wmb/was/nps-plan.htm>.

NHDES will be offering presentations on the draft Plan at workshops, conferences, and to stakeholder audiences into the spring of 2014. Comments will be accepted through May 31, 2014 with a final revised Plan completed by September 30<sup>th</sup>. Progress implementing the Plan will be tracked via our Nonpoint Source Management Annual Report. For more information on the revisions to the Plan, please contact Jillian McCarthy at [jillian.mccarthy@des.nh.gov](mailto:jillian.mccarthy@des.nh.gov).

## Soak Up the Rain

In 2012, NHDES launched Soak up the Rain NH (SOAK NH), modeled after EPA's Soak up the Rain program, to encourage widespread adoption of stormwater best management practices (BMPs) on residential properties. SOAK NH works with local organizations throughout the state to target high priority watersheds with the capacity to implement a local SOAK program. Together, NHDES and the local SOAK program coordinate with property owners to implement BMPs, such as rain gardens and dry wells, to reduce runoff to surface waters.

During the 2013 pilot year, staff continued to develop the program structure, build partnerships, and provide outreach. To further facilitate this program, NHDES hired a part-time position dedicated to all aspects of the program from material development to project design and installation.

In 2013, NHDES worked with several partners including the Great Bay Stewards, Lakes Region Planning Commission, Nashua Regional Planning Commission, New Hampshire Technical Institute, and UNH Cooperative Extension to help establish three SOAK NH groups in the Great Bay Watershed, and in the communities around Lake Waukewan and Baboosic Lake. Working with these partner groups, the SOAK NH program identified projects for screening assessments, provided several design recommendations, and completed one design and installation of a rain garden at a home in the Great Bay watershed. After the installation was complete, a heavy late summer rain confirmed that the rain garden was designed

properly and functioning as desired. Modeled results for pollutant load reductions from the rain garden installation were calculated with the estimated annual removals of 11.02 lbs/year of total suspended solids; 0.05 lbs/year of total phosphorus; and, 0.22 lbs/year of total nitrogen. There are plans currently in place to work with at least two more groups in 2014 - the Green Mountain Conservation Group and the Silver Lake Land Trust / Monadnock Conservancy.



*Members of Soak up the Rain Great Bay and the NHDES Soak up the Rain team are all smiles regarding their beautiful rain garden installation.*

During the pilot year, NHDES learned the following:

- **The difficulty of identifying and establishing local groups.** It was not always easy to identify local groups with the capacity to implement a program, not only in the short-term, but to continue in the long-term. NHDES has realized that they may need to stay involved for a longer time period by having an extended training period with a gradual transition of responsibilities to the local organization.
- **Site identification.** Identifying sites for installation projects proved more challenging than anticipated. While these practices can be installed on virtually any property, it was difficult to find properties where stormwater runs directly into a water body in order to demonstrate the direct effect of SOAK NH projects on improving water quality. In addition, a property owner interested in participating in the SOAK NH program sometimes received runoff from a neighboring property which would need to be addressed first. This led to the realization of the necessity of improved communication and coordination among neighbors.
- **Demand exceeds capacity.** Even in its infancy, it has become apparent that there is more need than the current SOAK NH program has the capacity to provide. Building partnerships with other groups, such as the NH Lakes Association, professional landscapers, natural resource stewards and other professional and volunteer organizations should be investigated.

To assist local groups in establishing and implementation of SOAK NH programs, NHDES developed and has available a wide range of training materials, templates, worksheets, and guides. This includes information on how to start up a local group as well as hands on guides for designing and installing various stormwater best management practices. To improve access to information and to promote the program's successes, a SOAK NH website and Facebook page will be launched in spring 2014. For more information on Soak up the Rain NH, please contact Jillian McCarthy at 603-271-8475 or by email at [jillian.mccarthy@des.nh.gov](mailto:jillian.mccarthy@des.nh.gov).

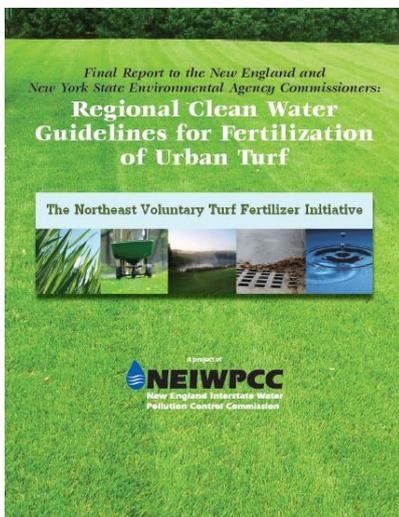
## Education and Outreach

In 2013, NHDES was involved in numerous efforts with partners to educate others on nonpoint source pollution causes and impacts and to promote the Watershed Assistance Grants program.

This included participating in Discover Wild New Hampshire Day, an annual event hosted by NHDES and New Hampshire Fish and Game Department; judging at New Hampshire's Sustainable Agriculture themed Envirothon; presenting on water quality before the New Hampshire Regional Planning Commissions and coordinating the training and display of an Enviroscape model that was presented at local schools and watershed events.

### Reducing the Impacts of Fertilizer

It is no secret that water quality in New Hampshire is impacted by pollution from the nutrients phosphorus and nitrogen. Excessive and improper fertilizer application on turf is one cause of phosphorus and nitrogen runoff to New Hampshire's rivers, lakes and coastal waters. In 2013, NHDES participated in several initiatives to address this concern.



#### ***Northeast Voluntary Turf Fertilizer Initiative: Regional Water Smart Guidelines on the Use of Turf Fertilizer.***

In May of 2011, the commissioners of the New England state environmental agencies asked the New England Interstate Water Pollution Control Commission (NEIWPCC) to work with state and EPA staff, as well as outside stakeholders, to develop fertilizer guidelines to supplement existing state laws. NHDES was an active participant in the planning and creation of these guidelines including hosting and contributing to stakeholder meetings with manufacturers of chemical and organic fertilizers, regulators, researchers, watershed groups and homeowners. The final guidelines lay out clear, easy to follow steps for homeowners, lawn care professionals, municipal groundskeepers and other land managers. Although there were many different opinions among the stakeholders, the regional turf

fertilizer guidelines highlight common ground to improve the health of turf while simultaneously reducing runoff and threats to water quality.

#### ***House Bill 393***

In June, New Hampshire House Bill 393 was signed into law. This new legislation, which takes effect January 1, 2014, limits the nitrogen and phosphorus content of fertilizers sold at retail stores for turf applications. When applied according to instructions on the label, turf fertilizer has nitrogen and phosphorus limits per 1,000 square feet per application as well as total annual limits per 1,000 square feet. The law also establishes limits on application rates and pre-empts local entities from regulating the registration, sale, formulation or transportation of fertilizer.



## ***NH Nonpoint Source Management Program Update: Landscaping and Turf Management Draft Chapter***

NHDES staff worked closely with UNH Cooperative Extension staff on the draft Nonpoint Source Management Program Plan's Landscaping and Turf Management chapter by outlining objectives and milestones that will help reduce water quality impacts from fertilizer. The draft Landscaping and Turf Management Chapter is now available for public comment at: <http://des.nh.gov/organization/divisions/water/wmb/was/documents/landscape.pdf>.

Past research by UNH Cooperative Extension on social and turf science was useful in assisting NEIWPC with the Turf Fertilizer Initiative. UNH Cooperative Extension and NH SEA Grant developed a public document titled Green Grass & Clear Water: Environmentally Friendly Lawn Care Recommendations for Northern New England. The draft NPS Management Plan outlines additional possible partnering efforts with UNH Cooperative Extension to reduce water quality impacts from turf fertilizer

## **Stormwater Utilities Efforts in New Hampshire Continue**

As follow-up to the 2009 Section 319 funded Stormwater Utility Feasibility Studies, NHDES participated in the following activities to promote funding mechanisms for stormwater programs. Staff provided assistance to EPA in developing a workshop titled Paying for Municipal Stormwater Programs: Confronting Challenges, Recognizing Opportunities and Building Community Consensus. The workshop, which was held in October at the Hugh Gregg Coastal Conservation Center in Greenland, included noted experts, MS4 town officials and audience members discussing strategies that have led to successful funding solutions. Over 100 participants shared their "real world" experiences building stakeholder agreement on funding solutions, and analyzed the factors that contributed to their successes and failures.

In May, a presentation was made to the Environmental Business Council New Hampshire Chapter on Stormwater Utilities in New Hampshire which included the results from the Dover, Portsmouth, Manchester, and Nashua Stormwater Utility Feasibility Studies. NHDES presented the background of the four case studies from the 2009 grant project, where they are now, and what is expected for the future. Attendees then had a panel discussion on how to move forward with encouraging stormwater utilities.

## **NH Municipal Stormwater Needs Exceed \$271 Million**

The EPA Clean Watersheds Needs Survey (CWNS) is completed by states every four years. The numbers are used in a report to Congress that informs national and state decision makers about the financial challenges municipalities face to assist in allocating resources. For example, the information may be used to allocate federal funds for New Hampshire's Clean Water State Revolving Fund (SRF) program.

In October, 2012, New Hampshire statewide capital costs associated with stormwater infrastructure needs were documented by NHDES for the EPA Clean Watersheds Needs Survey (CWNS) at \$271,676,710 – almost a fourfold increase from 2008 when the amount was \$69 million. These costs were determined using EPA CWNS rigorous data collection protocols. While wastewater costs have been recorded for several decades, collecting stormwater costs is relatively new for the CWNS. Data collection can be difficult as many municipalities lump stormwater costs in with road work, sewer line installation, or other construction costs. To more accurately reflect New Hampshire's stormwater needs, NHDES staff used an EPA-approved Innovative Method to extrapolate available data collected to all New Hampshire municipalities. NHDES obtained data from 49 (21 percent) of the municipalities to create a per-acre rate to extrapolate to the remainder 185 municipalities.

It is important to note that projects associated with stormwater flooding, or erosion and resulting sediment in rivers and streams are not eligible for inclusion in the CWNS. Because municipalities have additional costs associated with addressing these potential pollutants, e.g., culvert replacements, bank restoration, bridge abutment work, etc., NHDES staff recorded additional data to document those needs separately. In this more comprehensive report, the restrictive definition of stormwater “needs” as defined in the CWNS was supplemented and refined by New Hampshire stormwater experts adding another \$114,486,498 in state stormwater needs for a grand total of \$386,163,208.

## Nitrogen in Stormwater: Sources and Solutions Workshop

In May, NHDES staff partnered with UNH Stormwater Center, UNH research programs, and EPA to provide the first ever northeastern stormwater BMP nitrogen workshop, Nitrogen in Stormwater: Sources and Solutions. Speakers from each partner organization presented the most current research-based information on nonpoint source pollutant loads and appropriate stormwater treatment.

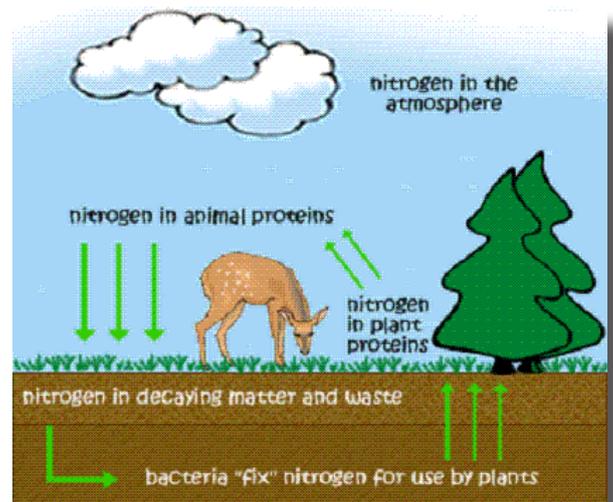
Held at the NHDES Coastal Office in Portsmouth, the workshop was filled to capacity with over 70 attendees from watershed organizations, municipalities, consulting firms, research institutions and governmental agencies. The workshop included the following elements:

- Overview of the nitrogen cycle.
- Nitrogen and the importance to Great Bay.
- Panel discussion of nitrogen sources in the Great Bay region.
- Methods of removal – how do different stormwater treatment systems work?
- Maintenance of stormwater systems.
- Pollutant load reductions and tracking implementation.

Workshop evaluations indicated that participants highly valued the program’s focus on solutions for enhancing BMPs to improve nitrogen removal and updates about recent scientific studies being conducted around the region to pin point sources of nitrogen.

## MS4 Permit Workshops

NHDES assistance to the three MS4 New Hampshire Regional Stormwater Coalitions in Manchester, Nashua, and the Seacoast regions took on a whole new approach with the release of the 2013 draft permit. Technical assistance and networking focused on working closely with EPA MS4 permit writers to coordinate a comprehensive outreach effort to municipalities. In addition to the public hearing, NHDES and EPA worked with the coalitions to host a total of four regional public meetings to explain the permit and to take questions. This enabled EPA MS4 permitting staff to have a more one on one relationship with New Hampshire municipalities.



Source: UNH Stormwater Center,  
<http://www.unh.edu/unhsc/sites/unh.edu.unhsc/files/docs/Nutrient%20Cycling.pdf>

# Highlights and Overview of Completed Projects

## Baboosic Lake Stormwater Management BMP Implementation – Phase 2, Baboosic Lake Association

**Project Background:** Baboosic Lake's 1536-acre watershed is located in the towns of Merrimack and Amherst. The lake is impaired by cyanobacteria blooms and elevated levels of *E. coli* bacteria. The Baboosic Lake Association worked with an engineering firm to identify, design and construct several BMPs as part of this project. This grant project is a continuation of steps being taken to improve the water quality of Baboosic Lake which have included the installation of community septic system and the disconnection from use of aging individual property systems near the lakefront.

**Problem:** Excess phosphorus inputs to the lake. The 2008 Baboosic Lake Watershed Based Plan identified stormwater runoff as the highest source of phosphorus loading to the lake at 46 percent, followed by 43 percent from septic systems and 11% from atmospheric deposition.

**Project Objectives:** To implement BMPs at twelve priority sites as identified in the watershed management plan which will result in reductions in sediment and phosphorus to the lake. The ultimate goal is to reduce phosphorus loading to a level that will eliminate cyanobacteria blooms in order to meet state water quality standards.



*A rain garden constructed along Lakeside Drive.  
Photo: Baboosic Lake Association*



Merrimack River Watershed

Baboosic Lake Stormwater Management BMP Implementation, Phase 2

Baboosic Lake Association, 2009 Restoration

Grant Amount: \$57,193

Local Match: \$50,856

TSS Reduction: 3,664 lbs/yr

Phosphorus Reduction: 3.15 lbs/yr

Nitrogen Reduction: 9.23 lbs/yr



*Rain Garden installed along Jebb Road.  
Photo: Baboosic Lake Association*

**Project Outcomes:** The Baboosic Lake Association in cooperation with the Town of Merrimack successfully implemented 14 consultant-designed BMPs at the 12 remaining BMP sites throughout residential neighborhoods on Baboosic Lake's east side. Due to Baboosic Lake Association's ability to leverage volunteer hours, equipment and Town assistance, they were able to complete all the deliverables of the project well under budget.

The BMPs consisted of seven rain gardens with associated forebays, four plunge pools and three rip-rap or vegetated swales. In total these BMPs are treating stormwater runoff from 31 acres in the watershed and removing an estimated 3,084 lbs/yr

of sediment. The Baboosic Lake Watershed Management Plan estimates that these sites could result in 1.4 lbs/yr TP removal annually. The final designs and BMP removal efficiency modeling estimates that approximately 3.15 lbs of TP is being removed on an annual basis. This is almost 5 percent of the 63.7 lb annual phosphorus load reduction goal established by the Baboosic Lake Association in their watershed based plan.

## Cobbetts Pond Watershed Restoration Plan Implementation – Phase 2 Fossa Road BMPs

**Project Background:** Cobbetts Pond is a 302-acre water body with a 2,048-acre watershed both located entirely within the town of Windham. Since 1985, the watershed population has almost tripled. The watershed is primarily dominated by residential development with several zones of commercial development. Population growth and development have resulted in an increase in impervious surface area from the conversion of farmland to residential neighborhoods and the close proximity of Interstate-93 which intersects the Cobbetts Pond watershed. Immediately around the pond, conversion of seasonal cottages to larger year-round homes is on-going. These changes to the landscape have resulted in damages to the shoreline riparian buffer and increases in stormwater runoff. Previously the Cobbetts Pond Improvement Association (CPIA) spearheaded an effort to obtain Section 319 funding to create and implement a watershed restoration plan. The plan was completed in 2010. This project begins implementation of that plan.

**Problem:** Cobbetts Pond has experienced declines in lake quality over the past several decades, as indicated by increasing phosphorus concentrations and more frequent nuisance blue-green algae blooms. NHDES classified Cobbetts Pond as the highest trophic level of oligotrophic in 1976, mesotrophic in 1986, and as the lowest trophic level of eutrophic in 2003. Over this same time period, water clarity decreased from approximately 4.8 to 2.6 meters. Cobbetts Pond is on the 2012 List of New Hampshire Threatened or Impaired Waters for Aquatic Life impairments due to low levels of dissolved oxygen and elevated levels of chlorophyll-a and total phosphorus; and, Primary Contact Recreation impairment due to blooms of cyanobacteria that have the potential to produce toxins.



*Sediment Plume from stormwater runoff discharging to Cobbetts Pond taken in 2009. Photo: Cobbetts Pond Improvement Association.*



Merrimack River  
Watershed

Cobbetts Pond  
Watershed  
Restoration Plan  
Implementation  
– Phase 2 Fossa  
Road BMPs

Cobbetts Pond  
Improvement  
Association

2006/2007/2009/  
2010 Restoration

Grant Amount:  
\$100,000

Local Match:  
\$71,129

TSS Reduction:  
4.94 tons/yr

Phosphorus  
Reduction:  
13.30 lbs/yr

**Project Objectives:** To begin implementation of the Plan by installing BMPs in the Fossa Road/Fossa Brook area which is a priority subwatershed identified in the Plan and a significant source of sediment and phosphorus loading. Stormwater runoff containing pollutants including nutrients (phosphorus) and sediments associated with urban runoff will be targeted for treatment and/or removal prior to entering Cobbetts Pond.

**Project Outcomes:** By the end of the project a multi-tiered storm water treatment system was installed in the 28-acre Fossa Road subwatershed. At the low-end of the subwatershed, approximately 300 ft. from the pond a large sediment trap/ detention pool with three overflows to address low, moderate and high flow conditions, was constructed on private property owned by Bill Day and located near the lake shore. Following the construction of the sediment trap, two 1000-gallon leaching catch basins were installed in the Town's road right of way on Hawley Rd and 10 rain gardens were constructed on private property in the upper portion of the watershed along Hawley and Marblehead Roads. The purpose of the leaching catch basins and rain gardens is to trap sediment in stormwater, but more importantly



*BMP under construction on the Bill Day property.  
Photo: Cobbetts Pond Improvement Association.*

to reduce stormwater flows and improve the efficiency of the sediment trap/detention pool BMP installed on the Day property. Annual cleanings of the sediment trap in 2011 and 2012 removed approximately 9,150 and 6,000 pounds of material, respectively. Sediment test results showed actual phosphorus removal of 2.3 and 1.5 pounds which and accounts for approximately 15 percent of the total phosphorus load reductions from all the BMPs constructed as part of this project.

## Mirror Lake Community Watershed Plan

**Project Background:** Mirror Lake is a 378-acre lake located within the towns of Wolfeboro and Tuftonboro. It's 2,160 acre watershed is primarily forested. Over the past several years, outbreaks of cyanobacteria blooms have been of concern. In 2008, Mirror Lake was listed as impaired for cyanobacteria. In addition, Mirror Lake Beach is listed as impaired for cyanobacteria and *E. coli*. A watershed management plan is necessary in order to determine the sources of the excessive nutrients contributing to the cyanobacteria blooms, quantify the phosphorus loading, and identify and prioritize sites for corrective measures. This project developed a watershed based plan that identifies nonpoint sources of phosphorus and estimated loadings to Mirror Lake surface waters and sediments and establishes a plan for source control, remediation if necessary and monitoring of results.

**Problem:** Excessive nutrient loading to Mirror Lake with sources unknown, resulting in frequent cyanobacteria blooms since 2007.

**Project Objectives:** Develop a watershed management plan for Mirror Lake to identify and quantify specific sources of phosphorus contributing to the lake's water quality impairments; develop a strategy to reduce phosphorus loading to the lake to a targeted level that would significantly improve in-lake water quality conditions and thereby reduce cyanobacteria blooms; develop a robust educational and outreach program to help the public understand the importance of controlling excess nutrients in waterbodies; and select one BMP site for design and future implementation to reduce sediment and phosphorus loads to the lake.

**Project Outcomes:** The Mirror Lake Watershed Management Plan estimates the current annual phosphorus load at 320 lb/year from the following sources: runoff from watershed land (52 percent); septic systems (7 percent); atmospheric deposition (24 percent); and internal loading (17 percent).

The Plan recommends that priority should be given to maintaining and improving water quality through watershed source controls such as stormwater BMPs, septic system upgrades; land conservation, regulatory tools and public education. The project stakeholders established a water quality goal for phosphorus of 8.5 ug/L. Annual load reductions needed are estimated at 7.4 lbs. As part of this project, one stormwater BMP site was selected and a design created for a location off of Lang Pond Road. Construction will be completed as part of a second Section 319 grant awarded in 2012.



Merrimack River  
Watershed

Mirror Lake  
Community  
Watershed Plan

Mirror Lake  
Protective  
Association

2008/2009/2010  
Restoration

Grant Amount:  
\$65,000

Local Match:  
\$61,423



*Mirror Lake*



Merrimack River  
Watershed

Newfound Lake  
Watershed Master  
Plan Implementation  
- Phase 1

Newfound Lake  
Region Association

2008/2010 Base

Grant Amount:  
\$127,960

Local Match:  
\$154,743

TSS Reduction:  
0.46 tons/yr

Phosphorus  
Reduction:

2.73 lbs/yr

Nitrogen Reduction:  
9.91 lbs/yr

## Newfound Lake Watershed Master Plan Implementation - Phase I

**Project Background:** Ranked as the fifth largest lake in New Hampshire, the Newfound Lake watershed is comprised of 63,150 acres across nine towns: Alexandria, Bridgewater, Bristol, Danbury, Dorchester, Groton, Hebron, Orange and Plymouth. The terrain is roughly 83 percent forested with steep slopes and thin soils. This results in rapid runoff during storm and snowmelt events, causing erosion and adding sediment, phosphorus and other contaminants to surface waters in the watershed.

This project begins implementation of *Every Acre Counts: The Newfound Watershed Master Plan* which was published on October 6, 2009. Through the collection and sharing of environmental data, working with local Planning Boards to support shared community visions of clean water, healthy forests and rural character, and educating stakeholders about stormwater prevention options, the ultimate goal of implementing the plan is a Newfound Watershed where quality of life and economic vitality continue to be fostered by stewardship and sustainable use of the watershed's natural resources, where land uses and development are balanced with conservation, and where the current water quantity and water quality have been maintained.

**Problem:** Threats to water quality are principally related to stormwater runoff which could result in the loss of Newfound Lake's high quality water status. Long-term monitoring of Newfound Lake indicates declining clarity and quality at two deep water sampling stations. Focused sampling of culverts discharging directly to Newfound Lake detected violations of *E. coli* bacteria and phosphorus standards in tributaries. In addition, both public (in 2009) and private (in 2008) beaches have been temporarily closed due to elevated *E. coli* bacteria concentrations.

**Project Objectives:** Adoption of *Every Acre Counts: The Newfound Watershed Master Plan* by the local watershed communities will enhance their local master plans, and provide the necessary legal foundation for future implementation efforts to guide land use development that will proactively protect water quality. Success will be measured by local adoption of guidelines, ordinances and behaviors that prevent addition of phosphorus, sediments and *E. coli* bacteria to Newfound Lake and maintaining Newfound Lake's 10-year median phosphorus concentration at or below its 2009 level of 4 micrograms/liter. The New Hampshire standard for phosphorus in Oligotrophic lakes is 8.0 micrograms/liter further demonstrating the high quality of Newfound Lake and the importance of implementing watershed management measures to maintain current nutrient levels.

**Project Outcomes:** At the completion of Phase I implementation two towns adopted *Every Acre Counts* with two more anticipated to do so by the end of 2012; three towns are developing land-use ordinances to protect steep slopes, highly erodible land and riparian buffers. In addition, an effective stormwater infiltration system was installed at

Cummings Beach in Bristol to address a significant erosion problem. This BMP collects and treats stormwater before it reaches Newfound Lake. During most storm events, all stormwater is now infiltrated through the vegetated swale rather than running off directly into the lake. This was a tremendous improvement whereby previously, stormwater carrying sediments and other pollutants were conveyed directly to the lake through a series of eroding ditches and as sheet flow over impervious surfaces. The BMP is maintained by the Bristol Department of Public Works.



*Installation of plantings as part of a stormwater treatment BMP at Cummings Beach, Bristol.  
Photo: Newfound Lake Region Association*



Merrimack River  
Watershed

Lake Winnisquam  
Watershed  
Management Plan -  
Phase 1 Black Brook

Town of Sanbornton

2010 Base

Grant Amount:  
\$25,000

Local Match:  
\$21,761

Phosphorus  
Reduction: 1.2 lbs/yr

## Lake Winnisquam Watershed Management Plan - Phase I Black Brook

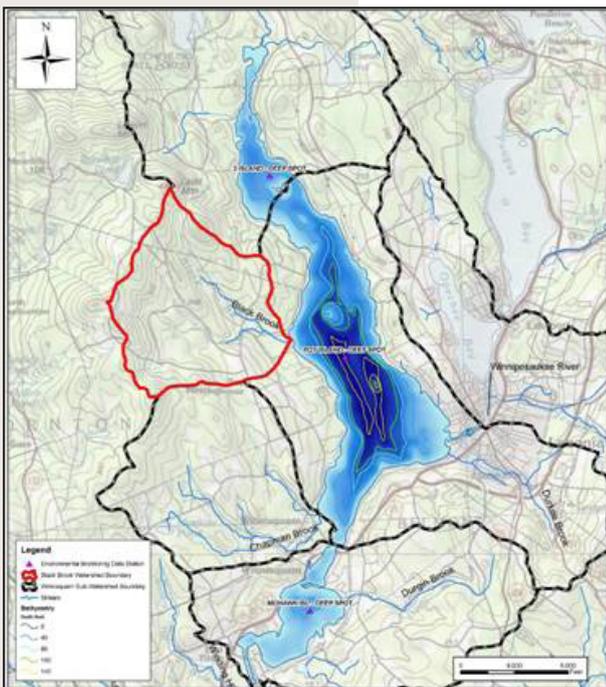
**Project Background:** Lake Winnisquam is the fourth largest lake in New Hampshire at 4,264 acres. This project is the first phase of a multi-phase project to develop a Watershed Management Plan (WMP) for Lake Winnisquam. This phase focused on the Black Brook subwatershed in the towns of Sanbornton and Meredith. While the Black Brook watershed is only a small part of the greater Lake Winnisquam watershed, the development of this plan is expected to serve as a model for additional watersheds around the lake.

**Problem:** With the landscape changing from a forested to non-forested condition, sediment and nutrient loads to Black Brook and Lake Winnisquam will increase if not managed with consideration for surface water quality impacts such as increased lake phosphorus concentrations, decreased water clarity, increased algal production and lower dissolved oxygen necessary for fish survival.

**Project Objectives:** To develop a WMP for the Black Brook watershed as part of an overall WMP for Lake Winnisquam. This includes establishing water quality goals for in-lake phosphorus concentrations, assessing current and future phosphorus loading to Black Brook and Lake Winnisquam and the design and implementation of best management practices for the Black Brook sub-watershed. The desired environmental outcome is that Lake Winnisquam remains a high quality oligotrophic lake.

**Project Outcomes:** The Black Brook WMP estimated the sources of phosphorus loading for Lake Winnisquam as 93% from surface water runoff from land uses and the remaining seven percent from atmospheric

deposition (6%) and septic systems (1%). The watershed stakeholders established a median in-lake short-term phosphorus goal of 6.1  $\mu\text{g/L}$ . To achieve this goal, watershed phosphorus loads need to be reduced by an estimated 538 pounds annually for the Lake Winnisquam watershed with 23.6 pounds from the Black Brook sub-watershed. Stormwater BMPs, regulatory tools and land conservation were identified as potential water quality improvement projects. The Black Brook WMP identified 38 stormwater BMPs to be implemented in order to achieve the required load reduction. In addition to the creation of the plan, this project implemented two of the identified BMPs, a sediment trap on Kaulback Road and a swale/sediment trap along Woodman Road. The final plan can be accessed at: <http://des.nh.gov/organization/divisions/water/wmb/was/documents/blk-brk-management-plan.pdf>.



*Lake Winnisquam and Black Brook subwatershed.*

## Looking Ahead

In 2014, we look forward to finalizing and beginning implementation of our updated *Nonpoint Source Management Program Plan*. We have generated renewed interest among many partners in working on the specific actions included in the Plan.

Our website lists 42 watershed-based plans that meet EPA requirements under the Section 319 program for such plans (see: [http://des.nh.gov/organization/divisions/water/wmb/was/watershed\\_based\\_plans.htm](http://des.nh.gov/organization/divisions/water/wmb/was/watershed_based_plans.htm)). We look forward to more work in these watersheds to restore impaired waters and protect high quality waters.

Nutrient concerns in Great Bay continue to spark innovation in meeting water quality standards. Several seacoast communities, including Durham, Exeter, Stratham and Newfields, are investing significant resources in development of integrated watershed plans that address both point and nonpoint sources of nitrogen. We look forward to working with these communities in their efforts.

In support of this work, in 2014 we are providing funding to the Rockingham County Conservation District to install two permeable reactive barriers to de-nitrify leachate from an individual septic system and a condominium complex. This promising technology could become an effective tool in regional efforts to reduce nitrogen inputs to our estuaries.

We will continue to work with the UNH Stormwater Center and seacoast communities on “Biopalooza,” an effort to install bioretention systems at priority sites. The Stormwater Center partnered with the Southeast Watershed Alliance to expand this work to many more sites and we are optimistic about the potential for significant nutrient load reduction.

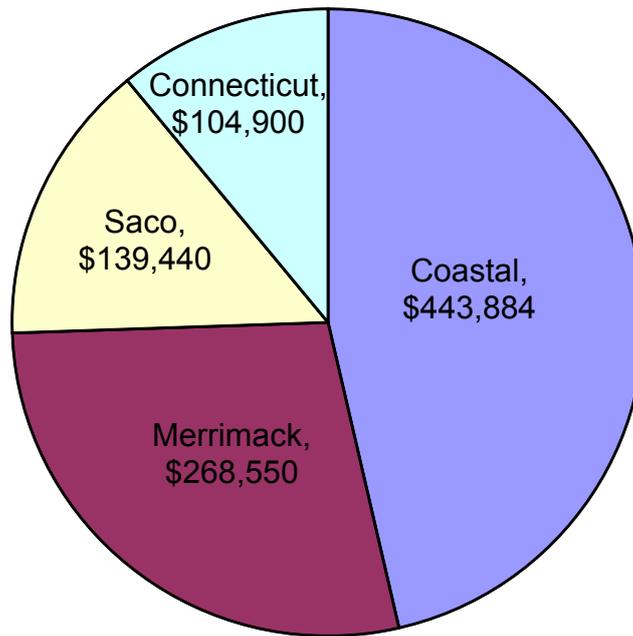
Our *Nonpoint Source Management Program Plan* is an ambitious blueprint for action, and will allow us to continue to make measurable progress toward clean water.



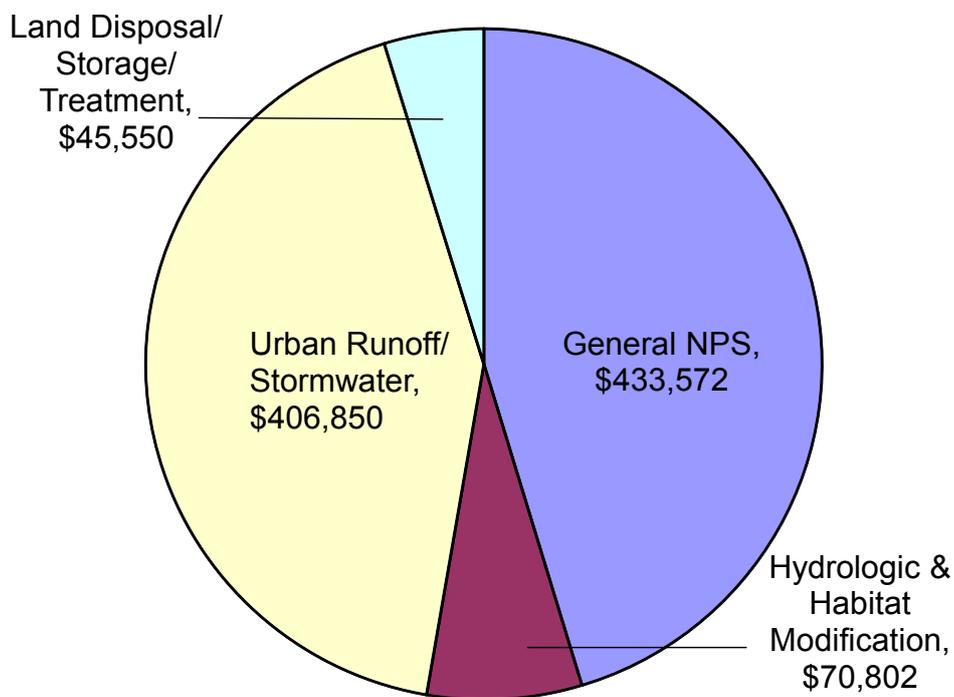
## Appendix A. DES Section 319 Watershed Assistance Grants Awarded in FFY 2013

DES Section 319 Watershed Assistance Grants Awarded in FFY 2013						
Grantee	Project Name	Project No.	NPS Pollutant Category	Watershed	Source of Funds (FFY)	Grant Award
Town of Farmington	Mad River Restoration, Phase I Preliminary Assessment	HI-13-C-05	Hydro-modification	Coastal	2012 Sec. 319 Restoration/2013 Project Implementation	\$22,802
Green Mountain Conservation Group	Ossipee Lake Watershed Mgt. Plan, Phase I, Danforth Pond and Lower Bays	HP-13-S-01	General	Saco	2013 PPG	\$65,000
UNH Office of Sponsored Research	College Brook and Reservoir Brook Watershed Mgt. Plan Development and Salt Reduction Demonstration	R-12-C-06	Urban Runoff/Stormwater	Coastal	2012 PPG	\$52,265
City of Dover	Berry Brook/Cocheco River Watershed Mgt. Plan Implementation, Ph. 3	RI-13-C-04	General	Coastal	2013 Sec. 319 Project Implementation	\$180,232
NHDES Dam Bureau	Boyce Pond Dam Removal, Ph. 1	R-12-CT-10	Hydro-modification	Connecticut	2012 Sec. 319 Restoration	\$48,000
Cobbetts Pond Improvement Association	Cobbetts Pond Restoration Plan Implementation, Ph. 2	R-12-M-03	Urban Runoff/Stormwater	Merrimack	2012 PPG	\$77,000
Lake Winnepesaukee Watershed Association	Development of a Watershed Plan for Lake Waukegan and Lake Winona	R-12-M-09	General	Merrimack	2011 Sec. 319 Restoration	\$57,000
Blue Ocean Society for Marine Conservation	Hodgson Brook Watershed Restoration Plan Implementation, Ph. 3	RI-13-C-06	Urban Runoff/Stormwater	Coastal	2013 Sec. 319 Project Implementation	\$116,120
Town of Rye	Parsons Creek Restoration Project Implementation, Ph.1	R-12-C-07	Urban Runoff/Stormwater	Coastal	2012 PPG	\$42,465
Town of North Hampton	Little River Watershed Mgt. Plan Implementation, Ph. 1	RI-13-C-07	Urban Runoff/Stormwater	Coastal	2011 PPG/2013 Sec. 319 Project Implementation	\$30,000
New Hampshire Rivers Council	McQuesten Brook and Pond Watershed Restoration Plan, Ph. 2 Dam Removals	RI-13-M-03	Urban Runoff/Stormwater	Merrimack	2012 Sec. 319 Restoration/2013 Project Implementation	\$89,000
Province Lake Association	Province Lake Watershed Mgt. Plan, Ph. 1, Plan Development	R-12-S-08	General	Saco	2012 Sec. 319 Restoration	\$74,440
Lake Winnepesaukee Watershed Association	Waukegan Watershed Mgt. Plan Implementation, Ph. 1, Septic System Improvement	RI-13-M-08	Land Disposal, Storage, Treatment	Merrimack	2010 Sec. 319 Restoration/2012 PPG	\$45,550
Franklin Pierce University	Pearly Pond Watershed Mgt Plan Development	RP-13-CT-02	General	Connecticut	2012/2013 PPG	\$56,900
					Total Awarded:	\$956,774

Appendix B. Distribution of Section 319 Grant Dollars Awarded in FFY 2013 by Watershed



Appendix C. Distribution of Section 319 Grant Dollars Awarded in FFY 2013 by NPS Category



## Appendix D. DES Section 319 Projects Completed in FFY 2013

DES Section 319 Projects Completed in FFY 2013							
Grantee	Project Name	FFY Source of Funds	Grant #	Date Completed	Watershed	319 Funds	Total Cost
Town of Sanbornton	Lake Winnisquam Watershed Plan Development: Black Brook	2010	B-10-M-04	12/27/2012	Merrimack	\$25,000	\$46,761
Newfound Lake Region Association	Newfound Lake Watershed Master Plan Implementation, Phase 1	2008/2010	B-10-M-03	12/31/12	Merrimack	\$127,960	\$282,703
Baboosic Lake Association	Baboosic Lake Stormwater Management BMP Implementation - Ph. 2	2009	R-09-M-02	2/5/13	Merrimack	\$57,193	\$108,049
Cobbetts Pond Improvement Association	Cobbetts Pond Watershed Restoration Plan Implementation, Phase 2 Fossa Road	2006/2007/2010	R-10-M-05	10/25/2012	Merrimack	\$100,000	\$171,129
Mirror Lake Protective Association	Mirror Lake Watershed Plan	2008/2009/2010	R-10-M-10	10/29/2012	Merrimack	\$65,000	\$126,423
					Total	\$375,153	\$735,065

# Appendix E. 2013 Estimated Pollutant Load Reductions Achieved

2013 Estimated Pollutant Load Reductions Achieved											
Grantee	Project Name	FFY Source of Funds	319 Funds	Total Cost	N (lbs/yr)	P (lbs/yr)	Sediment (tons/yr)	Model/Method	Notes	Notes	Notes
Town of New Ipswich	Implementation of the Furnace Brook Restoration Plan: Phase 1	2008, 2010, and 2012 Restoration	\$78,500	\$130,859	11.2	4.5	7.2	STEPL	Project still in progress	Project still in progress	project still in progress
Acton Wakefield Watersheds Alliance	Salmon Falls Headwaters Watershed - Watershed Based Plan Implementation Project - Phase 2	2009, 2010, and 2012 Base	\$87,026	\$58,600	n/a	71.7	22.73	Region 5 Model and Simple Method	Project still in progress	Project still in progress	project still in progress
Town of Rye	Implementation of the Parsons Creek Restoration Project: Phase 1, Demonstration BMPs and Septic System Ordinance	2012 Base	\$42,465	\$70,789	1	0	0.12	Region 5 Model	Project still in progress	Project still in progress	
Blue Ocean Society for Marine Conservation	Watershed Restoration Plan for Hodgson Brook Phase 2 - Pease Tradeport Retrofit Survey and Pannaway Manor and Great Bay Community College Best Management Practices	2009 and 2010 Restoration	\$104,574	\$69,751	22.95	3	1.66	Simple Method			Also 43.9 lbs/yr BOD, 0.26 lbs/yr lead, and 0.54 lbs/yr zinc
Blue Ocean Society for Marine Conservation	Watershed Restoration Plan for Hodgson Brook Phase 3 - Holly Lane Retrofit and Pease Buffer Improvement	2013 Restoration	\$116,120	\$193,572	2.4	1.2	1.4	Region 5 Model	Project still in progress	Project still in progress	
Cobbetts Pond Improvement Association	Cobbetts Pond Restoration Plan Implementation: Phase 2, Farmer Road and Horseshoe Road Demonstration BMPs.	2012 Base	\$77,000	\$128,539	n/a	1.07	0.24	Region 5 Model	Project still in progress	Project still in progress	
Mirror Lake Protective Association	Mirror Lake Watershed - Stormwater Improvement Implementation Project 2012	2009, 2010, and 2011 Restoration	\$68,220	\$113,720	n/a	0.81	1.09	Simple Method	Project still in progress	Project still in progress	project still in progress
City of Dover	Berry Brook Watershed Restoration Plan Implementation Phase 2: LID Retrofits in an Urban Environment	2007, 2008, 2009, & 2011 Restoration	\$172,315	\$114,935	66.3	13.8	2.12	Simple Method	Project still in progress	Project still in progress	
				<b>Totals:</b>	<b>103.85</b>	<b>96.08</b>	<b>36.56</b>				