

**NH Department of Environmental Services
Nonpoint Source Management
2010 Annual Report**



April 2011



Nonpoint Source Management 2010 Annual Report

Prepared by
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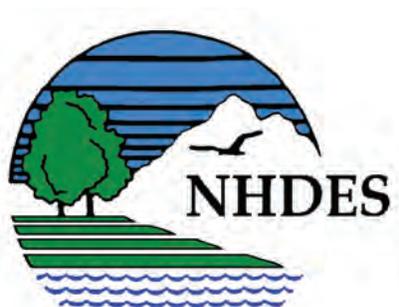


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Introduction

Stormwater continued to dominate public discourse on nonpoint source pollution issues during the year that ended September 30, 2010.

A legislative commission on stormwater finalized its [report](#), which recommended significant change in the way the state deals with stormwater. The report includes specific actions on development of watershed-based stormwater utilities, stormwater permits, and how stormwater should be integrated into the state's water quality regulatory framework.

The American Recovery and Restoration Act (ARRA) of 2009, better known as the "stimulus package," resulted in a significant change to New Hampshire's State Revolving Fund (SRF), which previously funded only wastewater and landfill closure projects. The first six SRF projects addressing stormwater



"Day lighting" an old storm drain system and replacing it with an artificial stream bed. Anthony Drive, Laconia Storm Water Project funded from the ARRA.

were completed in 2010. These projects used "green infrastructure," which includes practices that maintain and restore natural hydrology by infiltrating, evapotranspiring and re-using stormwater.

Finally, work continued on the development of stormwater utility feasibility studies in four cities. Recommendations will be made final in 2011.

Another significant milestone was achieved in 2010 with the posting of the [Black Brook Restoration Success Story](#) on EPA's web site. To be a success story, an impaired water body must be restored to meet state water quality standards with the assistance of Clean Water Act Section 319 funds

appropriated through EPA. This recognition is the culmination of more than seven years of work, including removal of the Maxwell Pond dam, with over 16 project partners that provided funding, technical assistance, and construction services.

This report describes these projects and many more that were completed in 2010 and identifies new projects awarded during the year. The sum of these projects reflects an impressive effort by municipalities, local organizations, and state agencies to improve water quality throughout the state.

Stormwater Initiatives

Stormwater Coalitions

DES continues to find tremendous value in leading the New Hampshire Regional Stormwater Coalitions – the municipal groups formed to assist each other in meeting Phase II requirements of the EPA stormwater permit. The coalitions provide an opportunity to distribute information about stormwater regulations, outreach, best management practices, and 319 grant projects to municipal department of public works staff and local decision-makers. The coalition members are also able to share their experiences about the barriers and incentives to getting low impact development (LID) implemented and local regulations passed. DES provided facilitation for outreach planning and assisted with securing guest speakers with the Seacoast and Manchester coalitions. After almost a two-year hiatus for the Nashua coalition, DES took the lead in getting them back on track with quarterly meetings.

Stormwater Utility Feasibility Studies

As reported in the 2009 Annual Report, DES provided grants to four New Hampshire cities, Manchester, Nashua, Portsmouth and Dover, to develop stormwater utility feasibility studies. The funding was used with match from the municipalities to hire consultants to gather data and facilitate the individual studies. The grants have provided an opportunity for DES to track the process each city uses while examining the nuances to identify barriers and successes that may be transferred to other New Hampshire municipalities. All four have interviewed and hired consultants and have had preliminary kick-off meetings. Manchester has completed a study, but is postponing implementation while waiting for a more appropriate local political climate. Dover has included a very public process with a stakeholder committee that will provide recommendations to their city council.

DES Pervious Pavement Demonstration Project

A pervious pavement demonstration pilot project was installed in the summer of 2009 in the parking lot near the entrance of the DES building on Hazen Drive. Three different pervious materials were installed — pervious pavers, pervious concrete and pervious asphalt pavement to replace the conventional paving materials in several walkways and parking spaces. As a cooperative project of DES and the NH Rivers Council, this effort incorporated multiple partners and stakeholders. Internal DES coordination included the Rivers Management Protection Program, the Lakes Management Protection Program, the Watershed Assistance Section, the Alteration of Terrain Program, and the Shoreland Program. Coordination also included approval from the NH Department of Administrative Services and installation provided by the NH Department of Transportation as well as donations of pervious materials from several local companies.



On-lookers observe the application of water on pervious surfaces during a demonstration in front of the DES offices at 29 Hazen Drive, Concord.

The purpose of the demonstration site is for people working in and visiting the building to learn about the importance of stormwater management and see an actual example of an innovative stormwater management strategy. A sign describing the project is prominently displayed next to the walkway in front of the building.

Legislative Stormwater Commission Completes Final Report

New Hampshire House Bill 1295, Chapter 71, Laws of 2008, established a commission to study the issues relating to stormwater. Over the course of two years, 20 stakeholders researched stormwater as it relates to water quality, water supply, flooding, drought hazards, climate change and land use change. They also studied existing federal, state and local stormwater regulations, the adequacy of conventional stormwater management practices, and options for sustainable funding.

The work of the Commission is documented in its final report, which was submitted to the Legislature in early November, 2010. In addition to a discussion of its findings, the report details a set of recommendations that the Commission believes, if implemented, will improve stormwater management in the state and reduce its negative impacts on New Hampshire's water resources. The Commission recommendations include legislative changes that would define the term "stormwater"; clarify stormwater control responsibilities; create a statewide, watershed based, stormwater utility program; and, amend state law to clearly enable and require municipalities to regulate stormwater within their boundaries. The final report is available at http://www.nh.gov/oep/legislation/2008/hb1295/final_report/november_2010.pdf.

Improved Data Management: BMP Implementation and Watershed Management Plan Implementation Tracking

In the spring of 2008 the DES Watershed Assistance Section began developing a systematic approach for completing follow-up site inspections of best management practices (BMPs) implemented through Section 319 Watershed Assistance and Restoration Grant projects. The purpose of this endeavor is to assess current BMP conditions and long term functionality. The immediate result of the site visits have been the identification of current maintenance and repair needs for existing BMPs. In cases where a BMP is determined to be in need of maintenance or repair, DES contacts the original grantee organization and explains the work that is needed to ensure that the BMP continues to function as originally designed. It is hoped that as more long-term data is compiled, this information will prove to be useful to inform stakeholders' decisions regarding the adequacy of proposed operation and maintenance plans for new BMPs, or the viability of a given type of proposed BMP.

Watershed Assistance Section staff members have completed nearly 100 initial or follow-up BMP site visits to date. The BMPs are visually inspected and photographed, their condition evaluated, and site conditions recorded on field sheets. The field sheets and photos are stored in a database for future reference. Completion of these site visits has led to correction of several problems that otherwise may not have been found. Some notable discoveries included: several instances of sediment capturing BMPs, such as catch basins, which were full or nearly full; kiosks that did not contain any project or environmental information; and a significant failure of a level spreader/constructed wetland treatment device.

In addition to the BMP implementation tracking activities, DES has begun developing a Watershed Management Plan tracking program. Based on the content of a completed watershed management plan, a simple spreadsheet was created that will allow grantees and staff to easily identify the implementation status for each recommended action within the plan. Beginning in January 2011, annual update requests will be sent to all organizations that have developed watershed management plans using Section 319 funding. The annual status report requests will help to ensure that a plan does not just sit on a shelf gathering dust, but will instead serve as an active implementation tool for watershed protection and restoration efforts.

Education and Outreach

Section 319 Projects Site Tour



EPA and DES staff listen as Sean Sweeney, Headwaters Hydrology, presents the project design at the Pemigewasset River restoration site.

DES hosted its annual EPA 319 projects site tour in the fall of 2009. A total of five sites were visited with grantees, project partners, and DES project managers providing in-depth overviews. Projects included Contoocook River urban stormwater improvements and LID demonstration in Peterborough, Hancock Village stormwater management and water quality improvements in Hancock, Pemigewasset River restoration plan implementation in Woodstock, and two EPA success stories in Manchester–Crystal Lake sediment control projects to restore recreational uses, and Maxwell Pond Dam removal/Black Brook restoration project. In addition to providing an opportunity for EPA and DES staff to see the grant projects and meet the partners, there was the added benefit for the project partners gaining some recognition for all of their hard work. EPA representatives came away from the day's tour very enthusiastic and supportive of the highlighted projects.

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Watershed Manager's Roundtable

In October 2009, DES held the first Watershed Manager's Roundtable for 319 Grantees. This event was inspired by a similar event held annually in Maine for 319 program grant recipients. A total of 46 past, present and possible future grantees spent a half-day sharing watershed management success stories, barriers encountered and lessons learned. The agenda included "What's Going on in Your Watershed" and recent case studies on structural and non-structural best management practices. The structural BMP case studies covered site evaluation, selection drivers (cost, benefit and feasibility), implementation barriers, maintenance tips, and evaluation methods to quantify loading reductions and demonstrate measurable water quality results. BMP highlights from Crystal Lake, Manchester and Long Creek, South Portland were presented. The non-structural BMP case studies included educational programs,

ordinance development, pollution prevention and social marketing campaigns.

Evaluations following the roundtable were extremely positive with 100 percent of survey respondents indicating that the roundtable should be held again and expanded to a full day. The attendees also expressed a desire for additional opportunities for grantees to network with fellow grantees, EPA and DES, for example, using a blog or listserve. DES will pursue these ideas for additional social networking next year.



Presentation during first 319 Grant Managers Roundtable.

Natural Resource Outreach Coalition (NROC)

DES continued work with NROC as they planned outreach efforts with coastal watershed communities to meet challenges related to development and water quality. In 2010, NROC expanded its efforts to partner more with the Piscataqua Region Estuaries Partnership (PREP) Local Grant Program by providing additional technical assistance and outreach for potential and current grant applicants. NROC complimented PREP's Environmental Planning Assessment Program with presentations on water quality, LID, and regulations to the Newmarket and Barrington planning boards, conservation commissions and members of the public. Newmarket then secured a PREP Local Grant to update its regulations.

In addition, NROC working closely with DES focused assistance to the Lamprey River Watershed Association and the Lamprey River Nomination Committee for support with the nomination of additional reaches of the Lamprey River and its tributaries into the New Hampshire River Management and Protection Program. The assistance led to unanimous municipal support from 13 New Hampshire municipalities in the Lamprey River watershed. More information can be found at <http://www.des.state.nh.us/organization/commissioner/pip/publications/wd/documents/r-wd-11-2.pdf>

Events and Project Assistance

DES was involved in several efforts with grantees and partners promoting the Watershed Assistance Grants, EPA outreach efforts, water quality related outreach planning techniques, innovative land use regulations, LID and the Federal Stormwater Permit. These included:

- Hosting the Center for Watershed Protection Stormwater Retrofitting Design Webcast at the DES coastal office for eight local department of public works, regional planning commissions, and UNH Cooperative Extension staff from the Seacoast area.
- Providing support for the celebration of the Black Brook Dam removal.
- Coordinating with past grantees and participation in



Display for Friends of Willand Pond at the "Paddle on the Pond" fundraiser event.

the filming of New Hampshire footage for an international dog waste documentary film.

- Presenting displays at the third annual Portsmouth Sustainability Fair in Portsmouth, which had over 100 environmental/sustainable vendors and over 1,000 residents and visitors, and at the Friends of Willand Pond “Paddle on the Pond” fundraiser, and at the Dover Apple Harvest Day.
- Presenting at the NH Lakes 17th Lakes Congress at Squam Lakes Natural Science Center, and at a UNH lakes management class along with Julia Peterson, N.H. Sea Grant.

Road Salt Reduction Spin-off

Following lessons learned thus far with involvement in the I-93 Chloride Total Maximum Daily Load (TMDL), DES spearheaded an effort to address concerns regarding chloride impaired or threatened waterbodies in other New Hampshire watersheds. DES partnered with local stakeholders in the coastal watershed: the Lamprey River Watershed Association, Great Bay Research Reserve, Durham Department of Public Works, UNH Technology Transfer Center, and the Hodgson Brook Local Advisory Committee, to design and host a seminar, “the Road Less Salted: A Water Quality and Salt Reduction Seminar.” This seminar was held and filmed at the Sandy Point Discovery Center in Greenland. DES provided an overview on the I-93 chloride TMDL and proposed certification and limited liability legislation for salt applicators. Additional presentations were given by NHDOT, town of Durham, a private winter maintenance contractor, UNH Technology Transfer (T2), UNH Department of Natural Resources and the Environment, and Emery & Garrett Groundwater Inc. Almost 100 attendees—including salt applicators, local decision makers, municipal staff and officials, and environmental organizations—were engaged in lively brainstorming at the end of the seminar to identify next steps. Follow-up to the seminar has included working with salt applicators and the UNH Stormwater Center to design practical BMPs for winter maintenance on pervious pavement, a website for the seminar, and regular updates to seminar attendees.

Several similar workshops have also been held in the Ossipee Watershed partnering with Section 319 grantee, the Green Mountain Conservation Group.

Highlights and Overview of Completed Projects

Coastal Watershed

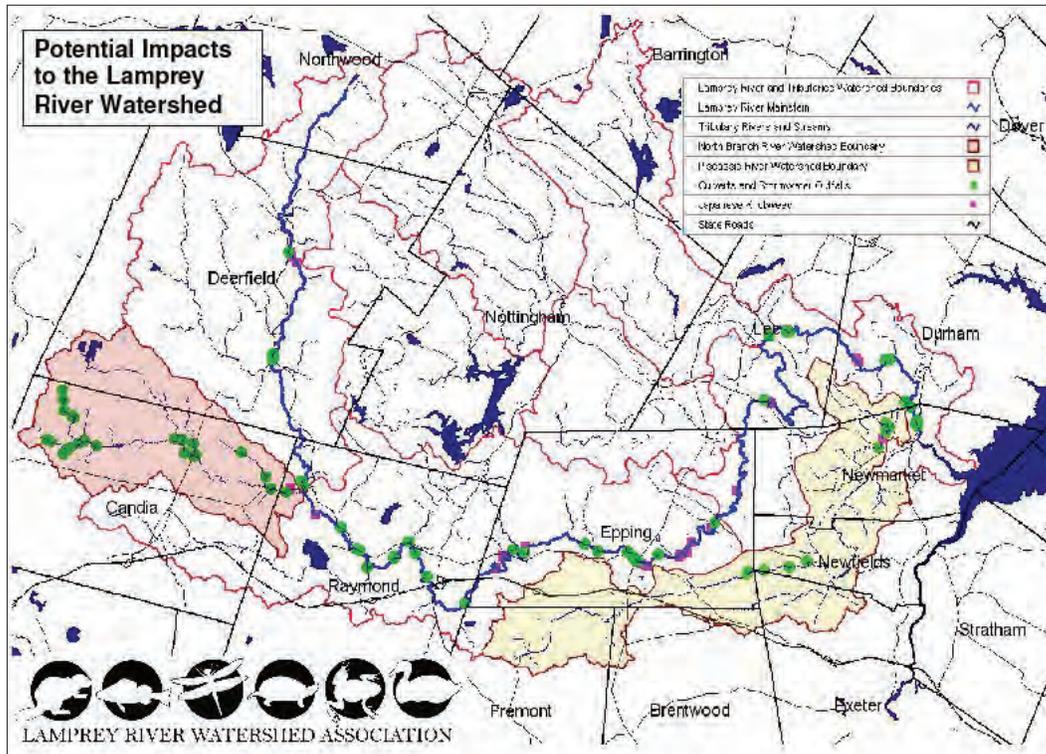
Assessment of Physical Factors Affecting Water Quality, Lamprey River Watershed Association (2003/2006/2007 Base)

Grant Amount: \$41,668 Local Match: \$40,660

An assessment of the Lamprey River was conducted from its headwaters in Northwood to the Macallen Dam in Newmarket, in addition to two main tributaries the Piscassic River and the North Branch River. In 2006, DES had listed 25 assessment units in the watershed as being impaired for E.coli, low dissolved oxygen or pH. By documenting current impacts in the watershed such as culverts, erosion, and buffer conditions, the Lamprey River Watershed Association (LRWA) intends to work with communities to restore and protect this valuable resource. Over two years, the LRWA trained over 50 volunteers to perform the on-the-ground assessment. The findings included debris blocking culverts and stormwater outfalls and the existence of invasive, Japanese knotweed. Although direct conclusions could not be

drawn for specific impairments, the survey did identify specific locations that need corrective action.

A secondary goal of the project was to increase watershed residents' awareness of the river and potential impacts. This was accomplished through the education of the volunteers, communication with riparian landowners, and presentation of survey results at the LRWA 2008 annual meeting and the 2009 UNH Water Resources Research Center Lamprey River Symposium, as well as through a newsletter.



Middle Exeter River Geomorphic Assessment and Watershed Restoration Plan, Bear Creek Environmental (2006 Restoration)

Grant Amount: \$40,520 Local Match: \$50,489

This project represents the second and final phase of a multi-year effort to collect data about the geomorphic condition of the Exeter River. The first phase collected data for 48 river and tributary miles and was completed in 2009. This second phase focused on the Middle Exeter River subwatershed and included approximately 12 miles of river located in the towns of Fremont and Brentwood. This reach of the river is recognized for its high quality geomorphic integrity and habitat. The two towns in the subwatershed will use results and recommendations from the study to foster river protection efforts. When combined, these two phases provide information about geomorphic conditions for the entire length of the Exeter River main stem—the biggest data set describing geomorphic integrity for a single river in New Hampshire.

The assessment evaluated physical factors influencing river channel stability, riparian habitat, and floodplain access. Bridges and culverts were screened to determine ability to pass flood flows of different recurrence intervals, suitability for aquatic organism passage, and geomorphic alignment. The assessment also resulted in the development of fluvial erosion hazard (FEH) zone maps. Communities will use the FEH maps as tools to protect infrastructure and riverfront property from major river channel adjustments. Site-specific recommendations for protecting and enhancing the river channel were



Middle Exeter River.

presented in the final plan. Municipal officials from the two towns in the study area participated in four public presentations and one field trip to learn about the study and to offer resources and assistance.

[The Exeter River Geomorphic Assessment and Watershed Based Plan Middle Exeter River](#) will serve as a useful tool in the future for surrounding communities to adopt specific actions to stabilize and enhance channel stability. Such as the Town of Brentwood which applied for a high quality waters grant from DES to address localized channel instability. To address the problem, the town proposes to implement stormwater management

practices to promote natural hydrology and limit erosion at the project site.

Restoration in the Cocheco River Watershed, Cocheco River Watershed Coalition (2006 Restoration)

Grant Award: \$40,000

Local Match: \$33,333

This grant project provided the opportunity to begin implementation of the [Watershed Restoration and Implementation Plan for the Cocheco River \(2006\)](#). Members of the Cocheco River Watershed Coalition (CRWC) took steps to build organizational capacity to carry out the implementation of tasks identified in the plan by revising bylaws, developing a board of directors and seeking technical assistance for project development. The board selected and hired a restoration coordinator to guide the project. Volunteers performed water quality and biological monitoring of over 36 sites on impaired river and stream assessment units to better understand the environmental status of the river and its tributaries. DES staff prepared recommendations and reports based on the data. An additional objective of the project was to encourage watershed communities to develop stormwater management regulations that would lead to reduction of nonpoint source pollution, especially in the urban communities of Dover, Rochester and Farmington. Further, CRWC partnered with the cities and the UNH Stormwater Center to develop projects that introduced the runoff reduction concepts of impervious cover reduction and low impact development BMPs. The project also resulted in the creation of a conceptual restoration plan for a stormwater-impaired reach of the Mad River. This plan includes recommendations for



CRWC volunteers identify macroinvertebrates during biological monitoring. Photo: Lorie Chase, CRWC.

structural improvements to reduce stormwater impacts from developed areas and improve river integrity. The CRWC River Coordinator will assist the town of Farmington to identify funding to implement these recommendations.

Seabrook Pet Waste Outreach and Education, Town of Seabrook (2005 Restoration)
Grant Amount: \$4,720 Local Match: \$10,128

The Cains Brook/Mill Creek watershed is impaired for E.coli bacteria, impacting shellfishing and other recreational uses. A DES ribotyping study identified pet waste as a contributor. The Seabrook Conservation Commission completed a watershed management plan that included the need to reduce bacteria loading. This project implemented an outreach campaign to educate pet owners and the public on the problem of pet waste as a contributing source of pollution to the Cains Brook watershed. To this end, the commission created fliers that were included with dog license renewal notices. Posters were also developed and posted in town buildings. Finally, the Department of Public Works installed “No Dumping –Drains to River” markers on all stormwater catch basins.



Markers were installed on stormwater catch basins as part of the pet waste education campaign in Seabrook.

Connecticut River Watershed

Partridge Lake NPS Phosphorus Load Reduction, Partridge Lake Property Owners Association. (2006 Base)

Grant Amount: \$30,000 Local Match: \$49,176
Phosphorus Reduction: 1.46 kg/yr

Partridge Lake is a naturally occurring lake located in Littleton. The lake is impounded at the southwest end by a three-foot high concrete dam and has a surface area of approximately 104 acres. A 2005 diagnostic study report identified phosphorus as the leading cause of decline in water quality from mesotrophic to early eutrophic. In 2006, Partridge Lake was placed on the 303(d) List as being impaired by cyanobacteria (algae) blooms. Although internal phosphorus loading is the leading cause of its water quality decline, it has been determined that in-lake restoration should not occur until all other phosphorus sources have been adequately managed. The study identified specific areas of concern including stormwater management, septic systems, land clearing and/development and beach erosion.



Partridge Lake shoreline.

The Partridge Lake Property Owners Association (PLPOA) engaged the services of Gomez and Sullivan Engineers to assist in the development of the [Partridge Lake Watershed Plan](#). The town of Littleton was a key partner in implementation of the plan. In addition, Lobdell Associates was hired to facilitate the implementation of the plan.

Four project targets were established to reduce phosphorus loading to the lake: 1) implement road BMPs to reduce sediment loads from stormwater runoff; 2) organize a septic system survey and recommend corrective measures to address older and failing septic systems; 3) educate watershed residents on methods to reduce and manage stormwater runoff by preparing a watershed property owners guide; and 4) develop a watershed based plan focused on phosphorus reduction through the development of a watershed partnership, public meetings, research and data collection, and plan development.

Following a septic survey the PLPOA produced a “lake guide” and held a workshop to educate property owners on the importance of properly constructed and maintained septic systems. Since the project has begun, at least six septic systems have been replaced or repaired within the watershed.

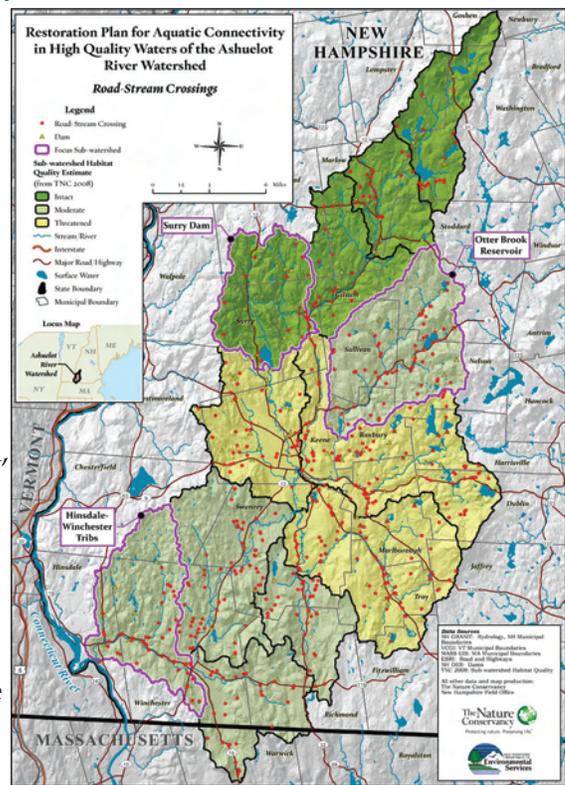
Implementation of road and stormwater BMPs was successfully implemented in the fall of 2009. The partnership with the town of Littleton resulted in BMPs being installed by the town highway department at 14 locations along Partridge Lake Road and Old Partridge Lake Road. In addition, the town’s public works department implemented an improved winter sand sweeping plan.

Although the development of the watershed plan and implementation of tasks through this project made significant progress, there are a number of tasks that remain to be implemented over the next six years including the construction of beach erosion controls and creating a watershed wide build-out analysis to better develop a long range future land use plan for the watershed.

Restoration Planning for Restoring Aquatic Connectivity in the Ashuelot River Watershed, The Nature Conservancy of NH (2008 Base)
Grant Amount: \$27,136 Local Match: \$19,074

The Ashuelot River is 64 miles long and is of relatively high water quality. It was designated under the New Hampshire Rivers and Protection Program in 1993. Due to the size and extent of its watershed it was deemed impractical to tackle an assessment of the entire watershed. Therefore, this project chose to pilot three specific tributaries in the watershed by assessing the river’s aquatic connectivity and stream health in these reaches.

The following selected areas had relatively low development pressure and a high percentage of natural land cover: the Hinsdale-Winchester tributaries sub-watershed, the Surry Dam sub-watershed, and the Otter Brook Reservoir sub-watershed. Two hundred twenty-three stream crossings were evaluated with 26 percent being rated as “severe,” that is, those that pose a significant barrier to aquatic organism passage, and that may disrupt certain stream functions. The 53 identified “severe” barriers were then further prioritized into three tiers of restoration priorities with preliminary restoration costs calculated.



A key objective of the project was to engage town officials and local road managers in the study area through individual and group meetings. In addition to educating the local stakeholders on the project,

they were also able to share valuable historical information about the project areas which were then incorporated into the study.

In addition to maintaining and enhancing high water quality for aquatic life, addressing stream and river barriers will also help with flood protection. By evaluating these selected sub-watersheds and developing restoration plans, it is hoped that this project can serve as a template for other sub-watershed assessments in the future. Restoring river continuity will be a multi-year effort. This project identified 20 top priority sites. The Nature Conservancy intends to engage with local and regional planning entities to implement river continuity restoration projects.

Beaver Brook E.coli Impairment Investigation and Remediation, City of Keene (2004 Restoration)

Grant Amount: \$58,940

Local Match: \$51,793

Beaver Brook is a small stream that begins in a rural setting, then transitions to more densely populated residential and urban areas as it flows through the city of Keene.



High school students collecting habitat data in Beaver Brook.

Much of the storm drainage system on the east side of Keene drains into Beaver Brook. This area includes a large amount of impervious surfaces and a wide variety of commercial and residential activities. The riparian zone and the brook itself have been greatly altered for flood-control purposes. As a result, Beaver Brook has been heavily impacted by its urban setting.

In 2004, the city of Keene was awarded a watershed restoration grant by DES to address a water quality impairment for E.coli. The city had conducted sampling in the brook over the years documenting E.coli problems. Additionally, there had been sporadic reports of pollutants of various sources and types. Follow up investigations were some-

times successful in tracking the problems to the source, but other times were inconclusive.

The city viewed the restoration grant as an opportunity to conduct a focused investigation into pollutant sources, to mitigate those sources, to develop a long-term restoration plan, and to promote public education and citizen stewardship around surface water quality issues. With municipal staff, professionals from other agencies, and local volunteers, the city investigated water quality in the brook through a sampling campaign and worked to track contaminants to their sources and eliminate them when possible. Problem areas were identified and further investigated resulting in elimination of several pollutant sources where sanitary sewer pipes were leaking into the storm drainage system.

In addition to addressing the E.coli problem, it was the city's goal to improve habitat throughout the brook for cold-water fish species as well as other aquatic and riparian zone-using species. With the assistance of NH Fish and Game, volunteers and a contractor, habitat surveys were conducted and evaluated in order to develop a restoration plan with specific recommendations that the city could use to improve and restore habitat, water quality, and create aesthetic improvements. Some of these recommendations have already been implemented; others will need to be evaluated for implementation feasibility over the long-term.

The grant also allowed the city to undertake a wide variety of public education activities, all geared toward informing citizens of ways that they may act to improve water quality and habitat in and around the brook and to promote stewardship of local surface waters, with a focus on Beaver Brook. This project has already allowed the city to make great strides in these areas, and has served as a staging ground for the development of actions that will continue to promote these objectives in the future.

Merrimack River Watershed

Pemigewasset River Restoration Plan Implementation, Trout Unlimited (2005 Restoration)

Grant Amount: \$315,000 Local Match: \$223,506

Phosphorus Reduction: 164 lbs/yr

Sediment: 2,344 tons/yr

Streambank Stabilized: 1,635 ft

With a total area of 1,023 square miles, the Pemigewasset River Watershed is the largest sub-watershed in the Merrimack River basin. This project accomplished the restoration of approximately a half-mile



Constructing a rock vane in the Pemigewasset River.

reach of the Pemigewasset River in Woodstock in what can be considered a headwater region of this sizeable and very dynamic watershed. This portion of the river had been characterized by ongoing bank erosion, which led to channel widening, formation of multiple channels, and degradation of cold water fisheries habitat. In the late 1970s, I-93 was extended in New Hampshire from Plymouth to the Vermont border. During this process a significant amount of sand and gravel was removed from the Pemigewasset River valley south of Woodstock. The gravel extraction created a 30-acre gravel pit containing a pond with depths of up to 30 feet adjacent to the river. Due to its size and depth, this pond provided valuable off-channel cold water fish habitat. However, channel instability and continued erosion of the west river bank reduced the land mass separating the river and the pond. A significant flood event in the mid-1990s eroded the remaining land and the pond became part of the river channel. Since the breach, sediment deposition had reduced the size of the pond to approximately 19 acres.

Planning for this project began in 2003 with an evaluation phase funded with an earlier DES Section 319 grant that resulted in the development of the 2004 *Pemigewasset River Restoration Study-Woodstock, NH*. The primary objectives of this restoration project were to reconnect the river to its original channel, enhance the in-stream and off

streambank stabilization. The gravel extraction created a 30-acre gravel pit containing a pond with depths of up to 30 feet adjacent to the river. Due to its size and depth, this pond provided valuable off-channel cold water fish habitat. However, channel instability and continued erosion of the west river bank reduced the land mass separating the river and the pond. A significant flood event in the mid-1990s eroded the remaining land and the pond became part of the river channel. Since the breach, sediment deposition had reduced the size of the pond to approximately 19 acres.

In the late 1970s, I-93 was extended in New Hampshire from Plymouth to the Vermont border. During this process a significant amount of sand and gravel was removed from the Pemigewasset River valley south of Woodstock. The gravel extraction created



Reshaping the right bank.

river fisheries and waterfowl habitat, and ultimately restore the impacted river reach to a condition of equilibrium where the channel is neither aggrading nor degrading.

The restoration involved over 2,200 linear feet of rock footers and rock vanes made with large boulders, over 2,200 linear feet of toe rock, over 900 linear feet of floodplain control structures, and over 2,000 cubic yards of Class "B" rock. More than 50,000 cubic yards of material were delivered, and 24,000 cubic yards of rock, gravel and cobble were relocated. The riparian enhancement was planted with an excess of 150 mature willow clumps and more than 50 trees from 1 inch to 5 inches in diameter. Wetland grasses, plants and bushes were also part of the new riparian areas.

In addition to the installation of three of the largest rock vanes/weirs on a river in New Hampshire, the project also generated in-stream habitat through channel shaping and the creation of features such as pools, glides and riffle habitats. These features not only provided immediate benefits to fluvial species residing in the Pemigewasset River, but also provided for a diversification of recreational opportunities along this reach of river that had been absent since the avulsion had occurred. Anglers, kayakers, swimmers, and other boaters now enjoy drops, swimming holes, and good fishing spots along this restored reach of river.



Rock weir elevation check.



High flows in restored channel of the Pemigewasset River.

Another significant result of this project is the creation of a living laboratory and outdoor classroom created at the restoration site. Local, state and federal officials as well as those from academic institutions and non-profit organizations will be able to visit this site for years to come to witness these large-scale river restoration techniques (grade controls and floodplain creation) installed at the site. Several New Hampshire groups are already considering similar approaches in their watersheds based upon the successful installation and function of the restoration elements on the Pemigewasset River in Woodstock

This project was one of the largest Section 319 grant awards made to a non-profit organization from DES and the EPA for river restoration efforts. This reach of the Pemigewasset River is currently on the 303(d) list of impaired waters for New

Hampshire for failure to support aquatic life use. The cause of impairment has been listed as “other flow regime alterations” due to the avulsion that occurred. The significance of successful completion of the project will culminate when this reach of the Pemigewasset River is removed from the 303(d) list of impaired waters and showcased by DES and EPA as a Section 319 success story on the national level. Members of the Pemigewasset Chapter of Trout Unlimited will continue to monitor conditions and share data with DES that will hopefully lead to the verification that the Pemigewasset River has returned to a state of equilibrium and is capable of supporting the designated use of aquatic life use support once again.

This project would not have been possible without the combined efforts and funding sources of DES, NH State Conservation Commission-Conservation Grant Program, NH Fish and Game License Habitat Fund, Davis Conservation Foundation, the Chase Family, Horizons Engineering, and Headwaters Hydrology.

Newfound Lake High Quality Watershed Master Plan, Newfound Lake Region Association, Base 2005/20007:

Grant Amount: \$184,000 Local Match: \$193,042

The Newfound Lake Watershed is 63,150 acres and located in the predominantly forested western edge of the Lakes Region. Newfound Lake has a surface area of 4,100 acres and is considered one of the deepest lakes in New Hampshire with a depth of 182 feet. It is the fifth largest of New Hampshire’s lakes. The watershed is located in the towns of Alexandria, Bristol, Bridgewater, Danbury, Dorchester, Groton, Hebron, Plymouth and Orange.

The hills and ridges that surround Newfound Lake and encompass the watershed, form a 50-mile ridgeline ranging in elevation from 350 feet at the juncture of the Newfound and Pemigewasset Rivers to 3,155 feet at Mt. Cardigan’s summit. Currently, 68 percent of the Newfound Lake watershed is poten-



Aerial view of the Newfound Lake watershed. Photo: BILL HEMMEL/LakesRegionAerials.com

tially buildable land with steep slopes and a high susceptibility to water quality impacts.

The existence of such a high percentage of watershed acreage available for development, coupled with the fact that Newfound Lake receives 74 percent of the external phosphorus load each year from streams and rivers, presents an immense threat to the high quality waters of Newfound Lake. Although the lake is currently classified as high quality water with an average, in-lake phosphorus concentration of 4 ug/L, a gradient of declining water quality has become apparent as one moves north to south toward the more densely developed portion of the landscape.

With continued development pressures facing local decision-makers in the nine towns, the Newfound Lake Region Association (NLRA) realized the need for scientifically-based information to provide support for proactive natural resource based planning. In 2007 the NLRA was awarded this grant to develop a watershed management master plan for the Newfound Lake watershed. With the assistance of numerous organizations and stakeholders, including Plymouth State University – Center for the Environment, the University of New Hampshire Cooperative Extension, and the Society for the Protection of New Hampshire Forests, data analysis was conducted that included surface water quality, groundwater resources, wildlife habitat, fisheries, forest resources, strategic conservation efforts, watershed population and housing demographics, and an assessment of community master plans and local land use regulations. A key component of the plan's development included two public opinion surveys in 2007 and 2009. The surveys documented residents' and property owners' desires for the future of the region, perceptions of issues important to address in the watershed plan, and sentiments about possible recommendations made in the plan.

With this information, [*Every Acre Counts: The Newfound Watershed Master Plan*](#) was developed. The plan provides a comprehensive analysis of the Newfound Watershed and creates a "tool kit" of implementation actions and methods to maintain and improve the environmental quality of the Newfound watershed into the future. There is a strong desire in the surrounding communities to protect the beauty of the region, and to have communities work together to protect the watershed landscape. *Every Acre Counts* is an essential step in the process of long-term planning for land protection of the Newfound Lake watershed. In 2010, the NLRA received a second Section 319 grant that will support the implementation of priority, short-term goals identified by the completed plan.

Maxwell Pond Dam Removal and Black Brook Restoration, City of Manchester, (2003 Base)

Grant Amount: \$105,000 Local Match: \$217,607

Black Brook flows approximately eight miles from its headwaters in the town of Dunbarton to the city of Manchester, where it empties into the Merrimack River. More than 100 years ago (circa 1900), the crystal clear waters of Black Brook prompted the construction of a dam on Black Brook immediately upstream of Front Street in northwest Manchester to create an ice-harvesting pond. When first created, Maxwell Pond included 5.5 acres of open water and a maximum depth of 12 feet.

In the late 1950s, a cement processing plant/sand and gravel company began operating in the Black Brook watershed upstream of Maxwell Pond. Lack of on-site stormwater management controls and undersized culverts at road crossings caused flooding and exacerbated erosion during storm events. The excessive sediment load from within the watershed was transported in the swift flow of Black Brook and then deposited in Maxwell Pond where flows decreased within the impoundment behind the dam.

By 2002, the pond that had once hosted ice harvesting, skating, swimming, fishing and other uses had become severely impaired by sediment accumulation with the maximum water depth diminished to three feet. Water quality data showed that dissolved oxygen levels did not support the aquatic life designated use, and DES added Maxwell Pond to the state's 2002 Clean Water Act Section 303(d) list of impaired waters. In addition to having an urban pond failing to support aquatic life, the city was also faced with an aging dam that had fallen into disrepair that now posed a public safety risk. The century old Maxwell Pond Dam had sink holes developing around it, concrete cap material failing, and several areas of seepage threatening to undermine the structure itself.

In 2002, DES issued Manchester an administrative order to repair or remove the dam. Lack of financial resources to repair the dam, dredge the pond, and repetitive flood losses in 2005 to city infrastructure, utilities and impacts to local businesses resulted in the city's decision to pursue dam removal.

In 2007, DES awarded the city a \$105,000 Section 319 Restoration grant for dam removal and river restoration on Black Brook that would return Black Brook to a free flowing condition for the first time in over a century. This followed a 2002 award to Trout Unlimited and the development of the Black Brook Topographic Survey and Corridor Restoration Design. After several years of planning, assessment, feasibility analysis, and recruitment of project partners, the physical removal of the Maxwell Pond Dam began in February of 2009. By mid-March, Black Brook cascaded over bedrock rather than the spillway of the Maxwell Pond Dam on its way to the Merrimack River. Project partners stabilized and replanted slopes in the spring of 2009 and will continue with riparian plantings and additional streambank stabilization activities during 2011. Post-removal monitoring data show that the Black Brook riverine assessment unit (NHRIV700060801-05-02) that runs through the former Maxwell Pond impoundment now meets water quality standards for dissolved oxygen. Therefore, DES has removed the former Maxwell Pond portion of Black Brook from the state's 2010 Section 303(d) list of impaired waters for dissolved oxygen. The restoration of Black Brook to fully supporting status of the aquatic life designated use has been developed as an EPA Nonpoint Source Success Story and is featured on their national website at http://water.epa.gov/polwaste/nps/success319/nh_maxwell.cfm.

Removing the dam in 2009 drained Maxwell Pond and reestablished the free-flowing condition of Black Brook. Within days after the first breach of the spillway, Black Brook began to adjust to the channel elevation change of nearly 15 feet, by actively eroding accumulated sediments in the impoundment in an upstream direction. This rapid down-cutting of the stream channel and upstream advance of the ero-



Maxwell Pond Dam prior to removal; Black Brook flows freely through the same area after the dam's removal.

sion of sediments not only allowed Black Brook to restore the original slope and habitat features (riffles, pools, runs, and glides), but also uncovered many artifacts associated with the ice harvesting industry that dominated the vicinity for nearly 60 years. During the weeks that followed the initial removal of the spillway, DES project managers recovered nearly 100 ice harvesting tools and associated artifacts that had accumulated within Maxwell Pond since 1900 and had been buried under nearly ten feet of sediment. All artifacts were catalogued, photographed, and stored by DES until delivery to the Manchester Historic Association. In recognition of the discovery and recovery of these historical artifacts, DES was honored with a *2010 Historic Preservation Award for "Dedication and Commitment to the Preservation of the History of the City of Manchester, NH"* by the Manchester Historic Association. These recovered artifacts will be placed on display at the Manchester Millyard Museum for the public to enjoy.

The environmental restoration success achieved in the Black Brook watershed would not have been possible without the commitment, collaboration and unwavering support from a community of project partners. The city of Manchester, in close cooperation with DES staff, provided project coordination and construction oversight. Other contributors of time, resources and money included American Rivers, National Oceanic and Atmospheric Administration (NOAA), Trout Unlimited, Gulf of Maine Council, New Hampshire State Conservation Committee, Amoskeag Fishways, Fairpoint Communications, National Grid, and Aggregate Industries.

An unexpected outcome of the Maxwell Pond Dam Removal and Black Brook Restoration Project was an invitation from American Rivers to have this project featured on their recently released DVD titled "Restoring America's Rivers – Preparing for the Future." This DVD tells the story of how community leaders around the country are working with nature and not against it by detailing how dams are being removed and levees are being set back in an effort to restore floodplains and give rivers room to spread out. These actions not only make communities safer and more resilient to weather extremes, but they also restore vital habitat for fish and wildlife. New Hampshire joined Pennsylvania and Washington as the three states featured on this DVD. This documentary premiered in New Hampshire during the summer of 2010 with a "Blue Carpet Event" organized by the NH Rivers Council and hosted by Public Service of New Hampshire at its facility on the banks of the Merrimack River just downstream of the confluence with Black Brook. The DVD will be featured in 2011 at the annual Wild & Scenic Film Festival in Concord at the Red River Theater. The DVD can be viewed online and copies can be ordered from American Rivers at <http://www.americanrivers.org/our-work/restoring-rivers/dams/restoring-americas-rivers-dvd.html>.

Although Black Brook will take several years to adjust into a final state of equilibrium with established floodplains and mature, riparian buffers, there have been signs of rapid restoration success that provide project partners with evidence of their anticipated outcomes. Fish population surveys using the Gulf of Maine Barrier Removal Monitoring Guidelines have already revealed several promising trends in 2010 by documenting bridle shiners, American eel, sea lamprey, and tessellated darters. The bridle shiner is a state threatened species; American eel are a species of concern in New Hampshire and the U.S.; while the sea lamprey has never been documented this far upstream in the Merrimack River basin. The tessellated darter is a host species for the dwarf wedge mussel (both state and federally listed as endangered) and the brook floater mussel (state endangered). The primary objective of this project was to eliminate a public safety hazard, eliminate flooding, and restore designated uses to a previously impaired surface water. These findings underscore, however, that the benefits to river ecology and the biota associated with dam removal and the return of freely flowing waters within Black Brook has had far reaching environmental benefits that will continue to spread throughout the project area in the coming years.

Webster Lake-Griffin Beach Sedimentation Restoration, City of Franklin (2007 Restoration)

Grant Amount: \$77,137 Local Match: \$57,341

Phosphorus Load Reduction: 3.7 lbs/year

Sediment Load Reduction: 7.4 tons/year

Webster Lake in the city of Franklin is a popular recreation area. In 2006 the lake was listed as impaired due to outbreaks of cyanobacteria. That same year the city received a 319 Restoration grant to develop the [Webster/Highland Lakes Watershed Management Plan](#), which was completed in December. The plan identified the Griffin Beach gravel parking lot and adjacent roadways located on the eastern shore of Webster Lake as a source of phosphorus and sediment. During storm events, runoff from the parking lot and beach area resulted in erosion and sedimentation to the lake.



Erosion at Griffin Beach, Franklin.

In order to help meet the plan's 25 percent annual phosphorus loading reduction goal the city applied for this 319 Restoration grant to reduce the amount of sediment and phosphorus entering the lake by detaining and treating the roadway runoff through the use of various stormwater BMPs and eliminating the erosion within the Griffin Beach parking lot and beach area.

The city hired a contractor and construction firm to design and install appropriate BMPs to address



Porous pavement parking area installed at Griffin Beach.

the stormwater runoff to the lake. The BMPs included porous pavement for the parking lot, a deep sump catch basin, a rain garden/detention basin, a bio-retention swale, and a grass swale to detain and treat runoff from the adjacent roads. The work was completed in early December 2009. Upon substantial completion of the project, regular site inspections were

conducted by city staff. During heavy rainfall events, inspectors observed improvement in stormwater treatment with less impact to the lake. It is estimated that these improvements will address less than 5 percent of the total phosphorous load reduction recommended in the Webster/Highland Lakes Watershed Management Plan and additional BMPs will be needed throughout the watershed to restore the lake's water quality.

Water Quality Mitigation and Community Outreach in the Waukegan Watershed, New Hampshire Lakes Association (2005 Base)

Grant Amount: \$15,420 Local Match: \$10,325

Phosphorus Load Reduction: 1 lb/year

Sediment Load Reduction: 1.1 tons/year

Nitrogen Load Reduction 1.9 lbs/year

As a result of a collaborative effort between the town of Meredith and the NH LAKES Lake Conservation Corps Program, an eroding shoreline of Lake Waukegan Park was stabilized. Bank erosion was contributing pollutants, including sediment, into the lake and undermining trees along the shoreline. In addition, stormwater runoff from nearby roads regularly contributed pollutants to the lake.

To address this problem, Section 319 grant funding helped facilitate the restoration effort. After obtaining a DES Wetlands permit, the town of Meredith Department of Public Works stabilized 45 linear feet of eroded shoreline by replacing boulders that had fallen into the water and filling the void spaces with smaller rocks. The Lake Conservation Corps Crew comprised of teachers and students from area schools installed vegetated buffers and a rain garden to help treat stormwater runoff from an adjacent roadway and residential development.



Lake Conservation Corps crew members plant stabilizing plants along shore of Lake Waukegan.

Interpretive signs were installed at the park to educate the public describing how the project protects lake quality. In addition, outreach events were conducted at the park to educate the general public and officials from nearby towns about how to construct “lake-friendly” landscaping practices.

Restoring Mill Pond, Town of Washington (2007 Restoration)

Grant Amount: \$48,546 Local Match: \$32,294

Phosphorus Load Reduction: 36 lbs/year

Sediment Load Reduction: 8 tons/year

Nitrogen Load Reduction 90 lbs/year

Mill Pond in East Washington was listed on the 2006 303(d) listed as impaired due to excessive bacteria at the town swimming beach. With funding assistance from EPA, DES staff prepared a Total Maximum Daily Load for bacteria. The study included microbial source tracking data showing that bacteria from



*Sheep at Purling Beck Farm with solar powered fencing and water pump.
Photo: Jed Schwartz, Washington, N.H.*

cows, horses, sheep, ducks and geese were significant contributors to the bacterial contamination present in Mill Pond.

A group of town residents and officials concerned about the quality of the pond got together in 2007 to develop a watershed plan to address the bacteria concerns, as well as a significant sediment problem emanating from gravel road drainage along the pond's southern shoreline.

The watershed plan was implemented in 2008 and 2009, which included the

installation of 22,070 linear feet of livestock fencing to keep livestock out of waterbodies, the closure of 1179 acres of pasture to livestock to protect sensitive waterbodies, and, the planting of 4.7 acres of grassy buffers to provide filtration of runoff to Purling Beck Brook. In addition, the construction of a dry well and vegetated slope are now treating the road run-off prior to discharge to the Mill Pond.

The town will continue to monitor the pond in hopes of de-listing the impairment.

Saco River Watershed

Chocorua Village Area Bioretention Stormwater Treatment Project (2007 Base)

Grant Amount: \$50,000 Local Match: \$35,652

Sediment Load Reduction: 320 lbs/year

Phosphorus Load Reduction: 1.5 lbs/year

Nitrogen Load Reduction: 96.5 lbs/year

Chocorua Village is located in the Saco River Watershed. Prior to completion of this project, untreated stormwater runoff carrying sand, salts, oils and other related contaminants flowed directly into the Chocorua River and Mill Pond. In addition, this direct discharge caused significant erosion of the steep slopes leading to the river and pond.

To address the stormwater runoff, this project integrated a bioretention area within a "pocket park" on town-owned land, previously occupied by the Village Store on the northwest corner of the Routes 16 and 113 intersection. This project was closely associated with Phase I of the NHDOT "Chocorua Village Safety Improvements Project," which provided sidewalks, curbing and general drainage improvements opposite the Mill Pond and Chocorua River. The Phase I project's drainage system was designed in close coordination with this project's bioretention area to ensure treatment of



Chocorua bioretention area in Tamworth.

the first inch of runoff. An informational kiosk was installed in the pocket park so that park visitors can learn about the environmental benefit that the park and the bioretention area provide.

The final project is an excellent demonstration showing how low impact development practices, such as bioretention can be integrated into a “traditional” roadway improvement project. In addition, the completion of this project was estimated to reduce the loading of suspended solids, total phosphorus and total nitrogen pollutants to the Chocorua River and Mill Pond by 76 percent, 52 percent and 49 percent, respectively.

Swift River Restoration at the Conway Scenic Railroad Bridge, Swift River Local Advisory Committee (2006 Restoration)

Grant Amount: \$47,700 Local Match: \$32,000

The Conway Scenic Railroad Bridge located behind Kennett High School has caused an obstruction for sediment flows of the Swift River. This has resulted in sediment being deposited upstream of the bridge, a shift in river alignment, channel instability, and erosion of adjacent lands.

This phase of the Swift River Stabilization Project involved the final design of improvements to the



Aerial view of Swift River and railroad bridge.

railroad crossing and river aimed at stabilizing the channel, protecting the railroad bridge, improving aquatic and riparian habitats, and reducing the sediment pollutant load.

Construction plans were prepared at the same time as environmental permit applications and estimates of construction costs and pollutant load reduction. This phase builds upon a previous Section 319 Restoration Grant-funded assessment of the Swift River that was completed in 2004. Final design plans, environmental permit applications, and estimates of construction costs and the anticipated sediment load

reductions to be achieved were completed. With the base work now finished, implementation will be dependent upon gaining land owner permissions and securing adequate funding.

Statewide

New Hampshire Green Yards Phase II: Motor Vehicle Salvage Yard Environmental Compliance Self-Audit and Certification (2004 and 2006 Base)

Grant Amount: \$33,400 Match: \$117,751

The New Hampshire Green Yards project began as a pilot self-certification program for salvage yards to become certified as a “NH Green Yard.” During the project period, new legislation was adopted that requires all motor vehicle salvage yards to annually certify to the local licensing body that they are in compliance with DES established BMPs. In addition, new legislation requires DES to establish rules for auto crushers and salvage yard operators to operate under a general permit. This led to a modification to the program to create a second level of certification for facilities that opt to go above and beyond required compliance.



In 2007, DES created and distributed a self audit checklist, conducted workshops and held open houses at certified facilities. In addition, DES actively searched for non-notifiers. In 2008, outreach was expanded to include consumers by making them aware of the environmental consequences when motor vehicles are abandoned or not recycled properly. Free on-site technical assistance was provided to salvage yard operators by the NH Pollution Prevention Program.

Due to the vacancy of the position that oversaw the program in 2008 and 2009, an extension was given to complete the project. In spite of being short staffed, the program continued to conduct facility inspections, hold training workshops, and develop an auto salvage yard database. In the beginning of 2010, a salvage yard compliance assurance specialist was hired and the remaining funding for the project was expended. Purchases included outreach materials for facilities and consumers including brochures, posters, magnetic fluid management checklists, hazardous waste labels, weekly inspection log books, and placards for “beyond compliance” yards. Fluid evacuators were also purchased and will be distributed to select facilities to promote proper fluid management practices. Although this project has ended, the work on ensuring compliance for salvage yard facilities and the protection of the state’s ground and surface waters continues as a legislative study commission has been reconvened to develop the regulations required for auto crushers and salvage yards to operate under a general permit.

Looking Ahead

In 2011 we will continue to work hard addressing stormwater issues through both policy changes and on-the-ground BMP implementation. We will have many more results to report from restoration projects in the coastal and Merrimack watersheds in 2011. After several years of work on the chloride issue in the southern I-93 watersheds, we will have a lot to talk about as new training programs and BMPs are implemented among the state, municipal, and private sectors. The private sector work is particularly important given that in some watersheds, private parking lots and driveways account for half of the salt loading. River watershed projects will continue to build off of New Hampshire’s efforts to increase the knowledge and applicability of fluvial geomorphology to restore impaired, and to protect high quality waters. New Hampshire is one of only two states in the nation to have a fluvial geomorphic assessment program.

Finally, to help us communicate better, we plan to have a watershed blog up and running, and will make the watershed roundtable and BMP tour an annual event. To access the blog, watershed based plans, lists of all 319 funded projects and other grant related resources visit <http://des.nh.gov/organization/divisions/water/wmb/was/index.htm>.

Appendices

A. DES Section 319 Watershed Assistance Grants for High Quality Waters Awarded in FFY 2010						
Grantee	Project Name	Project No.	NPS Pollutant Category	Watershed	Source of Funds (FFY)	Grant Award
Newfound Lake Region Assn.	Newfound Lake Watershed Master Plan Implementation, Phase 1	B-10-M-03	All Sources	Merrimack	2009	\$127,960
Acton Wakefield Watersheds Alliance	Salmon Falls Headwaters Watershed-Based Mgt. Plan Implementation, Phase 1	B-10-C-01	Urban Run-off/Stormwater	Coastal	2010	\$107,952
City of Manchester	Manchester Stormwater Utility Feasibility Study	B-09-M-05	Urban Run-off/Stormwater	Merrimack	2009	\$27,500
City of Nashua	Nashua Stormwater Utility Feasibility Study	B-09-M-06	Urban Run-off/Stormwater	Merrimack	2009	\$27,500
Town of Sanbornton	Lake Winnisquam Watershed Mgt. Plan Development, Phase 1-Black Brook	B-10-M-04	All Sources	Merrimack	2010	\$25,000
			Total Awarded:			\$315,912

B. DES Section 319 Watershed Restoration Grants for Impaired Waters Awarded in FFY 2010						
Grantee	Project Name	Project No.	NPS Category	Watershed	Source of Funds (FFY)	Grant Award
Trout Unlimited	Nash Stream Watershed Mgt. Plan Implementation, Phase 2	R-10-CT-08	Hydromodification	Connecticut	2010	\$200,356
Town of New Ipswich	Furnace Brook Watershed Restoration, Phase 1	R-10-M-06	Other	Merrimack	2010	\$71,500
Mirror Lake Protective Assn.	Mirror Lake Community Watershed Plan	R-10-M-10	All Sources	Merrimack	2010	\$65,000
Town of Exeter	Exeter River Restoration-Evaluating the Impacts of Removal of the Great Dam	R-06-C-09	Hydromodification	Coastal	2006	\$60,000
Town of Wolfeboro	Rust Pond, North Inlet & Rte 28 Boat Launch Watershed Mgt. Plan & Stormwater BMP Projects, Phase 1	R-10-M-07	Hydromodification	Merrimack	2010	\$50,000
Blue Ocean Society for Marine Conservation	Pet Waste Outreach in Seacoast NH-Tracking & Reducing Pet Waste	R-05-C-14	Urban Run-off/Stormwater	Coastal	2005	\$48,595
Town of Warren	Baker River Restoration Design and Permitting, 2009	R-07-M-06	Hydromodification	Merrimack	2007	\$22,500
Town of Milford	Souhegan River Restoration Phase I Dam Removal Feasibility Study	R-10-M-02	Hydromodification	Merrimack	2010	\$50,000
			Total Awarded:			\$567,951

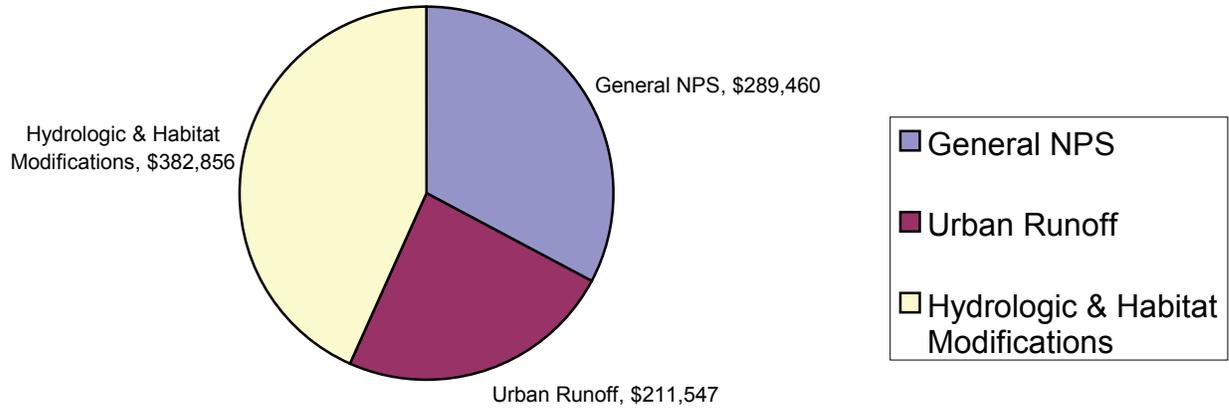
C. Section 319 Base Projects Completed in FFY 2010

Grantee	Project Name	FFY Source of Funds	Project Number	319 Funds	Total Cost	Date Completed	Watershed
Lamprey River Watershed Assn.	Assessment of Physical Factors Affecting Water Quality	2003/2006/2007	B-07-C-03	\$41,668	\$82,328	8/5/2010 (partial)	Coastal
Town of Tamworth	Chocorua Village Area Bioretention Stormwater Treatment	2004/2007	B-07-S-02	\$50,000	\$85,652	4/12/2010	Saco
Newfound Lake Region Assn.	Newfound Lake Watershed Master Plan Development	2005/2007	B-07-M-01	\$184,000	\$377,042	1/15/2010	Merrimack
Partridge Lake Property Owners Assn.	Partridge Lake NPS Phosphorus Load Reduction	2006	R-05-C-02	\$30,000	\$79,176	2/12/2010	Connecticut
The Nature Conservancy NH Chapter	Restoration Planning for Aquatic Connectivity in High Quality Waters of the Ashuelot River Watershed	2008	B-08-CT-03	\$27,136	\$46,210	12/31/2009	Connecticut
NH Department of Environmental Services	NH Green Yards, Phase 2	2004/2006	B-04-SW-05	\$33,409	\$117,751	9/30/2010	State-wide
New Hampshire Lakes Assn.	Water Quality Mitigation and Community Outreach in the Waukegan Watershed	2005	B-05-M-P2A	\$15,420	\$25,745	10/8/2009 (partial)	Merrimack

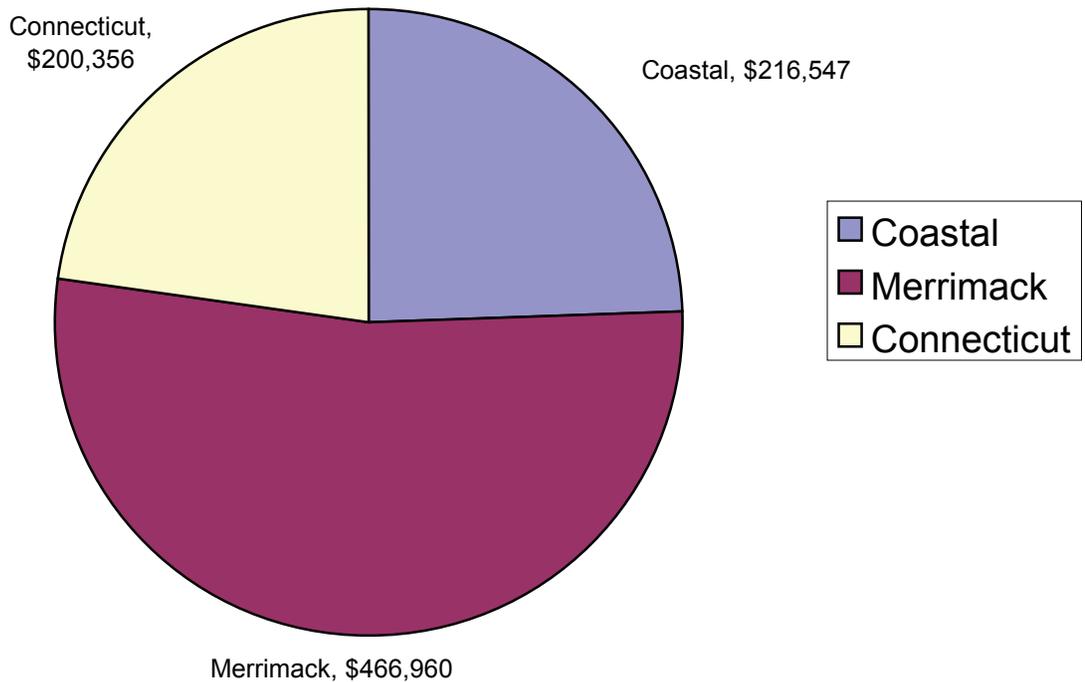
D. Section 319 Restoration Projects Completed in FFY 2010

Grantee	Project Name	FFY Source of Funds	Grant #	319 Funds	Total Cost	Date Completed	Watershed
City of Keene	Beaver Brook E-Coli Impairment Investigation and Remediation	2004	R-04-CT-02	\$58,940	\$110,733	10/1/2009	Connecticut
City of Franklin	Franklin-Webster Lake-Griffin Beach Sedimentation Restoration	2007	R-08-M-02	\$77,137	\$134,478	2/10/2010	Merrimack
Bear Creek Environmental, LLC	Geomorphic Assessment and Watershed Restoration Plan - Middle Exeter River	2006	R-06-C-08	\$40,520	\$91,009	6/7/2010	Coastal
City of Manchester	Maxwell Pond Dam Removal and Black Brook Restoration	2003	R-06-M-02	\$105,000	\$322,606	1/6/2010	Merrimack
Trout Unlimited	Pemigewasset River Restoration Plan Implementation	2005	R-05-M-04	\$315,000	\$538,506	12/17/2009	Merrimack
Cocheco River Watershed Coalition	Restoration in the Cocheco River Watershed	2006	R-06-C-07	\$40,000	\$33,333	9/30/2010	Coastal
Town of Seabrook	Pet Waste Outreach and Education	2005	R-05-C-12	\$4,720	\$14,848	2/18/2010	Coastal
Swift River Local Advisory Committee	Swift River Restoration at the Conway Scenic Railroad Bridge	2006	R-06-S-04	\$47,700	\$79,700	1/4/2010	Saco
Town of Washington	East Washington Mill Pond Restoration	2003/2007	R-07-M-04	\$48,546	\$32,394	12/31/2009	Merrimack

**E. Distribution of Section 319 Grant Dollars
Awarded in FY 2010 by NPS Category**



**F. Distribution of Section 319 Grant Dollars
Awarded in FY 2010 by Watershed**



G. 2010 Estimated Pollutant Load Reductions Achieved

Grantee	Project Name	FFY Source of Funds	319 Funds	Total Cost	P (lbs/yr)	N (lb/yr)	Sediment (tons/yr)	Other	Model/Method	Notes
Acton Wakefield Watersheds Alliance	Salmon Falls Headwater Lakes Watershed Management Plan Implementation Project	2010 - Base	\$107,952	\$214,189	13.1	n/a	15.4	n/a	Region 5 Model	project still in progress
Town of Seabrook	Cains Pond Restoration - Dredging to Remove Navigation Impairment	2008 - Incremental	\$91,800	\$151,200	n/a	n/a	752	n/a	physical measurement	project still in progress
Pennichuck Water Works	Tinker Road Best Management Practice Implementation	2004 and 2008 Incremental	\$210,780	\$351,300	5	23.3	5.7	n/a	SIMPLE	project still in progress
Green Mountain Conservation Group	The Ossipee Watershed Water Quality Initiative	2009 - Base	\$35,000	\$98,800	13	46	25.1	n/a	Region 5 Model	project still in progress
Trout Unlimited	Nash Stream Restoration	2004 - Incremental	\$78,100	\$197,600	n/a	n/a	n/a	2,000 ft	physical measurement	Stream channel stabilization through restoration of geomorphic integrity
Blue Ocean Society for Marine Conservation	Demonstrating Reduction of Impervious Cover in the Lower Hodgson Brook Watershed through LID	2009 -Incremental	\$120,416	\$210,398	4.4	15.9	2	1,491 lbs/yr TSS	Region 5 Model	project still in progress
New Hampshire Lakes Association	Water Quality Mitigation and Outreach in the Waukegan Watershed	2005 - Base	\$15,420	\$25,745	1	1.9	1.1	n/a	Region 5 Model	

H. Watershed Based Plan Implementation Status Report

Organization: **Town of Seabrook** Project Manager: **Sue Foote**

Report for year: **2010** Signature: _____ date: **02/23/2011**

Project name: **Cains Brook and Mill Creek Restoration** Project Project Number: **R-06-C-06**

Action #	Action Description	Current Status	Status Notes
Goal 1	Improve the water quality of Cains Brook/Mill Creek to meet New Hampshire water quality standards		
Objective 1	Ensure that Cains Brook Meets Class B Water Quality Standards		
	1) Protect shoreline trees and shrubs	Not Begun	
	2) Review/update stormwater management and erosion control regulations	In progress	"Stormwater Management Regulations Adopted; Stormwater Manual for developers adopted by Planning Board."
	3) Address riparian shoreline erosion	Not Begun	
	4) Reduce the impact of small motor craft on the erosion of tidal marsh banks in Mill Creek	Completed	NH Dept. of Safety effective 10/1/07 all ski craft banned from salt marshes of the Hampton/Seabrook estuary.
	5) Amend the towns earth excavation ordinance	Not Begun	
	6) Monitor/maintain sanitary sewer system	Ongoing	
Objective 2	Ensure that natural and man-made portions of the Cains Brook system contribute to water quality and habitat for aquatic life.		
	7) Dredge Cains Pond and Cains Mill	Completed	
	7a) Design and install a water quality treatment device in the town utility easement on the west side of Route 1	Completed	
	8) Install modifications to the Rte 1 culvert and weir	Completed	
	9) Fund/install a nature-friendly spillway & pursue a conservation easement at Noyes Pond.	Completed	
Objective 3	Work toward having the surface waters and riparian shorelands of the Cains Brook Watershed be free of man-made debris.		
	10) Establish outreach program to watershed residents and businesses to maintain a debris-free stream corridor	Completed	Con. Comm. established Clean Up Action Committee to work with businesses along Route 1.
	10a) Undertake a trash reduction pilot project within the Route 1 corridor	Not Begun	
	11) Enact a provision to control wind-blown trash	Not Begun	
	12) Improve the Rte 1 drainage system	In progress	"Identified the location of stormwater discharges along Route 1."
Goal 2	Improve the management of stormwater runoff in an effort to protect storm water quality and reduce peak stormwater flows		
Objective 1	Determine BMPs for eliminating or minimizing the effects of watershed pollutants.		
	13) Perform spot testing of observed discharges and pursue enforcement.	Not Begun	
	14) Conduct dry/wet weather outfall investigations of the town's MS4s.	Not Begun	
Objective 2	"Encourage Seabrook DPW, NH Department of Transportation, key businesses and landowners to employ BMPs to treat stormwater runoff."		
	15) Attach stainless steel embossed plates to all street storm drains.	Scheduled	
	16) Monitor all Stormwater Operations and Maintenance Plans to ensure compliance.	Completed	O&M manual prepared and approved by PB.
Goal 3	Provide suitable recreational opportunities that are directly related to the waters of Cains Brook.		

Objective 1	Maintain and, where appropriate, upgrade the existing public access points to the waters of the watershed.		
Objective 2	Identify additional suitable locations for public access.		
	17) Improve the public access of the small boat launching area on Cains Mill Pond.	Completed	
	18) Investigate upgrading the public access area on Lakeside Drive.	Scheduled	
	19) Investigate/develop small boat launch area on Mill Creek.	Not Begun	
Objective 3	Ensure that the depths of Cains Pond and Cains Mill Pond are suitable for hand-powered craft and a healthy aquatic environment.		
	19a) See Actions 7 and &7a above		
Goal 4	Build community support for the protection and enhancement of the land and water resources of the Cains Brook Watershed.		
Objective 1	Prepare an outreach program to citizens and businesses to promote and implement the watershed plan.		
	20) Hold informational meetings and local access television broadcasts.	Not Begun	
	21) Develop a town web page to promote the long-term environmental value of the watershed, etc.	In progress	Web page as part of DES grant for pet waste. Partial fulfillment of action.
	22) Pursue grants to fund Seabrook student awareness, education and field trips.	Not Begun	
	23) Prepare and implement a long-term business outreach program.	In progress	Con. Comm. established a clean up action committee to work with businesses along Rte 1.
	24) Adopt Watershed Plan by reference.	Completed	
	25) Establish a volunteer organization to help implement Watershed Management Plan.	Not Begun	
	26) Establish long-term outreach program.		Partially fulfilled. See Action #23 above
Goal 5	Preserve, protect and restore critical anadromous and freshwater fisheries, wildlife habitat and migration corridors, and rare and endangered species.		
Objective 1	Undertake habitat inventories and research of the watershed's aquatic and terrestrial resources.		
	27) Undertake a Habitat Restoration Study within the watershed.	In progress	DES will work with the town to conduct an initial physical and biological assessment to gather some baseline information that will be used to inform future work.
	28) Assist with matching funding and research study suggestions for Seabrook student studies along the brook, ponds and creek.	Not Begun	
	29) Implement the Habitat Restoration Plan.	Not Begun	
Objective 2	Protect and maintain the valuable functions of watershed wetlands, streams and ponds.		
	30) Update and strengthen wetlands section of the town-zoning ordinance.	Completed	"2008 revisions to wetland regulations strengthened the restrictions on vegetative cutting and updated provisions for buffer/setback."
	31) Undertake a Prime Wetland Study to determine the highest value wetlands.	Not Begun	
Goal 6	Provide for long-term health and environmental quality of Cains Brook and Mill Creek by ensuring that the Watershed Plan's goals are continually met.		
Objective 1	Monitor water quality at appropriate locations in Cains Brook and Mill Creek in cooperation with personnel from DES on a semi-annual basis.		
	32) Establish a monitoring program to measure depths in Cains Brook and Cains Mill Pond on an annual basis.	Scheduled	
	33) Establish a water quality monitoring program in cooperation with personnel from	Scheduled	
	34) Establish a biomonitoring program in cooperation with DES.	Scheduled	
	35) Review and monitor Watershed Action Plan on annual basis	Ongoing	

I. BMP Inspection Field Sheet

 Entered into NPS database

 Follow-up Required Completed

BMP INSPECTION FIELD SHEET

NHDES Watershed Management Bureau, Watershed Assistance Section

General

Date 6/15/10	Time 10:05	Investigator(s) MARCOUX	Project number R-05-M-01
Multiple BMPs assoc. with project? <input checked="" type="checkbox"/> BMP <u>1</u> of <u>4</u>		BMP type FOREBAY & LEVEL SPREADER "EAST INLET"	EPA ID#

Location

Latitude/Longitude (decimal deg.) 42.96041 -71.44577	Datum NAD 83	Equipment used GPS II # 92199859
Street and location information MARCH AVE MANCHESTER, NEAR HOME DEPOT. ACROSS STREET FROM HENRY'S AUTO BODY		

Condition

Implementation date: DEC '06 Maintenance due date: 2X Annual

BMP condition: New/Excellent Good Fair Poor Not found

Condition description:

FOREBAY OK. HAS SOME MATERIAL IN IT. LEVEL SPREADER IS PRETTY FULL & DEBRIS IS PUSHING OUT OF L.S. INTO WETLAND. Left channel, outlet of L.S. is now the main channel. Right side channel is blocked by tarps etc. Left channel is down cutting significantly, creating plunge/pool features

Follow-up Comments:

ask rob to contact engineers & have them inspect?
& Tell AC.

Photographs

Photo Point ID	Time	Photo Point GPS Reading	Photo Pt. Description & Location	Bearing to Subject	Subject Description
1	10:05		AS COMPLETED PREVIOUSLY (SEE LAST		
2	10:06		YEAR'S SHEET)		
2	10:06				
3	10:10	42.960376 -71.446204	in wetland area no good landmark	S	upper plunge/pool feature
3	10:10	"	"	S	"
4	10:12	42.960328 -71.446299	"	S	lower plunge/pool feature (large pool)
4	10:12	"	down-cutting 1" plunge/pool	S	"
4	10:12	"	"	S	"
Misc	10:06	42.960342 -71.445999	Near South end of the level spreader	N	debris in level spreader

Site map/additional notes:

