New Hampshire WRRC Information Transfer

Basic Information

<table>
<thead>
<tr>
<th>Title</th>
<th>New Hampshire WRRC Information Transfer</th>
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<tbody>
<tr>
<td>Project Number</td>
<td>2008NH97B</td>
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<tr>
<td>Start Date</td>
<td>3/1/2014</td>
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<tr>
<td>End Date</td>
<td>2/28/2015</td>
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<td>Funding Source</td>
<td>104B</td>
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<td>Congressional District</td>
<td>01</td>
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<tr>
<td>Research Category</td>
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<tr>
<td>Focus Category</td>
<td>Management and Planning, Education, Non Point Pollution</td>
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<td>Descriptors</td>
<td>None</td>
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<td>Principal Investigators</td>
<td>Michelle Daley</td>
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</tbody>
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Publications


Information Transfer

Unbridled development and population growth can have detrimental impacts to water resources and ecosystem services. Rapid population growth is occurring in New Hampshire and state regulations, planning board decisions and zoning classifications all attempt to minimize the environmental impact of this rapid population growth. Most land use planning decisions are made at the local level on a town by town basis, often by volunteers who serve on various boards, commissions and committees. Decisions by these various resource managers are often made without a full understanding of the consequences that their decisions will have on water resources or ecosystem services.

This project provided salary for the Center’s Associate Director to meet with state representatives, local town officials, watershed groups, school groups, the general public and scientists to discuss WRRC findings that relate to population growth and land use change. The NH WRRC website (http://www.wrrc.unh.edu/) is also used to disseminate information on water resources, and is updated and maintained by salary provided by this project. The time of the Director and Associate Director is increasingly spent discussing current and future research in the Lamprey River Hydrologic Observatory, which is partially funded by the longstanding 104B project “Water Quality and the Landscape: Long-term monitoring of a rapidly developing suburban watershed” and on nitrogen dynamics in New Hampshire’s Great Bay watershed. On January 9, 2015 the NH WRRC totally funded and organized the Eighth Annual Lamprey River Symposium (see also below). Presentations focused on water quality, hydrology, stormwater, climate and landuse change, aquatic species and habitat, watershed planning and nitrogen cycling in coastal New Hampshire. The symposium attracted approximately 90 attendees, including scientists, regional leaders, town officials, members of state agencies, and federal agencies. The agenda can be found on the NH WRRC Lamprey River Hydrologic Observatory Symposium website. This annual symposium and other discussions in which the Center’s Director and Associate Director participate further the research and information transfer goals of the NH WRRC.

2014 Information Transfer Activities Supported by Section 104b Funding and Matching Funds

Data sharing with Lamprey River watershed local advisory committee

The Lamprey River Advisory Committee (LRAC) is undergoing a long-term analysis of Lamprey River water quality data collected by both the Lamprey River Watershed Association’s (LRWA) volunteer monitoring program and the NH WRRC 104B project “Water Quality and the Landscape: Long-term monitoring of a rapidly developing suburban watershed”. The NH WRRC associate director serves on the LRAC and is a member of the water quality sub-committee which is advising a LRAC funded intern who is conducting the long-term water quality analysis. Preliminary temporal and spatial trends in dissolved oxygen and pH have been examined thus far and further analysis is underway.

Nitrogen Data in New Hampshire’s Great Bay watershed

Over the six years, there has been significant focus on nitrogen loading to New
Hampshire’s largest estuary, the Great Bay estuary, and the impairment to aquatic life it has caused. In August 2009, Great Bay, Little Bay and the tidal rivers were added to the New Hampshire 2008 303d list of impaired waters rendering them in violation of the federal Clean Water Act. Based on the most recent “State of Our Estuaries Report” prepared by the Piscataqua Region Estuaries Partnership (PREP 2013), 32% of the nitrogen entering Great Bay and Little Bay is from point sources; the majority (68%) enters via non-point sources of pollution. The Lamprey River is the largest tributary to Great Bay, and thus the long-term data provided by the NH WRRC from the LRHO are of considerable value for watershed management. The NH WRRC provides the best dataset in NH for assessing the spatial and temporal variability in N concentrations and export in response to suburbanization and changes in land use. These 14+ years of data will be instrumental in assessing the success of current and future efforts to reduce non-point sources of nitrogen pollution reaching Great Bay. There is much interest in LRHO datasets from NH Department of Environmental Services (DES), PREP, the Environmental Protection Agency (EPA) and other municipal, regional, state and federal agents. Many of the presentations and meetings listed below focused on transferring information on nitrogen cycling to stakeholders throughout NH’s coastal watershed and beyond. The NH WRRC has received several phone calls and meeting requests to discuss the Great Bay nitrogen issue. The NH WRRC has been specifically asked to present coastal NH nitrogen data to the following groups: the NH Shoreland Advisory Committee, the Water Integration for Squamscott-Exeter (WISE) and Green Infrastructure (GI) NERRS Science Collaborative projects and the Southeast Watershed Alliance.

**Water quality monitoring advice for wood restoration projects in NH streams**

The Natural Resources Conservation Service (NRCS) and Trout Unlimited (TU) have selected 23 Wetlands Reserve Program (WRP) properties in NH for possible wood loading restoration work. The project plan is to add wood into small segments of 1st and 2nd order stream channels (averaging about 1,000 feet) on 15 properties in the summer of 2015 with the goal of recreating and increasing fish spawning and rearing habitat. A supplemental goal of this work is to study the changes in water quality and nutrient uptake which may be enhanced by adding carbon (in the form of wood) to streams. The NH WRRC Director, Associate Director and the WQAL manager have been advising the NRCS and TU on how to best understand changes in water quality and nutrient dynamics with existing financial resources.

**Symposia, Conferences and Seminars Organized and Funded**

The NH WRRC funded and organized the "Eight Annual Lamprey River Symposium" held January 9, 2015 in Durham, NH. The symposium is dedicated to exchanging the results of recent research on the water quality, hydrology, water resources issues, and management of the Lamprey River basin. The Symposium is a vehicle for researchers to share data and insights with other researchers, as well as those in the management and policy arena who would benefit from exposure to the latest research on the watershed. The symposium drew approximately 90 attendees, including researchers, legislators, water system operators, town officials, regional leaders and government officials. The symposium contained 14 presentations split up over three sessions. There was a poster session during and after lunch where 7 posters and displays were exhibited. The day ended with an open discussion on research priorities in the Lamprey
watershed and southeast NH. This event was funded and organized by the NH WRRC. Staff from UNH cooperative extension and Great Bay National Estuarine Research Reserve helped moderate the open discussions and NH EPSCoR assisted with registration and printing. Survey results indicate that most of the attendees found the topics covered to be either helpful or very helpful.

The NH WRRC sponsored the “**NH Water and Watershed Conference**” in Plymouth, NH on March 21, 2015. This event was designed to meet the information and networking needs of lake, river, and watershed groups; environmental organizations; volunteer monitors; municipal board and staff members; elected officials; local and regional planners; policy makers; scientists; educators; consultants and students. The focus for the 2014 conference was on the sustainability of New Hampshire’s water resources. The NH WRRC co-sponsored this conference along with Plymouth State University and the Center for the Environment, NH EPSCoR, NH DES, US Geological Survey New England Water Science Center and a few others. The conference contained 5 concurrent sessions including the sustainability of New Hampshire’s water resources, integrating science with decision making for water resources, climate change and water resources, emerging issues in water and public health and integrated land use planning for water resources. The conference drew approximately 250 people, including researchers, legislators, water system operators, land use planners, and government officials.

**Publications**


Meyer, A. 2014. Response of ammonium uptake to carbon availability in an agriculturally influenced first order stream. M.S. Dissertation, Department of Natural Resources & the
Shonka, N. 2014. Water quality sensors provide insight into the suspended solids dynamics of high flow storm events in the Lamprey River. M.S. Dissertation, Department of Natural Resources & the Environment, College of Life Science and Agriculture, University of New Hampshire, Durham, NH, 93 pages.


Conference Proceedings & Abstracts:


**Presentations/Information Transfer**


Daley, M.L. 2014. Shared preliminary Great Bay N Sources and Transport NERRS Science Collaborative project results with Brian Giles and Mitch Kalter who are representatives of the Piscataqua Region Estuaries Partnership serving as ad hoc science advisory committee members of the NH Shoreland Advisory Committee. The purpose was to see how the latest science from the project can be used to evaluate the current shoreland standards embodied in RSA 483-B, Shoreland Water Quality and Protection Act. April 16, 2014.

Daley, M.L. 2014. Presentation and field trip on “What it’s like to be a scientist and how I became a water quality scientist” with 20 3rd graders from the Maple Street Magnet School Rochester NH. Students learned how to measure pH, temperature, dissolved oxygen and conductivity in the Cochecho River using field meters and they gained an understanding of how to interoperate these water quality values. June 18, 2014.


Daley, M.L. 2014. Presented Great Bay N Sources and Transport project results to members of the Water Integration for Squamscott-Exeter (WISE) and Green Infrastructure (GI) NERRS Science Collaborative projects to facilitate collaboration on water resource issues. October 30, 2014.


Koenig, Lauren. 2014. Co-lead the NH Envirothon Aquatics portion (training day). Approximately 75 middle to high school students and 5-10 secondary ed. teachers in attendance from across NH. Sanborn Farm, Pittsfield, NH. April 5, 2014.

Koenig, Lauren. 2014. Served as an instructor for the STEM mini-course offered August 25-29th through the CONNECT program at UNH (http://www.unh.edu/connect/). The objective of the course is to help incoming freshmen that come from groups with historically low retention in STEM majors (e.g., low-income, multicultural, first-generation college students) build skills that are needed to succeed in their academic programs (e.g., writing of lab/research reports, basic math and statistics for analyzing scientific data). There were 12 students in the class, but the broader CONNECT program serves approximately 100 students.

- Students measured soluble reactive phosphorus (SRP) concentrations across sites with different land uses for their project (WHB, LMP73, Burley Demeritt, College Brook and Pettee Brook). They had to give a general presentation to the entire CONNECT program (including non-STEM majors), so to best communicate their study, they chose to combine a traditional science powerpoint presentation with a music video. Their version of “These boots were made for sampling” - http://www.youtube.com/watch?v=lQCZ4XEwj7c&feature=share.

McDowell, William H. July 22, 2014. Interviewed by NHPR for The Exchange talk show with Laura Knoy about the continued recovery of New England’s lakes after several decades of pollution.


Press Releases


Meetings attended