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# New Hampshire Water Resources Research Center: Program Evaluation Report Fiscal Years 2003 - 2007

William H. McDowell

*University of New Hampshire*, [bill.mcdowell@unh.edu](mailto:bill.mcdowell@unh.edu)

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**Water Resources Research Center  
Program Evaluation Report  
Fiscal Years FY 2003 through FY 2007**

**Submitted By**

**William H McDowell, Director**

**To:**

**Office of External Research  
Water Resources Discipline  
U.S. Geological Survey**

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# Preface

The Water Resources Research Center receives an annual Federal matching grant as authorized by section 104 of the Water Resources Research Act of 1984 (Public Law 98-242) as amended by Public Laws 101-397, 104-147, 106-374, and 109-471. Section 104 of the Act requires that the Secretary of the Interior "conduct a careful and detailed evaluation of each institute at least once every 3 years to determine that the quality and relevance of its water resources research and its effectiveness at producing measured results and applied water supply research as an institution for planning, conducting, and arranging for research warrants its continued support under this section." The U.S. Geological Survey (USGS), Department of the Interior, administers the provisions of the Act. This evaluation report describes, in the format prescribed by the USGS, the research, training, and information transfer activities supported by the section 104 grants and required matching funds during fiscal years FY 2003 through FY 2007.

# Program Evaluation Report

## Introduction

The New Hampshire Water Resources Research Center (NH WRRC), located on the campus of the University of New Hampshire, is an institute that serves as a focal point for research and information on water issues in the state. The NH WRRC actually predates the Federal program. In the late 1950s Professor Gordon Byers (now retired) began a Water Center at UNH. This Center was incorporated into the Federal program in 1965 as one of the original 14 state institutes established under the Water Resource Research Act of 1964. The NH WRRC is currently directed by Dr. William McDowell with administrative and technical assistance from Michelle Daley and Jody Potter. The NH WRRC is a stand alone organization, in that it is not directly affiliated with any other administrative unit at UNH. The NH WRRC has no dedicated laboratory or research space on campus. The NH WRRC does have an office which serves as a central focus for administration and outreach, and a website ([www.wrrc.unh.edu](http://www.wrrc.unh.edu)). The web site is used heavily for all aspects of the NHWRRC. It serves as a focal point for information dissemination and includes all NH WRRC publications and results from past research, as well as links to other sites of interest to NH citizens and researchers.

## The Water Resource Problems of New Hampshire

New Hampshire's lakes and streams are a valuable resource, contributing significantly to the state's economic base through tourism, recreation and enhanced real estate values. Further, many lakes and rivers are current or potential sources of public drinking water. Water quality sufficient to support these uses is imperative to maintain the state's economy and quality of life. The biggest threats to water quality include phosphorus loading to lakes, nitrogen loading to the coastal zone, and contamination of groundwater with a variety of naturally occurring and anthropogenic contaminants.

A survey of NH water resource stakeholders was conducted in 1998 to get a sense of New Hampshire's most significant water resource problems and concerns to develop a list of research priorities for the NH WRRC (Table 1). Almost all of the issues can be included into the broad category of Land Use and Water Quality. Similar results were obtained from the 2009 NH State Water Survey, which showed that 82% of those responding were very concerned or somewhat concerned about the effects of development on water quality, and 77% were concerned about potential contamination of aquifers and drinking water wells. This is not terribly surprising based on the rapid development and population pressures of the last two decades, particularly in southern areas of the state. New Hampshire currently leads all New England states in the rate of development and redevelopment. The long term effects of development and land use change are uncertain, with potential impacts on water quantity, in-stream flows, and water quality.

Table 1. Research Priority issues for the New Hampshire WRRC, based on a survey of stakeholders conducted in 1997-1998.

## Surface Water

- Land use impact on surface water quality
- Non point source pollution

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- Effects of urban development and storm water runoff on surface water quality
- Impacts of highway maintenance on surface water quality
- Low flow wastewater flow interactions and effect on surface water quality
- Linking water quality data and biological functions
- Effect of individual septic systems on surface water quality

### **Groundwater**

- Bedrock aquifer delineation and protection
- Mapping aquifers for GIS data base
- Effects of sand and gravel extraction on groundwater quality

### **Land Use/Application**

- Impact of development/land use on surface and groundwater quality
- Biosolids in land farming
- Buffer zone/riparian zone effectiveness with different land use
- BMP effectiveness

### **Management/Planning Issues**

- Impact of development
- Level of sustainable development

### **Watershed**

- Watershed approach to management decisions
- Watershed approach to studying water quality
- Systems approach on a watershed scale to management: economic factors and quality of life

### **Technology Transfer**

- Water quality and water use
- Water conservation education

## **Water Resources Research Center: An Overview**

The primary charges of each institute are: research, technology transfer, and education of new professionals. The institutes accomplish these charges through Federal and state funding mechanisms. Annually, the NH WRRC supports several research projects with its 104b funding. These projects typically involve academic researchers working with undergraduate and graduate student employees. Several lake and watershed monitoring groups have also been involved in recent research projects, allowing for an information exchange between researchers and the public. Recent research topics include: pathogens in biosolids, assessing household risk and knowledge related to water quality, fate of terrestrial organic matter in lakes, role of buffers in salt marsh species diversity and river response to flooding. A list of recent research projects can be found in the index of our NH WRRC website ([www.wrcc.unh.edu](http://www.wrcc.unh.edu)). All of the research results are published and available online at the Center's website. Technology transfer also occurs through phone conversations or public appearances. Staff make public presentations on watershed management, effects of chemical deicers on water quality, and various aspects of water quality management including nitrogen cycling. They also make presentations at national and international meetings on a variety of scientific topics. In addition to research and technology transfer conducted with the 104b funding, staff of the WRRC have received additional funding that supports the mission of the NH WRRC.

The Water Quality Analysis Lab (WQAL) is affiliated with the NH WRRC and facilitates water resources research through technical assistance and sample analysis. The WQAL was established by the Department of Natural Resources in 1996 to meet the needs of various research and teaching projects both on and off the UNH campus. It is currently administered by the NH WRRC and housed in James Hall. The mission of the Water Quality Analysis Laboratory is to provide high-quality, reasonably priced analyses in support of research projects conducted by scientists and students from throughout the University, state, and nation. Past clients have included numerous research groups on the UNH campus, Federal agencies, scientists from other universities, and private firms. Many thousands of analyses are conducted each year.

To further encourage and support water resources research near the UNH campus, the WRRC has led in the development of a hydrologic observatory centered on the Lamprey River of southeastern NH. The entire Lamprey basin is referred to as The Lamprey River Hydrologic Observatory (LRHO). Because it is largely forested, is undergoing rapid increase in human population density, contains lakes with high recreational value, and discharges to the state's largest estuary, the Lamprey basin captures many of the most important water resource issues facing New Hampshire. The goal of the LRHO is to serve as a platform for research, student training, and community engagement that encompasses the major water resource issues facing the state. It currently involves faculty, staff and students from the Department of Natural Resources & the Environment, the Department of Earth Science, the Department of Civil Engineering, the Climate Change Research Center and the Complex Systems Research Center. Topics addressed in the LRHO include hydrology, biology, biogeochemistry and management of a suburban basin. The Water Resources Research Center has provided laboratory equipment and technical advice needed for various ongoing projects and long term sampling of the Lamprey River, and organizes annual symposia for LRHO researchers and managers. A small part of the annual 104b funding goes towards this project. Other work on the LRHO is funded by a wide variety of state, University, and federal grants.

### Section 104 Objectives

The primary emphasis of the 104b funding is research and education of undergraduate and graduate students through support of research projects. Research objectives were primarily dictated by the list of research priorities presented earlier (Water Resource Issues and Problems of NH), but varies based on the interests of the principle investigators applying for funding. Matching funds are also used to support research and education of students, but a large portion of the matching funds are used for information transfer.

<b>Allocation of Federal Grant and Matching Funds Among Program Activities: FY 2003 through FY 2007</b>	
<b>Activity</b>	<b>Percent</b>
Research	50
Information Transfer	20
Education	20
Administration	10
Other (please specify)	0
Total	100

### Institutional Support and Effectiveness

The NH WRRC receives no discretionary funding from the state or the university.

### Discretionary Base Funding

<b>Appropriated or Other Discretionary Funds Available to the Institute: FY 2003 through FY 2007</b>					
<b>Source of Discretionary Funds</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>

### Other Water Resources Research Funding

<b>Total and Average Value of Water Resources Grants, Contracts, and Cooperative Agreements in Which the Institute Had a Major Role During the Evaluation Period: FY 2003 through FY 2007</b>	
Total Value of Awards, in dollars	\$4,514,870
Number of Awards	15



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Average Value of Awards	\$300,991.33
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Please list in the table below the 10 largest grants (other than section 104 grants), contracts, and cooperative agreements for which the Director or staff of the institute played a major role in assembling the proposal or otherwise obtaining the grant or contract. Include the dollar amount of the contract, grant, or cooperative agreement, the year that it was initiated, and the source of the funds. USGS-Water Resources Research Institute Internships and funds from other federal agencies passed through to your institute by the USGS should be included here.

<b>The Ten Largest Water Resources Grants, Contracts, and Cooperative Agreements in Which the Institute Had a Major Role during the Period of the Evaluation: FY 2003 through FY 2007</b>			
Title/Topic	Source of Fundings	Year Initiated	Amount
Linking DOC and DON fluxes to soil properties at watershed and landscape scales	NSF Ecosystems. DEB-0108385	2001-2006	\$776,740
Nitrate uptake and retention in streams: mechanisms and effects of human disturbances from stream reaches to landscapes	NSF Integrated Research Challenges in Environmental Biology, DEB 0111410	2002-2006	\$221,756
Connecticut River Airshed Watershed Consortium	EPA, Subcontract from U. Conn	2001-2007	\$944,430
A satellite-based system for monitoring biogeochemical fluxes between the continental land mass and the coastal oceans: a renewal proposal with a focus on plumes	NASA SEAWIFS	2002-2005	\$252,000
Long-term ecological research in the Luquillo Experimental Forest	NSF LTER, DEB-0218039	2002-2006	\$223,000
Calcium oxalate pools in forest soils	USDA NRICGP	2003-2006	\$255,494
AIRMAP Wet deposition - Linking temporal variability in atmospheric deposition to air mass origin and chemistry	NOAA	2006-2009	\$120,650
Assessing the Effectiveness of the Clean Air Act	EPA ORD	2006-2011	\$978,043
Luquillo LTER Program 4: Understanding Change in the Ecosystems of Northeastern Puerto Rico	NSF LTER, DEB-0620919	2006-2012	\$376,000
Watershed Assessment of the New Boston Air Force Station	DOD USAF	2007-2009	\$126,213

### Research Program

The number of proposals requesting funding through the NH WRRC ranged from 3 to 5 proposals per year throughout the evaluation term. The availability of other funding, as well as the required 2:1 match for the WRRC funds has likely discouraged other potential applicants. We have funded at least 3 projects each year, with topics ranging pathogens in biosolids to river response to severe flooding. Most projects include heavy involvement of one or more graduate students.

## Research Projects

### Summary of Research Projects

<b>Number of Research Projects and Percentage of Research Funds, by Research Category: FY 2003 through FY 2007</b>		
<b>Research Category</b>	<b>Number</b>	<b>Percent of Funds</b>
Biological Sciences	0	0
Climate and Hydrologic Processes	0	0
Engineering	2	15
Ground-water Flow and Transport	0	0
Social Sciences	2	14
Water Quality	7	71

### Research Projects Receiving Follow-on Funding

The number of projects receiving follow-on funding from another source after completion as a section 104-funded project was: 2.

### Summary of Research Publications

<b>Number of Research Publications, by Category of Publication: FY 2003 through FY 2007</b>	
<b>Publication Category</b>	<b>Number</b>
Articles in Refereed Journals	15
Book Chapters	0
Theses and Dissertations	9
Water Resources Institute Reports	0
Articles in Conference Proceedings	4
Other Publications	11

### Most Significant Research

#### Most Significant Research Projects

FY2004 The NH WRRC project "**Use of Male Specific Bacteriophage as an Indicator for the Presence of Hepatitis A Virus in Alkaline Stabilized Biosolids Intended for Land Application**" resulted in a peer reviewed publication that had significant implications for biosolid applications. Biosolid applications have occurred in NH and there is concern regarding the impact of biosolids on water quality and human health. Identifying biosolids which contain Hepatitis A is one way to mitigate potential human health impacts from

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land application of biosolids.

FY2003 The NH WRRC project "**Linking Lakes with the Landscape: The Fate of Terrestrial Organic Matter in Planktonic Food Webs**" resulted in numerous important publications focusing on terrestrial and aquatic carbon cycling and microbial activity produced by both the PI (Kathy L. Cottingham) and also the PhD student (J.T. Lennon). The PI was an Assistant Professor at the time of the NH WRRC award and has gone on to become a full Professor at the University of New Hampshire. Jay-Terrence Lennon is now an Assistant Professor at Michigan State University. Both have received several research awards that resulted in part from NH WRRC funding.

FY2003-FY2007 The NH WRRC project "**Water Quality and the Landscape: Long-term monitoring of rapidly developing suburban watersheds**" has provided relevant data and research on two very important water quality management issues: chemical deicer (road salt) application and nitrogen loading to sensitive coastal ecosystems. Two streams in Durham, NH (College Brook and Pettee Brook) were listed on the NH 303d list of impaired water bodies based on elevated chloride and data from the NH WRRC project contributed to this listing. These streams are in violation of the EPA clean water act and a TMDL for chloride is scheduled for the near future. Recently the Great Bay estuary in NH and its tidal tributaries were added to the NH 303d list and classified as impaired by elevated nitrogen levels. Consequently, these water bodies are also in violation of the Clean Water Act and towns throughout the entire seacoast watershed will have to work together to reduce nitrogen loading to the bay. Data from the LRHO will be vital to this process as research from the LRHO has already shown a long-term increase in nitrate in the largest tributary to the bay, and shown that inorganic nitrogen varies spatially throughout the watershed with human activity and nitrogen inputs.

FY2003-FY2007 The Lakes Lay Monitoring Program funded in part by the NH WRRC projects "**Effects of Land Use on Water Quality in a Changing Landscape**" and "**Water Quality Change-Effects of Development in Selected Watersheds**" is a statewide volunteer sampling effort of NH's lakes and tributaries that has been used as a nation model for volunteer sampling programs.

### Five Most Distinguished Grant Recipients

**Brian F Chabot** - Professor of Ecology, Cornell University, Ithaca, NY. Past recipient of NH WRRC funding and has served as the College of Agriculture and Life Sciences Director of Research and Dean. Dr. Chabot is developing a research and extension program supporting the maple sugar production, has numerous publications and received several honors and awards. <http://www.eeb.cornell.edu/chabot/>

**James W Hornbeck** - A past recipient of NH WRRC funding who has worked for the US Forest Service at the Northern Research Station in Durham, NH for several years. He has produced numerous publications.

**Kenneth D. Kimball** - Dr. Kimball's PhD research was funded in part by NH WRRC funds. Dr. Kimball has gone on to work for the Ecosystems Research Center at Cornell University in Ithaca, NH (1981-1984) and then became the Director of Research at the Appalachian Mountain Club.

**W. Berry Lyons** - Director of Byrd Polar Research Center, Professor of Geological Sciences, Ohio State University in Columbus, OH. Dr. Lyons was a Research Faculty member at the University of New Hampshire when he received NH WRRC funding. Now his research focuses on environmental geochemistry with interests in the earth's chemical environment and how it is affected by physical, biological, geological and anthropogenic processes.

**Frederick T. Short** - Research Professor, University of New Hampshire, Durham, NH. Past recipient of NH WRRC funding and now Director of SeagrassNet which is an expanding global monitoring effort of

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Seagrasses. Seagrass monitoring sites have been established in New England, the Western Pacific, Brazil, Indonesia and Tanzania. For monitoring data and more information visit: [www.SeagrassNet.org](http://www.SeagrassNet.org)

### Summary of Awards

One of the volunteer groups we work with as part of our 104B funded Water Quality and the Landscape: Long-term monitoring of rapidly developing suburban watersheds project received a prestigious award from the Environmental Protection Agency. The Green Mountain Conservation Group received the EPA's Environmental Merit Award. Given out by EPA since 1970, the merit awards honor individuals and groups who have shown particular ingenuity and commitment in their efforts to preserve the region's environment. This year's competition drew approximately 50 nominations from across New England. These awards are among the highest honors EPA can bestow to recognize environmental accomplishments.

J.T. Lennon received the Best Student Presentation Award at the National meeting of the North American Lake Management Society in November 2003 for his presentation titled Trophic state and plankton nutrition along a terrestrial DOM gradient in New England lakes.

Traister, E.M. and W. H. McDowell. Physical, biological, and biogeochemical response of a northeastern river to a severe flood. (poster) Presented at the UNH 2007 Graduate Student Research Conference in Durham, NH. Received best poster award.

JT Lennon. 2004. Hannah T. Croasdale Graduate Scholar Award. College-wide award given to the graduating Ph.D. student who best exemplifies the qualities of academic scholarship.

KL Cottingham received tenure in 2003 and was also awarded Dartmouth's Karen E. Wetterhahn Award for Distinguished Creative or Scholarly Achievement for that year's tenure class.

### Information Transfer Program

One information transfer project "Seed Funding for the First Annual NH Water Resources Conference" was funded during the evaluation period. Over 200 people attended the conference, and it is now an annual event. Information Transfer also occurs through a number of less-easily quantified channels. First, our website is frequently updated, and serves as our primary information transfer component. The site provides on-line access to NH WRRC reports, a list of recent and current research projects, data from several projects, and links to other sites of potential interest to NH residents and water resource professionals. Other Information Transfer occurs through our interaction with local watershed and lake associations, phone calls, public presentations and scientific meetings.

**Information Transfer Projects**

**Information Transfer Publications**

IT Publication Type	IT Publication Citation

**Audio-Visual Productions**

Several PowerPoint presentations have been produced and delivered to various local watershed and lake associations, town planners, managers and conservation members and the general public using NH WRRC funding. PowerPoint presentations that focus on the Lamprey River Hydrologic Observatory (LRHO) are posted on the LRHO website (<http://www.wrcc.unh.edu/lrho/index.htm>) under the Annual Symposium and Outreach links.

**Newsletter**

The NH WRRC does not currently produce a newsletter. We have made the decision to rely on our website to disseminate information. The site is updated frequently (every week or two) to include items we feel might be of interest to the public and researchers.

**Conferences**

The NH WRRC was involved in supporting and organizing the November 2007 NH Watershed Conference held in Concord, NH. The conference drew approximately 200 people including researchers, legislators, water system operators, land use planners, and government officials. The conference contained 6 tracks including organizational development, effecting change, tech time, managing our watersheds, ecology and a newly added GIS track that was facilitated solely by the UNH cooperative extension and the NH WRRC.

**Lead Sponsor**

The NH WRRC organized and totally funded the first annual “Lamprey River Hydrologic Observatory Symposium” in Durham, NH in January 2008. Data from the WRRC project “Water Quality and the Landscape: Long-term monitoring of rapidly developing suburban watersheds” were presented along with various presentations made by UNH researchers from several different departments and one NH DES employee. Presentations focused on water quality, hydrology, nutrient cycling in coastal New Hampshire and also coastal Massachusetts. The symposium was quite a success and drew over 50 attendees including researchers, watershed organization members, state legislators, town officials and land use planners.

### **Cosponsor or Supporter**

The first annual New Hampshire Water Conference was held on April 9, 2007 at the Grappone Conference Center in Concord. The conference drew over 200 people, including researchers, state legislators, water system operators, land use planners, and government officials. Governor John Lynch spoke to the attendees about the importance of New Hampshire's water resources. Seven state legislators were in attendance. The conference theme was Sustainability of New Hampshire's Water Resources in a Developing Landscape. The current knowledge of the quality, quantity and use of water was examined through talks and sessions on the current conditions of New Hampshire's water resources, water demand trends, projected household costs for water, effects of climate change, and the sustainability and management of surface and ground water. The day closed with a panel discussion on the future outlook on the sustainability of our water resources. Evaluations completed by conference participants indicate that the conference has provided useful and relevant information.

### **Internet Services**

We rely extensively on our website ([www.wrcc.unh.edu](http://www.wrcc.unh.edu)) for information transfer. The website is a gateway to a plethora of water resources information relevant to the state and region.

The site's "WRRC News" section is frequently updated with USGS press releases, reports from state and local agencies, requests for proposals and other news items we feel might be of interest to the NH public and researchers.

The website also includes a listing of research project titles and abstracts funded through the WRRC since 1990. Electronic versions of annual and final reports are also available on the site.

Other highlights of the website include an overview of the WRRC at UNH, a description of our Water Quality Analysis Lab, research and outreach activities occurring in the Lamprey River Hydrologic Observatory, links to departments, programs and faculty on the UNH campus that focus on water resource issues and links to other sites of interest to NH water resources shareholders (e.g. federal, state agencies, non-profit NGOs, etc.).

**Awards**

**Most Significant Achievements**

- The NH WRCC has been a supporter and has been directly involved with organizing and executing the NH Watershed Conference since 2007. The annual NH Watershed Conference now contains a GIS track each year which is facilitated solely by the UNH cooperative extension and the NH WRRC. The GIS track is designed to provide low cost practical GIS training for town planners, managers and watershed and lake association members. The conference draws approximately 200 people each year including researchers, legislators, water system operators, land use planners, and government officials.
- The annual New Hampshire Water Conference was first held in April 2007, again in April 2008 and in 2009 the organizing committees of the annual New Hampshire Water Conference and the annual New Hampshire Watershed Conference joined forces to offer a single, comprehensive event. The merger combined the talent, resources, and audiences from both events into a unique, two-day event 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. This conference provided a state-wide forum for learning and networking about issues related to water resources in New Hampshire and drew over 200 people, including researchers, legislators, water system operators, land use planners, and government officials.
- The first annual "Lamprey River Hydrologic Observatory Symposium" (totally funded as part of the WRRC project "Water Quality and the Landscape: Long-term monitoring of rapidly developing suburban watersheds") has transformed from a half day event in January 2008 to an all day event in January of 2009 and 2010 based on the amount of research occurring in the LRHO and from the public demand for access to the most recent research results. The annual symposium has been quite a success and drawing over 50 attendees each year including researchers, watershed organization members, state legislators, town officials and land use planners.

**Education**

Most projects funded by the 104 base grant and matching funds include significant involvement of graduate and undergraduate students and approximately 20% of these funds goes toward tuition waivers, stipends and hourly salary for students. Over the 5-year review period WRRC base grant projects have directly supported or involved almost 90 undergraduate, M.S. and Ph.D. students and one post doctoral associate and have likely indirectly impacted at least twice as many, through volunteer efforts, use of data in several field and lecture classes, equipment loan, analytical services, technical advice and field support.

**Number of Students Supported**

<b>Number of Students Supported, by Degree and Grant Type: FY 2003 through FY 2007</b>		
<b>Degree</b>	<b>Base Grants</b>	<b>National Competitive Grants</b>
Undergraduate	49	

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Masters	33	
Ph.D.	7	
Post Doc	1	

**Theses and Dissertations**

<b>Number of Theses and Dissertations Resulting from Student Support: FY 2003 through FY 2007</b>	
Master's Theses	7
Ph.D. Dissertations	1

**Student Grants and Fellowships**

**Administration, Coordination, and Cooperation**

**National Competitive Grant Program**

One proposal “Hyporheic Exchange and Groundwater Contribution Characterization in New England Coastal Streams using Fiber Optic Temperature Sensing” was submitted by the NH WRRC on behalf of PIs Jennifer Jacobs and Matt Davis to the National Competitive Grant Program in FY2007, but this proposal was not funded.

**Cooperation**

One funded research project took place at Dartmouth College. This was a 2–year project that began in FY02 and continued through FY03. The funds represented in the table for Dartmouth College include only FY03. Steve Kahl at Plymouth State University received funding to support information transfer activities through seed funding for the 1<sup>st</sup> annual New Hampshire Water Conference.

<b>Expenditure of Section 104 and Matching Funds, by University or Other Organization, State, and Year: FY 2003 through FY 2007</b>						
		<b>Section 104 Federal Grant and Matching Fund Expenditures</b>				
<b>University or Organization</b>	<b>State</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
University of New Hampshire	NH	176206	277900	277236	254308	277005
Dartmouth College	NH	76496				



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Plymouth State University	NH				22697	

### **Institute Directors over Evaluation Period**

<b>Name</b>	<b>Academic Discipline</b>	<b>Term</b>
William H. McDowell	Biogeochemistry	Feb. 2000-Present

### **Advisory Committees**

Our advisory/review committee is made up of, Dr. Scott Bailey (USDA Forest Service), Dr. Stephen Jones (Marine Science Director, UNH Center for Marine Biology), Richard Flanders (NH Department of Environmental Services, Manager Sludge and Septage Program), Michelle Daley (NH WRRC Associate Director) and the Director, Dr. William McDowell. The committee does not meet formally, however they are contacted on an individual basis as needed for program development and guidance. The committee also reviews the proposals submitted for 104b funding.

### **Research Proposal Review and Selection Process**

The request for proposals in early August each year, with a submission deadline of October 15. Preproposals are reviewed by our advisory committee, including the Director and Associate Director. Another reviewer with an appropriate area of expertise is also selected if necessary. Each preproposal gets an independent review by each reviewer, critiquing the proposal for scientific merit, relevance of work to state and regional problems as well as likelihood of success. Based on these reviews the director and associate director select the projects for funding. Reviewer's comments are given to the PIs anonymously. The accepted proposals are then fine tuned and the budgets are finalized as necessary, with the final proposals due sometime in mid-December.

### **Peer Review of Institute Publications**

Institute manuscripts are reviewed by the director and associate director prior to acceptance and posting on our website. Comments are made to the authors, who then make any necessary changes.

**Number of Principal Investigators Supported, by Rank and Year**

<b>Principal Investigators on Research Projects Supported by Section 104 Grants and Matching Funds, by Academic Rank and Year: FY 2003 through FY 2007</b>					
<b>Academic Rank</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Assistant Professor and below	2	0	0	1	0
Associate Professor	1	0	2	1	0
Professor	2	1	0	6	1
Total	5	1	2	8	1

**Additional Information for the Evaluation Panel**

## Appendix A: Individual Project Attachments

### 'Effects of Land Use on W...': 2002NH4B Research Project Description

**Title** Effects of Land Use on Water Quality in a Changing Landscape  
**Project Number** 2002NH4B  
**Start Date** 3/1/2003  
**End Date** 2/28/2005  
**Research Category** Water Quality  
**Focus Categories** Water Quality, Non Point Pollution, Nutrients

Principal Investigators		
Name	Rank During Project Period	Affiliation
Jeffrey Schloss	Associate Extension Professor	University of New Hampshire

Funding				
Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2003	\$4,314	\$27,055		
FY2004	\$4,668	\$22,404		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

Student Support		
Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	17	0
Masters	4	0
Ph.D.	2	0
PostDoctoral	0	0

Publications	
Publication Type	Publication Citation
Other Publications	Schloss, Jeff and Ellie Ely. 2004. Measuring Clarity, Transparency, Turbidity, and TSS. 2004. Volunteer Monitor National Newsletter of Volunteer Water Quality Monitoring. Winter Edition. <a href="http://www.epa.gov/owow/monitoring/volunteer/newsletter/volmon16no1.pdf">http://www.epa.gov/owow/monitoring/volunteer/newsletter/volmon16no1.pdf</a>
Conference Proceedings	Schloss, Jeffrey A. 2004. Participatory Watershed Monitoring: Linking Citizens to Scientists Through the NH Lakes Lay Monitoring Program. National Water Quality Monitoring Council Conference. May 2004. Chattanooga TN. Powerpoint: <a href="http://water.usgs.gov/wicp/acwi/monitoring/conference/2004/conference_agenda_links/">http://water.usgs.gov/wicp/acwi/monitoring/conference/2004/conference_agenda_links/</a>

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	power_points_etc/04_ConcurrentSessionB/36_Rm11_Schloss.pdf ExtendedAbstract: <a href="http://water.usgs.gov/wicp/acwi/monitoring/conference/2004/conference_agenda_links/title_pages/block_b/attach_36.pdf">http://water.usgs.gov/wicp/acwi/monitoring/conference/2004/conference_agenda_links/title_pages/block_b/attach_36.pdf</a>
Other Publications	R. Craycraft and J. Schloss. 2004. Lakes Lay Monitoring Program Annual Report for 2003. A series of 27 individual lake reports distributed to lake associations, towns, conservation and planning commissions, and state agencies. Published by the UNH Center for Freshwater Biology and UNH Cooperative Extension
Other Publications	J. Schloss and R. Craycraft and 2004. Lake Chocorua Watershed Road Drainage Best Management Practice Evaluation and Wetlands Study. Final Report for Phase 3 of the NH Department of Environmental Services Nonpoint Source Pollution Program. UNH Cooperative Extension, UNH Center for Freshwater Biology, Carrol County Conservation District, Lake Chocorua Association.
Other Publications	J Schloss 2004 Squam Lakes Diagnostic Watershed Study. UNH Center for Freshwater Biology Project Report.
Conference Proceedings	Schloss, J., 2003, Top-Down/Bottom-Up, High Tech/Low Tech, Participatory Monitoring and GIS Watershed Inventories, in Proceedings of the 2003 USDA Water Quality Conference
Conference Proceedings	Schloss, J., 2003, Motorized Boating on Lakes: What are the environmental Impacts?, Proceedings of the 12th annual North American Lakes Management Society Southeast Lakes Management Conference
Other Publications	Schloss, J. 2003, Participatory Research: Linking Citizens to Scientists. Volunteer Monitor Newsletter, Winter 2003, 15:1 pg 22-23.
Other Publications	Annual Lake Reports were generated for 27 NH lakes 2003 and 26 NH lakes in 2004.
Other Publications	R. Craycraft and J. Schloss. 2005. Lakes Lay Monitoring Program Annual Report for 2004. A series of 26 individual lake reports distributed to lake associations, towns, conservation and planning commissions, and state agencies. Published by the UNH Center for Freshwater Biology and UNH Cooperative Extension

### **Awards and Achievements**

[None]

**'Linking Lakes with the L...': 2002NH1B Research Project Description**

**Title** Linking Lakes with the Landscape: The Fate of Terrestrial Organic Matter in Planktonic Food Webs  
**Project Number** 2002NH1B  
**Start Date** 3/1/2003  
**End Date** 2/28/2004  
**Research Category** Water Quality  
**Focus Categories** Ecology, Models, Surface Water

Principal Investigators		
Name	Rank During Project Period	Affiliation
Kathryn Cottingham	Assistant Professor	Dartmouth College
Jay Lennon	Ph.D. Candidate	Dartmouth College

Funding				
Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2003	\$12,569	\$63,927		
2006 - 2008			USDA National Research Initiative	\$110,000
2002 - 2004			NSF Doctoral Dissertation Improvement Grant	\$8,075

This project received follow-on funding after completion as a section 104-funded project (Yes  No ). *If yes, please describe the funding period, source and amount in the funding table.*

Student Support		
Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	7	0
Masters	0	0
Ph.D.	1	1
PostDoctoral	0	0

Publications	
Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Lennon, J.T., 2004, Experimental evidence that terrestrial carbon subsidies increase CO2 flux from lake ecosystems. <i>Oecologia</i> 138, 584-591.
Articles in Refereed Scientific Journals	Lennon J.T. and K.L. Cottingham. 2008. Microbial productivity in variable resource environments. <i>Ecology</i> . 84(4): 1001-1014.

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Articles in Refereed Scientific Journals	Lennon J.T., A.M. Faiia, X. Feng, K.L. Cottingham. 2006. Relative importance of CO <sub>2</sub> recycling and CH <sub>4</sub> pathways in lake food webs along a terrestrial carbon gradient. <i>Limnology and Oceanography</i> . 51: 1602-1613.
Dissertations	Lennon, Jay-Terrence, 2004, The energetic importance of terrestrial carbon in lake ecosystems, PhD Dissertation, Dartmouth College, Hanover, NH. 184 pp.
Articles in Refereed Scientific Journals	Lennon JT, Pfaff LE., 2005, The source and supply of terrestrial carbon affects aquatic microbial metabolism. <i>Aquatic Microbial Ecology</i> . 39:107-119.
Articles in Refereed Scientific Journals	Cottingham KL, Lennon JT, Brown BL (2005) Designing more informative ecological experiments. <i>Frontiers in Ecology and the Environment</i> 3: 145-152.
Articles in Refereed Scientific Journals	Cottingham KL, Lennon JT, Brown BL (2005) Regression versus ANOVA. <i>Frontiers in Ecology and the Environment</i> 3: 358.

### **Awards and Achievements**

Special session organizer - Lennon co-organized a special session on Ecological implications of terrestrial inputs into lakes and ponds for the 2002 American Society of Limnology and Oceanography national meeting. J.T. Lennon received the Best Student Presentation Award at the National meeting of the North American Lake Management Society in November 2003 for his presentation titled Trophic state and plankton nutrition along a terrestrial DOM gradient in New England lakes. JT Lennon. 2004. Hannah T. Croasdale Graduate Scholar Award. College-wide award given to the graduating Ph.D. student who best exemplifies the qualities of academic scholarship. KL Cottingham received tenure in 2003 and was also awarded Dartmouth Karen E. Wetterhahn Award for Distinguished Creative or Scholarly Achievement for that year tenure class.

**'Pathogens in Biosolids: ...': 2003NH20B Research Project Description**

**Title** Pathogens in Biosolids: Evaluation of Clostridium perfringens as an indicator organism to assess the efficiency of biosolid disinfection processes

**Project Number** 2003NH20B

**Start Date** 3/1/2003

**End Date** 2/28/2004

**Research Category** Engineering

**Focus Categories** Treatment, Waste Water, Toxic Substances

<b>Principal Investigators</b>		
<b>Name</b>	<b>Rank During Project Period</b>	<b>Affiliation</b>
Christine Bean	Assistant Professor	University of New Hampshire

<b>Funding</b>				
<b>Funding Period</b>	<b>Federal 104 Funds</b>	<b>Required 104 Matching Funds</b>	<b>Other Funding</b>	
			<b>Source</b>	<b>Funds</b>
FY2003	\$15,079	\$43,145		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

<b>Student Support</b>		
<b>Degree Level</b>	<b>Number of Students</b>	<b>Number of Dissertations/Theses</b>
Undergraduate	1	0
Masters	0	0
Ph.D.	0	0
PostDoctoral	0	0

<b>Publications</b>	
<b>Publication Type</b>	<b>Publication Citation</b>

**Awards and Achievements**

[None]

**'Water Quality and the La...': 2003NH21B Research Project Description**

**Title** Water Quality and the Landscape: Long-term monitoring of rapidly developing suburban watersheds

**Project Number** 2003NH21B

**Start Date** 3/1/2003

**End Date** 2/28/2008

**Research Category** Water Quality

**Focus Categories** Non Point Pollution, Surface Water, Nutrients

Principal Investigators		
Name	Rank During Project Period	Affiliation
William McDowell	Director, Professor	University of New Hampshire

Funding				
Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2003	\$24,770	\$21,965		
FY2004	\$35,307	\$55,741		
FY2005	\$31,130	\$78,023		
FY2006	\$100	\$11,087		
FY2007	\$22,605	\$89,030		
2008 - 2009			University of New Hampshire	\$53,000

This project received follow-on funding after completion as a section 104-funded project (Yes X No   ). *If yes, please describe the funding period, source and amount in the funding table.*

Student Support		
Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	2	0
Masters	6	6
Ph.D.	0	0
PostDoctoral	1	0

Publications	
Publication Type	Publication Citation
Dissertations	Legere, K.A. September 2007. Nitrogen loading in coastal watersheds of New Hampshire: an application of the SPARROW model. Masters Thesis, University of New Hampshire, Durham, NH. 75 pages.
Dissertations	Traer, K. December 2007. Controls on denitrification in a northeastern coastal suburban



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	riparian zone. Masters Thesis, University of New Hampshire, Durham, NH. 97 pages.
Dissertations	Buyofsky, L.A. 2006. Relationships between groundwater quality and landscape characteristics in the Lamprey River watershed. M.S. Dissertation, Department of Natural Resources, College of Life Science and Agriculture, University of New Hampshire, Durham, NH
Dissertations	Proto, Paul J. 2005, The Significance of High Flow Events in the Lamprey River Basin, New Hampshire, for Annual Elemental Export and Understanding Hydrologic Pathways. M.S. Dissertation, Department of Earth Sciences, College of Engineering and Physical Sciences, University of New Hampshire, Durham, NH, 176 pages.
Dissertations	O'Donnell, Tracey E, 2004, Suburbanization, water quality and property values in three northern forest watersheds, MS Dissertation, Department of Natural Resources, College of Life Sciences and Agriculture, University of New Hampshire, Durham, NH, 120 pages.
Articles in Refereed Scientific Journals	Pellerin BA, WM Wollheim, CS Hopkinson, WH McDowell, MR Williams, CJ Vorosmarty, ML Daley, 2004, Role of wetlands and developed land use on dissolved organic nitrogen concentrations and DON/TDN in northeastern US rivers and streams, <i>LIMNOLOGY AND OCEANOGRAPHY</i> 49 (4): 910-918.
Dissertations	Flint, Shelby, 2007, Impacts of palustrine wetlands on surface water quality in the Lamprey River watershed, New Hampshire, M.S. Disertation, University of New Hampshire, 99 pages.
Articles in Refereed Scientific Journals	Daley, M.L., Potter, J.D. and McDowell, W.H. 2009. Salinization of suburbanizing New Hampshire streams and groundwater: effects of road salt and hydrologic variability. <i>Journal of the North American Benthological Society</i> 28(4) 929-940.

### Awards and Achievements

One of the volunteer groups we work with as part of our 104B funded Water Quality and the Landscape: Long-term monitoring of rapidly developing suburban watersheds project received a prestigious from the Environmental Protection Agency. The Green Mountain Conservation Group received the EPA's Environmental Merit Award. Given out by EPA since 1970, the merit awards honor individuals and groups who have shown particular ingenuity and commitment in their efforts to preserve the region's environment. This year's competition drew approximately 50 nominations from across New England. These awards are among the highest honors EPA can bestow to recognize environmental accomplishments. Data collected during this project have been used to heighten awareness of the impacts of excessive road salting and snow dumping in local streams. Communication with local road agents has led to the remediation in one development where road salting was an issue. Samples collected and data generated from this funding have shown an improvement in water chemistry following reduced salting and snow dumping.

**'Use of Male Specific Bac...': 2004NH31B Research Project Description**

**Title** Use of Male Specific Bacteriophage as an Indicator for the Presence of Hepatitis A Virus in Alkaline Stabilized Biosolids Intended for Land Application

**Project Number** 2004NH31B

**Start Date** 3/1/2004

**End Date** 2/28/2005

**Research Category** Engineering

**Focus Categories** Treatment, Methods, Toxic Substances

Principal Investigators		
Name	Rank During Project Period	Affiliation
Aaron Margolin	Professor	University of New Hampshire

Funding				
Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2004	\$22,945	\$72,123		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

Student Support		
Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	0	0
Masters	0	0
Ph.D.	0	0
PostDoctoral	0	0

Publications	
Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Katz, B.D. and A.B. Margolin. Submitted. Inactivation of Hepatitis A virus HM-175/18f, Reovirus type 1 Lang and Bacteriophage MS2 during alkaline stabilization of biosolids. Journal of Applied. 103: 2225 2233.

**Awards and Achievements**

[None]

**'Assessing Household Risk...': 2005NH36B Research Project Description**

**Title** Assessing Household Risk and Knowledge in Mitigating Nonpoint Source Pollution in Coastal Watersheds

**Project Number** 2005NH36B

**Start Date** 3/1/2005

**End Date** 2/28/2006

**Research Category** Social Sciences

**Focus Categories** Water Quality, Models, Non Point Pollution

<b>Principal Investigators</b>		
<b>Name</b>	<b>Rank During Project Period</b>	<b>Affiliation</b>
Robert Robertson	Associate Professor	University of New Hampshire
Mary Robertson	PhD Student	University of New Hampshire

<b>Funding</b>				
<b>Funding Period</b>	<b>Federal 104 Funds</b>	<b>Required 104 Matching Funds</b>	<b>Other Funding</b>	
			<b>Source</b>	<b>Funds</b>
FY2005	\$22,752	\$49,466		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

<b>Student Support</b>		
<b>Degree Level</b>	<b>Number of Students</b>	<b>Number of Dissertations/Theses</b>
Undergraduate	1	0
Masters	0	0
Ph.D.	0	0
PostDoctoral	1	1

<b>Publications</b>	
<b>Publication Type</b>	<b>Publication Citation</b>

**Awards and Achievements**

Robertson, Mary. Anticipated May 2010. Social Capital and Open Space Design in the Lamprey River Watershed. PhD Dissertation, University of New Hampshire, Durham, NH. Information and data from the homeowner survey was disseminated to the Lamprey River Watershed Association.

**'The Role of Vegetated Bu...': 2005NH39B Research Project Description**

**Title** The Role of Vegetated Buffers in Maintaining Salt Marsh Species Diversity  
**Project Number** 2005NH39B  
**Start Date** 3/1/2005  
**End Date** 2/28/2006  
**Research Category** Water Quality  
**Focus Categories** Wetlands, Ecology, Nutrients

<b>Principal Investigators</b>		
<b>Name</b>	<b>Rank During Project Period</b>	<b>Affiliation</b>
David Burdick	Associate Research Professor	University of New Hampshire
Joanne Glode	Graduate Student	The Nature Conservancy

<b>Funding</b>				
<b>Funding Period</b>	<b>Federal 104 Funds</b>	<b>Required 104 Matching Funds</b>	<b>Other Funding</b>	
			<b>Source</b>	<b>Funds</b>
FY2005	\$5,840	\$11,686		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

<b>Student Support</b>		
<b>Degree Level</b>	<b>Number of Students</b>	<b>Number of Dissertations/Theses</b>
Undergraduate	1	0
Masters	1	0
Ph.D.	0	0
PostDoctoral	0	0

<b>Publications</b>	
<b>Publication Type</b>	<b>Publication Citation</b>
Dissertations	Glode, Joanne. 2008. Effects of Vegetated Buffers on Salt Marsh Plant Composition and Groundwater Nitrogen Uptake. MS Dissertation, Department of Natural Resources, College of Life Sciences and Agriculture, University of New Hampshire, Durham, NH.

**Awards and Achievements**

[None]

**'Frequency of Reovirus De...': 2006NH51B Research Project Description**

**Title** Frequency of Reovirus Detection in Biosolids: Comparison of the EPA CFR 503 Technique to Integrated Cell Culture Real Time PCR

**Project Number** 2006NH51B

**Start Date** 3/1/2006

**End Date** 2/28/2007

**Research Category** Water Quality

**Focus Categories** Methods, Water Quantity, Groundwater

Principal Investigators		
Name	Rank During Project Period	Affiliation
Aaron Margolin	Professor	University of New Hampshire

Funding				
Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2006	\$25,000	\$51,356		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

Student Support		
Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	1	0
Masters	1	0
Ph.D.	0	0
PostDoctoral	0	0

Publications	
Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Gallagher, Elizabeth M. and Aaron B. Margolin, 2007, Journal of Virological Methods, 139: 195-202.

**Awards and Achievements**

[None]

**'Protecting water supply ...': 2006NH52B Research Project Description**

**Title** Protecting water supply quality through improved watershed planning and management  
**Project Number** 2006NH52B  
**Start Date** 3/1/2006  
**End Date** 2/28/2007  
**Research Category** Social Sciences  
**Focus Categories** Management and Planning, Economics, Law, Institutions, and Policy

<b>Principal Investigators</b>		
<b>Name</b>	<b>Rank During Project Period</b>	<b>Affiliation</b>
John Halstead	Chair, Professor, Dept. of Resource Economics and Development	University of New Hampshire
Thomas Ballestero	Associate Professor of Civil Engineering	University of New Hampshire

<b>Funding</b>				
<b>Funding Period</b>	<b>Federal 104 Funds</b>	<b>Required 104 Matching Funds</b>	<b>Other Funding</b>	
			<b>Source</b>	<b>Funds</b>
FY2006	\$22,191	\$46,660		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

<b>Student Support</b>		
<b>Degree Level</b>	<b>Number of Students</b>	<b>Number of Dissertations/Theses</b>
Undergraduate	1	0
Masters	1	1
Ph.D.	1	0
PostDoctoral	0	0

<b>Publications</b>	
<b>Publication Type</b>	<b>Publication Citation</b>
Dissertations	Rogers, Shannon, 2007, Characterization of public and stakeholder objectives in environmental management: The application of conjoint analysis and other survey tools to the management of the Lamprey River, M.S., University of New Hampshire, Durham, NH, 110 pages.
Articles in Refereed Scientific Journals	Rogers, S., J.M. Halstead, and T. Seavey, 2007, Balancing Competing Water Uses in Participatory Watershed Planning and Management. Agricultural and Resource Economics Review. 36(2): 353

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Articles in Refereed Scientific Journals	Rogers, S., J.M. Halstead, and T. Seavey, Characterization of public and stakeholder objectives in environmental management: the application of conjoint analysis and other survey tools to the management of the Lamprey River. under revise and resubmit at the Journal of Environmental Planning and Management.
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### **Awards and Achievements**

[None]

**'Water Quality Change-Eff...': 2006NH60B Research Project Description**

**Title** Water Quality Change-Effects of Development in Selected Watersheds  
**Project Number** 2006NH60B  
**Start Date** 3/1/2006  
**End Date** 2/28/2008  
**Research Category** Water Quality  
**Focus Categories** Non Point Pollution, Nutrients, Surface Water

Principal Investigators		
Name	Rank During Project Period	Affiliation
Jeffrey Schloss	Extension Professor	University of New Hampshire

Funding				
Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2006	\$5,834	\$22,022	US EPA/NH DES	\$33,000
FY2007	\$9,586	\$24,631	UNH Cooperative Extension	\$14,100

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

Student Support		
Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	15	0
Masters	4	1
Ph.D.	2	0
PostDoctoral	0	0

Publications	
Publication Type	Publication Citation
Articles in Refereed Scientific Journals	Baumann, A.J. and J.S. Kahl. 2007. Chemical trends in Maine High Elevation Lakes. <i>LakeLine</i> 27:30-34.
Articles in Refereed Scientific Journals	Hunt, K., J.S. Kahl, J. Rubin, and D. Mageean, 2007. Assessing the science-based needs of stakeholders; a case study on acid rain research and policy. <i>Journal of Contemporary Water Research and Education</i> , 136: 68-79.
Articles in Refereed	Rosfjord, C., K. Webster, J.S. Kahl, S.A. Norton, I. Fernandez, and A. Herlihy, 2007. Anthropogenically-driven changes in chloride complicate interpretation of base cation trends in



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Scientific Journals	lakes recovering from acidic deposition. Environ Sci Technol, 41:7688 -7693.
Other Publications	Schloss and R. Craycraft 2006. Quality Assurance Project Plan: Mendums Pond Watershed Assessment. UNH Center for Freshwater Biology and UNH Cooperative Extension. <a href="http://des.nh.gov/organization/divisions/water/wmb/was/qapp/documents/mendums_pond.pdf">http://des.nh.gov/organization/divisions/water/wmb/was/qapp/documents/mendums_pond.pdf</a>
Other Publications	Craycraft and J. Schloss. 2006. Lakes Lay Monitoring Program Annual Report for 2005. A series of 29 individual lake reports distributed to lake associations, towns, conservation and planning commissions, and state agencies. Published by the UNH Center for Freshwater Biology and UNH Cooperative Extension
Other Publications	Schloss, Jeffrey A. and Robert Craycraft. 2006 Gaining Clarity on Water Transparency Measurements II: Is Everything Black and White? Proceedings of the 4th National Water Quality Monitoring Conference. May 2006 San Jose, CA. Environmental Protection Agency, USGS NAWQA Program and North American Lake Management Society.
Other Publications	R. Craycraft and J. Schloss. 2007. Lakes Lay Monitoring Program Annual Report for 2006. A series of 28 individual lake reports distributed to lake associations, towns, conservation and planning commissions, and state agencies. Published by the UNH Center for Freshwater Biology and UNH Cooperative Extension

### **Awards and Achievements**

Schloss, J. 2006. Choosing a Sampling Scheme for the National Lakes Assessment: Stressors and Indicators (April 2006). Invited presentation for 19th Annual National Conference Enhancing State Lake Management Programs: Developing the National Lakes Survey. Schloss, J. 2007. REALISTIC EXPECTATIONS AND OUTCOMES FROM THE SURVEY OF THE NATION'S LAKES. Invited presentation for: 20th Annual National Conference Enhancing the States' Lake Management Programs: Interpreting Lake Quality Data for Diverse Audiences. May 24-27, 2007. Chicago IL.

**'Physical, Biological, an...': 2007NH73B Research Project Description**

**Title** Physical, Biological, and biogeochemical response of a northeastern river to a severe flood  
**Project Number** 2007NH73B  
**Start Date** 3/1/2007  
**End Date** 2/28/2008  
**Research Category** Water Quality  
**Focus Categories** Surface Water, Ecology, Sediments

Principal Investigators		
Name	Rank During Project Period	Affiliation
William McDowell	Director, Professor	University of New Hampshire

Funding				
Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2007	\$32,152	\$18,374		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

Student Support		
Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	3	0
Masters	0	0
Ph.D.	1	0
PostDoctoral	0	0

Publications	
Publication Type	Publication Citation
Conference Proceedings	Traister, E.M. and W. McDowell. Physical, biological, and biogeochemical response of a northeastern river to a severe flood. (poster) Presented at the AGU 2006 Fall Meeting in San Francisco, CA.

**Awards and Achievements**

Traister, E.M. and W. McDowell. Physical, biological, and biogeochemical response of a northeastern river to a severe flood. (poster) Presented at the UNH 2007 Graduate Student Research Conference in Durham, NH. (received poster award)

## 'Seed Funding for the Fir...': 2005NH54B Information Transfer Project Description

**Title** Seed Funding for the First Annual NH Water Resources Conference  
**Project Number** 2005NH54B  
**Start Date** 3/1/2006  
**End Date** 2/28/2007  
**Research Category** Not Applicable  
**Focus Categories** Education, Management and Planning

Principal Investigators		
Name	Rank During Project Period	Affiliation
Jeffrey Kahl	Professor	Plymouth State
Paul Currier	unknown	NH Dept. Environmental Services
William McDowell	Director, Professor	University of New Hampshire
Kevin McGuire	Assistant Professor	Virginia Tech
Keith Robinson	Chief Hydrologist	US Geological Survey
Jeffrey Schloss	Extension Professor	University of New Hampshire

Funding				
Funding Period	Federal 104 Funds	Required 104 Matching Funds	Other Funding	
			Source	Funds
FY2006	\$7,425	\$15,272		

This project received follow-on funding after completion as a section 104-funded project (Yes \_\_\_ No X). *If yes, please describe the funding period, source and amount in the funding table.*

Student Support		
Degree Level	Number of Students	Number of Dissertations/Theses
Undergraduate	1	0
Masters	16	0
Ph.D.	0	0
PostDoctoral	0	0

Publications	
Publication Type	Publication Citation
Conference Proceedings	<a href="http://www.plymouth.edu/cfe/conference/">http://www.plymouth.edu/cfe/conference/</a>

**Awards and Achievements**

The first annual New Hampshire Water Conference was held on April 9, 2007 at the Grappone Conference Center in Concord. The conference drew over 200 people, including researchers, legislators, water system operators, land use planners, and government officials. Governor John Lynch spoke to the attendees about the importance of New Hampshire's water resources. Seven state legislators were in attendance. The conference theme was Sustainability of New Hampshire's Water Resources in a Developing Landscape. The current knowledge of the quality, quantity and use of water was examined through talks and sessions on the current conditions of New Hampshire's water resources, water demand trends, projected household costs for water, effects of climate change, and the sustainability and management of surface and ground water. The day closed with a panel discussion on the future outlook on the sustainability of our water resources. Evaluations completed by conference participants indicate that the conference has provided useful and relevant information.