

Curriculum Vitae
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(See also <http://www.uvm.edu/~wbowden> and <http://www.uvm.edu/bwrl>)

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Education

- Ph.D. 1982 North Carolina State University, Raleigh, NC
Conducted at Marine Biological Laboratory: 1976-1982
Research Area: biogeochemistry of nitrogen in coastal ecosystems
- M.S. 1976 North Carolina State University, Raleigh, NC
Research Area: microbial numbers and biomass in aquatic ecosystems
- B.S. 1973 University of Georgia, Athens, GA.
Majors: Zoology and Chemistry

Experience

2012 to present, *Director*, Lake Champlain Sea Grant program. Manage and develop resources for research, education and outreach relevant to the mission of the National Sea Grant Organization. The Director of the Lake Champlain Sea Grant program is a de facto member of the Lake Champlain Basin Program Steering Committee.

2004-12/2015- Present, *Member* and 2010-12, *Chair*, Technical Advisory Committee for the Lake Champlain Basin Program. Manage a committee of technical experts from two state and one province (Quebec) and provide advice about technical issues and needs relevant to management of the resources in the Lake Champlain basin. The Chair of the Technical Advisory Committee is a de facto member of the Lake Champlain Executive and Steering Committees.

2008-present, *Director* and *Principal Investigator*, Theme 1, Northeastern States Research Collaborative, Rubenstein School of Environment and Natural Resources, Burlington, Vermont. Manage an interdisciplinary research program on the integration of resource management and socio-economic concerns in the northern forests of the New England region.

2008-present, *Senior Science Advisor*, Vermont National Science Foundation Experimental Program to Stimulate Competitive Research (EPSCoR) Program. Provide overall guidance on the science themes and directions.

2004-present, *Director*, Vermont Water Resources and Lake Study Center, Rubenstein School of Environment and Natural Resources, Burlington, Vermont. Manage and develop resources relevant to water resources of the state of Vermont and the Lake Champlain region.

2002-present, *Robert & Genevieve Patrick Professor of Watershed Science & Planning*, School of Natural Resources, Burlington, Vermont. Provide leadership in teaching, research and community service, focused on management of natural resources through an approach to watershed management that integrates environmental, social, and economic considerations and approaches.

1997-2002, *Programme Leader*, Integrated Catchment Management Programme, Landcare Research, Lincoln, New Zealand. Provide overall science leadership for a national research program involving approximately 40 research scientists and collaborators focused on integrated management of land and water resources in regional-scale catchments. Manage collaborative subcontracts with four other national laboratories. Maintain communication and collaboration with key government and industry stakeholders. Report to key managers within the company and to the New Zealand Foundation for Research, Science & Technology.

1997-2002, *Team Leader*, Catchment and Biospheric Processes, Landcare Research, Lincoln, New Zealand. Provide direct human resources support and guidance for a team of 15 science staff. Identify and develop consulting opportunities to minimize the un-funded time of team members. Identify career training and development opportunities. Conduct annual performance appraisals and recommend merit increases and bonuses.

1992-1997, *Associate Professor (Tenured) and Curriculum Coordinator*, Water Resources Management, Department of Natural Resources, UNH, Durham, NH. Taught a General Education course in freshwater resources and upper class courses in Wetland Resources Management and Field Wetland Ecology. Lead Senior Research Projects on alternate years. Team taught an introductory course for Natural Resources department majors. Supervised, on demand, independent study and senior thesis projects. Developed independent research programs focussed on various aspects of land and water management.

1993-1994, *Visiting Scientist*, Landcare Research, Lincoln, New Zealand. Sabbatical leave. Conducted a study of hillslope flow processes in a native tussock grassland, wetland, and stream system on the South Island (Glendhu Forest).

1987-1992, *Assistant Professor and Curriculum Coordinator*, Water Resources Management, Department of Natural Resources, University of New Hampshire, Durham, NH. As for 1992-1997.

1987-1989, *Director and Advisor*, Hubbard Brook Research Experiences for Undergraduates Program. Directed a summer program for 10 undergraduate students who worked on research projects at the Hubbard Brook Experimental Forest.

1984-1986, *Lecturer in Water Resources*, School of Forestry and Environmental Studies, Yale University, New Haven, CT. Taught a graduate student course in hydrology and water resources management.

1982-1984, *Associate in Research (Post-Doctoral Fellow)*, School of Forestry and Environmental Studies, Yale University, New Haven, CT. Effect of whole-tree harvesting on gaseous nitrogen emissions from soils. With Dr. Herbert Bormann.

1979-1982, *Graduate Research Associate*, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA. Nitrogen cycling in a freshwater tidal wetland. With Dr. John E. Hobbie.

1973-1978, *Project Consultant or Research Assistant*:

Boston University Marine Program, Woods Hole, MA

The Ecosystems Center, MBL, Woods Hole, MA

Water Resources Research Institute, Raleigh, NC

Sea Grant Program, NCSU, Raleigh, NC

S.E. Fish and Game Statistics Project, NCSU, Raleigh, NC

Synergistic Activities

2013 to present, *Member*, Advisory Board, Polar Geospatial Center, University of Minnesota, St. Paul

2011 to present, *Member*, Toolik Field Station Advisory Board and Toolik Environmental Data Center Advisory Committee, University of Alaska - Fairbanks

2009 to present, *Chair*, Domain Science, Education, and Communication Committee, Arctic Domain (D-18), National Environmental Observatory Network.

2012 to 2016, *Senior Science Advisor* and *co-PI*, Northeastern Water Resources Network project. Vermont ESPCoR. Provide overall science advising and leadership for a proposed multi-state project (Vermont, Rhode Island, and Delaware) to integrate an advance optical sensor network with research on end user uptake of new forms of environmental monitoring data.

2011 to 2017, *Member*, NSF Search for Arctic Change (SEARCH) Science Steering Committee.

2011 to 2016, *Senior Science Advisor*, Regional Adaptation to Climate Change. Vermont ESPCoR. Provide overall science advising and leadership to integrate research on lake, watershed, and social research focused on climate change in the Lake Champlain basin.

2008 to 2011, *Senior Science Advisor*, Complex Systems initiative. Vermont ESPCoR. Provide overall science advising and leadership to integrate research on lake, watershed, and social research focused on climate change in the Lake Champlain basin.

2010 to 2011, *co-Guest Editor*, Special issue of the New Zealand Journal of Marine and Freshwater Science dedicated to a collection of research articles on integrated catchment management.

2009 to 2010, *Member*, Understanding the Arctic, National Science Foundation Task Force.

2008-2010, *Science co-Leader*, Watershed Science and Hydrology, Vermont ESPCoR Complex Systems research project. Lead one of three science areas focused on integrating research on ecosystem processes with research on innovative complex systems modeling techniques.

2008 to present, *Lead-PI*, NSF Changing Seasonality in Arctic Stream Networks project. This collaborative and integrated research project includes approximately 7 researchers at 3 independent institutions. Served in 2010 as the co-organizer and host for a national workshop of ~25 collaborating scientists working in NSF's Changing Seasonality in the Arctic research program.

2008 to present, *Lead-PI*, Arctic Systems Science Thermokarst Project. This collaborative and integrated research project includes 25 researchers and 12 independent institutions across the US and including Canada.

2008 to present, *Co-PI and Coordinator*, Arctic Long-Term Ecological Research Program, Streams Component. This collaborative and integrated research project includes approximately a dozen researchers at 5 independent institutions across the US.

2008 to present, *Contributor and Chair*, Stream Environmental Observatory Network experiment development team.

2007-2008, *Contributor*, National Environmental Observatory Network, Aquatic Sensor Array Team.

2006 to 2009, *Co-PI*, Consortium of University Scientist for the Advancement of Hydrologic Sciences, Hydrologic Measurement Facility working group.

2005 to present, *Co-Founder and Director*, Joint University of Vermont and Vermont Agency of Natural Resources research program on river corridor management.

2004-2012 *Member and Chair* (2010-2012), Technical Advisory Committee, Lake Champlain Basin Program. Cha automatic membership in the Lake Champlain Basin Program Steering Committee and Executive Committee.

2004, *Co-Developer* of UNESCO Hydrology for Environment Life and Policy (HELP) Basin Program for the Lake Champlain Basin, USA.

2001-2002, *Charter Member and Developer* of UNESCO Hydrology for Environment Life and Policy (HELP) Basin Program for the Motueka River and Tasman Bay, New Zealand.

2000-2002, *Founding Member and Organizer*, the Cooperative Research Group for Integrated Catchment Management. An ad-hoc, national coordinating group for interdisciplinary research on integrated environmental management in New Zealand.

1989, *Coordinator*, Department of Natural Resources, University of New Hampshire, Durham, NH. Led an initiative to establish the Ph.D. program in Natural Resources Management.

1987-1997, *Curriculum Coordinator*, Department of Natural Resources, University of New Hampshire, Durham, NH. Established a new undergraduate major and later M.S. in Water Resources Management.

1987-1989, *Director and Advisor*, Hubbard Brook Research Experiences for Undergraduates Program.

Honors and Awards

Kroepsch-Maurice Teaching Award. Nominated but not selected. 2016.

Vermont Transportation Research Center annual meeting, Best Poster presentation (with J. Bartlett and M. Watzin), 2009 and 2010.

Kroepsch-Maurice Teaching Award. Nominated but could not accept due to time conflicts to prepare required materials. 2008.

North American Benthological Society annual meeting. Best Poster presentation (with N. Morse), 2004.

Royal Society of New Zealand. ISAT collaborative initiative funding. 2001.

New Zealand Hydrological Society. Best presentation on a management issue. 2000.

New Zealand Ministry for Research, Science & Technology. Travel award. 2000.

Marion and Jasper Whiting Foundation. Sabbatical travel award. 1993.

Distinguished Teaching Award, Department of Natural Resources. 1993.

Outstanding Assistant Professor Award, University of New Hampshire. 1991.

Teacher of the Year Award, Department of Forest Resources. 1989.

NSF Doctoral Dissertation Grant. 1978-1980.

Awards while at the Ecosystems Center, MBL, Woods Hole, MA.

Year-in-Science Student Program. 1976-1982

Robert Sterling Clark Foundation Fellowship. 1976-1977.

Jessie Smith Noyes Foundation Fellowship. 1976-1982.

Phi Kappa Phi, University of Georgia. 1973.

Graduated cum laude, University of Georgia. 1973.

Phi Eta Sigma, freshman honor society, University of Georgia. 1969.

Other Appointments

Adjunct Professor, Department of Natural Resources, University of New Hampshire (2001 - 2003)

Water Steward, in the Water Stewards Network (2002 to present)

Professional society memberships

Member, American Association for the Advancement of Science

Member, American Geophysical Union

Member, Society for Freshwater Science (formerly North American Benthological Society)

Member, Phi Kappa Phi, Honor Society

Member, Xi Sigma Pi, Alpha Epsilon Chapter, Forestry Honor Society

Teaching interests and experience

Courses taught

Ecological Risk (Watershed) Assessment (ENSC 202, UVM, Spring 2003-present): A senior capstone course in the UVM Environmental Sciences major focusing on the science underpinning resource management at the watershed scale.

Stream Ecology, (NR280, UVM, Fall 2011-present): An advanced undergraduate and graduate course in basic stream ecology including hydrology, biogeochemistry, and biology in the context of resource management.

Aquatic Ecology and Watershed Science Seminar, (NR385, UVM, Fall and Spring, 2010-2011): A graduate seminar course for students in the AEWS graduate concentration.

Ecological Stoichiometry (ENSC 285, UVM, Fall 2004, 2006, 2008, 2010): A senior-to-graduate level seminar focused on recent research on interactions between biogeochemical dynamics and food webs in an ecosystem context.

Fate and Transport of Pollutants (ENSC 160, UVM, Fall 2010). A junior-level course required in the UVM Environmental Sciences major, focusing on quantitative methods to estimate dynamics of pollutants in the environment. Section of lectures on water.

Environmental Hydrology (NR285, with Beverley Wemple, Geography): A senior-to-graduate level, project-based, quantitative course designed to provide students with an interest in natural resources management with the essential theory and technical knowledge they need to communicate effectively with hydrologic engineers and consultants.

Geomorphic Assessment of Stormwater Impacted Urban Streams (ESNC 285B, Spring 2005): A senior-to-graduate level, project based, service learning course supported by the Vermont Agency of Natural Resources, Department of Environmental Conservation, River Management Section. The seminar was focussed on development of a benchmark database of stream geomorphic metrics for stormwater impacted streams in Chittenden County Vermont and improvement of the protocols developed by ANR/DEC to better assess and monitor these streams. The seminar was a precursor to a field campaign conducted in the summer of 2005 to quantify the stream geomorphic metrics.

Stream Ecosystem Modeling (ENSC 285, UVM, Fall 2003): A senior-to-graduate level seminar focused on the biogeochemistry of whole-stream ecosystems at the reach scale.

Urban Stormwater Management (ENSC 285, UVM, Fall 2003): A senior-to-graduate level seminar focused on modeling stormwater dynamics in traditional and green-engineered urban and sub-urban systems.

Urban Watershed Management (NR 285, UVM, Fall 2002): A senior-to-graduate level seminar focused on urban sprawl and its impacts on water resources.

Independent studies (UNH, as required): Individual senior research projects.

Critical Analysis in Water Resources Management (UNH, 1996-1997): A senior and graduate level seminar focused on readings and analysis of topical water resource management issues.

Land use seminar (UNH, 1988-1989, 1992): A senior ‘cap-stone’ course focused on a real and current resource management problem approached as a group research project.

Wetlands Resources Management and Wetland Field Ecology (UNH, annually from 1989 to 1997): Two linked courses for seniors, graduate students, and continuing education professionals. Focusing on wetland types, identification, ecology, and management. The field course focused on practical skills needed to assess the ecology of different wetland types.

Water Resources Management (UNH annually from 1987-1997): The water cycle, nutrient cycles, water policy and regulation, and water management issues for both majors in natural resources and non-majors.

Catchment Hydrology (Yale University 1985-1986): Water cycle and water processes for graduate students in the Yale University School of Forestry and Environmental Studies graduate program.

Teaching record

| <u>Year</u> | <u>Course</u> | <u>Content</u> | <u>Credits</u> | <u>Students</u> |
|-------------|---------------|----------------------------------|----------------|-----------------|
| 2017 | ENSC 202 | Ecological Risk Assessment | 4 | 46 |
| 2016 | NR 280 | Stream Ecology (field intensive) | 4 | 18 |
| 2016 | ENSC 202 | Ecological Risk Assessment | 3+1 | 40 |
| 2015 | NR 280 | Stream Ecology (field intensive) | 4 | 16 |
| 2015 | ENSC 202 | Ecological Risk Assessment | 3 | 42 |

| | | | | |
|------|--------------|--------------------------------------|-----|-----|
| 2014 | NR 280 | Stream Ecology (field intensive) | 4 | 14 |
| 2014 | ENSC 202 | Ecological Risk Assessment | 3 | 41 |
| 2013 | NR 280 | Stream Ecology (field intensive) | 4 | 28 |
| 2012 | NR 280 | Stream Ecology (field intensive) | 4 | 20 |
| 2012 | ENSC 202 | Ecological Risk Assessment | 3 | 44 |
| 2011 | NR 280 | Stream Ecology | 4 | 30 |
| 2011 | ENSC 202 | Ecological Risk Assessment | 3 | 48 |
| 2010 | ENSC 106 | Fate and Transport (Co-taught) | 4 | 75 |
| 2010 | NR 285 | Ecological Stoichiometry | 2 | 8 |
| 2010 | Spring | Sabbatical semester | NA | NA |
| 2009 | Fall | Sabbatical semester | NA | NA |
| 2008 | NR385 | AEWS Seminar | 1 | Var |
| 2008 | ENSC 202 | Ecological Risk Assessment | 3 | 27 |
| 2007 | NR385 | AEWS Seminar | 1 | Var |
| 2007 | NR285 | Environmental Hydrology (Co-taught) | 4 | 16 |
| 2007 | ENSC 202 | Ecological Risk Assessment | 3 | 28 |
| 2006 | ENSC 285 | Ecological Stoichiometry | 2 | 10 |
| | | Urban Stream Geomorphic | | |
| 2005 | ENSC 285 | Assessment | 2 | 8 |
| 2005 | ENSC 202 | Ecological Risk Assessment | 3 | 22 |
| 2004 | ENSC 285 | Ecological Stoichiometry | 2 | 8 |
| 2004 | ENSC 202 | Ecological Risk Assessment | 3 | 36 |
| 2003 | ENSC 285 | Stream Ecosystem Modeling | 2 | 3 |
| 2003 | ENSC 285 | Urban Stormwater Modeling | 2 | 4 |
| 2003 | NR 285 | Urban Watershed Management | 2 | 15 |
| 1997 | WaRM 700 | Critical Analysis of WaRM Literature | 2 | 14 |
| 1997 | WaRM 504 | Freshwater Resources | 4 | 74 |
| 1996 | NR 993 | “Hot Topics” Graduate Seminar | 1 | 7 |
| 1996 | WaRM 713/813 | Field Wetland Ecology | 3 | 9 |
| 1996 | WaRM 711/811 | Wetland Resources Management | 3 | 23 |
| 1996 | WaRM 700 | Critical Analysis of WaRM Literature | 2 | 9 |
| 1996 | WaRM 504 | Freshwater Resources | 4 | 123 |
| 1995 | WaRM 711/811 | Wetland Resources Management | 3 | 31 |
| 1993 | WaRM 504 | Freshwater Resources | 4 | 159 |
| 1992 | NR 775 | Senior Team Project | Var | 5 |
| 1992 | NR 401 | Natural resources perspectives | 4 | 75 |
| 1992 | WaRM 713/813 | Field wetland ecology | 2 | 17 |
| 1992 | WaRM 711/811 | Wetland resources management | 3 | 29 |
| 1992 | WaRM 504 | Freshwater Resources | 4 | 163 |
| 1991 | NR 401 | Natural resources perspectives | 4 | 67 |
| 1991 | WaRM 713/813 | Field wetland ecology | 2 | 13 |
| 1991 | WaRM 711/811 | Wetland resources management | 3 | 27 |
| 1991 | WaRM 504 | Freshwater Resources | 4 | 155 |

| | | | | |
|------|--------------|-----------------------------------|-----|-----|
| 1990 | NR 401 | Natural resources perspectives | 4 | 60 |
| 1990 | WaRM 713/813 | Field wetland ecology | 2 | 13 |
| 1990 | WaRM 711/811 | Wetland resources management | 3 | 24 |
| 1990 | WaRM 716/816 | Wetland delineation (Co-taught) | 4 | 35 |
| 1990 | WaRM 610 | Independent study | Var | 2 |
| 1990 | WaRM 594 | Freshwater resources | 4 | 160 |
| 1989 | WaRM 611 | Wetland resources management | 4 | 25 |
| 1989 | WaRM 610 | Independent study | Var | 2 |
| 1989 | WaRM 775 | Land use seminar | 2 | 6 |
| 1989 | WaRM 504 | Freshwater resources | 4 | 120 |
| 1988 | WaRM 775 | Land use seminar | 2 | 6 |
| 1988 | WaRM 603 | Watershed management | 4 | 12 |
| 1988 | FORS 504 | Freshwater resources | 4 | 145 |
| 1988 | FORS 755 | Regional silviculture (Co-taught) | 2 | 9 |
| 1987 | FORS 603 | Watershed management | 4 | 11 |
| 1987 | FORS 504 | Freshwater resources | 4 | 125 |
| 1986 | FES 543b | Water resource management | 4 | 24 |
| 1985 | FES 543b | Water resource management | 4 | 12 |

Undergraduate advisees by year

| | | | |
|-----------|---|----|---|
| 2017 | - | 43 | |
| 2016 | - | 42 | |
| 2015 | - | 30 | |
| 2014 | - | 29 | |
| 2013 | - | 28 | |
| 2012 | - | 28 | |
| 2011 | - | 22 | |
| 2010 | - | 7 | Sabbatical year, graduate students only |
| 2009 | - | 7 | Sabbatical year, graduate students only |
| 2008 | - | 30 | |
| 2007 | - | 23 | |
| 2006 | - | 23 | |
| 2005 | - | 16 | |
| 2004 | - | 14 | |
| 2003 | - | 33 | Including A. McIntosh advisees, during his sabbatical leave |
| 1997-2002 | - | Na | Overseas, New Zealand, non-academic appointment |
| 1997 | - | 27 | |
| 1996 | - | 27 | |
| 1995 | - | 50 | Including W. McDowell advisees, during his sabbatical leave |
| 1994 | - | Na | Sabbatical year |
| 1993 | - | 25 | |
| 1992 | - | 27 | |

| | | |
|------|---|----|
| 1991 | - | 20 |
| 1990 | - | 19 |
| 1989 | - | 10 |
| 1988 | - | 6 |
| 1987 | - | 3 |

Research interests and experience

Note: Additional information on these projects can be found at my personal web sites:

<http://www.uvm.edu/~wbowden> See the 'Research' link
<http://www.uvm.edu/bwrl> Bowden Watershed Research Lab

General

Interactions between hydrological and biogeochemical processes, especially as these processes are influenced by land use practices and land cover characteristics at catchment scales. Uptake and use of science knowledge by resource managers, policy makers, and community stakeholders.

Active and Recent Research Areas

Changing Seasonality in the Arctic System: This is a new suite of 3 major projects funded by the Office of Polar Programs at the National Science Foundation that build on my 20+ years of experience in arctic research (see below). In 2008 I initiated a collaborative project with colleagues across the United States and in Canada to take a systems approach to quantify the environmental consequences of thawing permafrost on that structure and function of the arctic landscape. This project is focused on the formation of thermokarst failure features (a physical disturbance to the soil that can occur when frozen ground thaws) on hydrological, biogeochemical, microbial, soil, vegetation, geomorphological, and social processes in the arctic. I am the lead Principal Investigator on this project, which includes 14 other collaborating PIs and 12 graduate students, technicians and post-doctoral researchers. See <http://thermokarst.psu.edu/> for additional details. Beginning 2008 I worked with a group of 10 other collaborators to investigate the ecological consequences of a highly unusual tundra wild fire. Until recently wildfires were virtually unheard of in the tundra biome. The Anaktuvuk Burn that occurred in late 2007 burned over 1000 square kilometers near the Toolik Field Station, our research base, and is the largest arctic tundra fire on record. We hypothesize that fire may become a more important component of the arctic landscape in a future, warmer arctic landscape and are using the Anaktuvuk Burn as a natural laboratory to understand how fire affects the tundra environment. Finally, in 2009 I initiated a project with 2 other colleagues to examine the effects of changing seasonality on stream nutrient and material processing. Warming in the arctic is extending the snow- and frost-free seasons in the spring and autumn. However, plants continue to bloom and senesce on the basis of sunlight (day length) cues. Thus there is growing asynchrony in demand for nutrients and plants and production of nutrients by soil microbes that has important consequences for the way that nutrients and carbon are processed in arctic streams. See <http://water.engr.psu.edu/csasn/> for additional details.

Scaling ecosystem processes in river networks: This is a collaborative research project funding by the NSF Macrosystems Biology program. The project is designed to explore how small scale ecological experiments be applied to understand structure and function of large, regional ecological systems. Our goal is to develop new insights regarding how best to extrapolate small-scale experimental measurements used by field researchers to large-scale river networks. Specifically, we are quantifying whether patch-scale measurements (at 10s of cm) of ecosystem rates over- or under-estimate reach-scale (100 – 1000 m) rates in streams. We are examining abiotic variables that may drive scaling of reach- to network-scale measures of ecosystem function and exploring how ecosystem rates and the effects of consumers vary among a suite of biomes across the United States. This project is designed to provide information to the National Ecological Observatory Network initiative. I am one of five co-PIs on this project and Leader of the Arctic group. More information on this research program can be found at <http://www.k-state.edu/ecoforecasting/SCALER/index.html>.

Influences of hyporheic dynamics on nutrient processing in arctic tundra streams: The key findings from this research are that hyporheic processes are of fundamental importance to clear understanding of C, N, and P turnover in arctic tundra stream; a finding that was unexpected. In August 2003 I received a new, multi-year award from NSF, with co-PIs from Utah State University (Dr. Michael Gooseff) and Boise State University (Drs. Jim McNamara and John Bradford) to study the potential impacts of climate change in the Arctic on stream hyporheic dynamics. Additional information on this and related projects can be found at <http://ecosystems.mbl.edu/ARC/>

Linkages between benthic primary production and nitrogen cycling in Arctic tundra streams, North Slope, Alaska: A contribution to a large, inter-disciplinary program to better understand the basic ecosystem ecology of Arctic tundra landscapes, through an investigation of “bottom-up and top-down” controls on ecosystem processing. Since 1987 my research has contributed to a better understanding of Arctic streams ecosystems. The key findings of this on-going research are that benthic primary production is fundamental controller of N and P cycling in these streams and that the balance of N and P inputs has profound influences on the structure and function of the benthic autotrophic community structure and function. More information on this research program can be found at <http://ecosystems.mbl.edu/ARC/>

Vermont Flow Monitoring Project: In 2004 the Water Resources Board created a stakeholder-driven process to develop a scientific rationale for the management of stormwater in Vermont. The group concluded that stream flow data alone could be used to target actions to reduce stormwater pollution. Based on this decision, the Vermont Agency of Natural Resources (VTANR) developed Total Maximum Daily Load (TMDL) analyses for some stormwater impaired streams in Vermont, which have subsequently been accepted by the USEPA. The original TMDL analyses were based on synthetic stream flow values produced by Tetrattech using the P8 model. Although the model was partially validated using stream flow data from selected streams in the Vermont and New York area, the lack of historic data for the specific streams that VTANR has identified as impaired by stormwater presents a serious challenge to validate any hydrologic model or to select hydrologic targets. In addition, VTANR realized that without “benchmark” data providing a basis for comparison, future monitoring efforts to assess the effectiveness of mitigation efforts would be difficult. Thus, beginning in 2005 VTANR sought to address this lack of data and has contracted with my lab to monitor precipitation and stream flow in stormwater-impaired and attainment streams through the state. This management objective is leading to interesting new research on simple indicators of hydrologic alteration to small urban streams in Vermont. For additional information see <http://www.uvm.edu/bwrl/vermontflow/>.

Impacts of Transportation Infrastructure on Stream Ecosystem: Transportation infrastructure is a major source of stormwater runoff that can alter hydrology and contribute significant loading of nutrients, sediment, and other pollutants to surface waters. These increased loads frequently lead to impaired receiving waters, as is the case for streams throughout the Lake Champlain basin, as well as the Lake itself. We have selected six watersheds that represent the range of road types (gravel and paved) and road densities (rural, suburban, and urban) present in Chittenden County, Vermont and have characterized the road networks for each watershed using GIS (geographic information systems) analysis. Monitoring stations in each watershed were constructed and instrumented to measure discharge and water quality parameters continuously from spring through early winter. Storm event composite samples and monthly water chemistry grab samples have been collected and analyzed for total nutrients, chloride, and total suspended sediments. Preliminary results from two field seasons of monitoring suggest that road type and road density may be closely linked with the level of impairment in each watershed. For additional information on this project see <http://www.uvm.edu/bwrl/transportation/>.

Water quality monitoring in the National Park Service Northeastern Temperate Network: The Northeast Temperate Network (NETN) was established by the National Park Service to monitor ecological conditions in eleven parks located throughout seven northeastern states. The vital signs include physical,

chemical, and biogeochemical indicators intended to represent overall health or condition of park resources. My has been monitoring water quality within the network since 2006. The majority of that work has consisted of implementing the network's stream and pond monitoring protocol. More recently we have included a wetland monitoring component. These monitoring efforts have lead to a research interest in the importance mercury accumulation and methylation in vernal pools, a critical habitat for amphibian species. The data collected for NETN is used in a multitude of ways to inform park planning decisions, evaluate the effectiveness of management decisions or restoration efforts, provide early warning of potential threats, and promote public understanding of park resources. Addition information on my lab's contribution to this project can be found at <http://www.uvm.edu/bwrl/npsnetwork/>. The National Park Service web site for NETN is at <http://science.nature.nps.gov/im/units/netn/>.

Stormwater management utilizing low-impact designs in urbanizing landscapes: In 2003 I initiated a research program with several colleagues from the Rubenstein School of Environment and Natural Resource and the Gund Institute for Ecological Economics that is focused on stormwater management issues that are currently a critical challenge to resource management and economic development in Vermont. The "Redesigning the American Neighborhood" (RAN) is a collaboration of several different projects that are designed to assess public attitudes and understanding of stormwater processes and issues, monitor effects of stormwater on suburban streams, and demonstrate the utility of alternative low-impact stormwater management options. This program has already drawn considerable local attention and provides information that is essential to address these pressing issues. The project has developed strong collaborations with the City of South Burlington, Vermont and with the Vermont Agency of Natural Resources, Department of Environmental Conservation. More information about the RAN program can be found at <http://www.uvm.edu/~ran>.

Previous Research Experience

Integrated management of land and water resources in complex catchments: Until 2002 I was the Program Leader this suite of projects focused on research relevant to adaptive management of land and water resources in urban and intensively-utilized rural catchments. The core research focuses on surface-water/groundwater interactions, land use impacts on river water quality, characterization of riparian structure and function, catchment scale hydrological modeling, marine biogeochemical processes, and development of publicly-accessible knowledge bases linked to GIS databases and Web interfaces. Information about the program is disseminated via an interactive web site (<http://icm.landcare.cri.nz>). I continue to maintain a working relationship with my former New Zealand colleagues and to identify opportunities for collaborative projects.

Flow path dynamics at hillslope to catchment scales: Hydrodynamics of runoff processes in landscapes under different land use. Recent research has focused on storm event hydrodynamics in tussock grasslands with native cover compared with those afforested with *Radiata* pine and on runoff processes in pasture land that may be subject to municipal development or modified farm management.

Environmental impacts of applying municipal biosolids in forest lands (New England and New Zealand): Land application of biosolids (solid wastes from municipal and industrial waster water treatment) has the potential to be an inexpensive alternative to traditional engineered waste treatment options and can substantially improve soil moisture and nutrient qualities with economic benefits in farming and forestry applications. However, inappropriate applications can lead to environmental degradation and potential health risks. I have conducted research on the effects of biosolid loading rates on nutrient uptake by vegetation uptake and loss through soil leaching, in both the Northeast, USA and in New Zealand. The key finding from this research was that mechanisms that limit NO₃ leaching losses will typically tend to limit the losses of other solutes that might be of concern in surface and ground water. With careful attention to the nature of the material being applied and the characteristics of the target environment, land

application of biosolids can be a safe and economical alternative.

The Lotic Intersite Nitrogen Experiment (LINX): comparative nitrogen cycling in North American headwater streams: A collaborative project to compare N cycling in selected North American headwater streams and to test a number of key hypotheses about the influences of stream metabolism and hydrologic function on N cycling in streams. A key finding was that biogeochemical cycling of nitrogen was strongly linked to discharge rates and that nitrification was a surprisingly responsive component of the nitrogen cycle in these headwater streams. See <http://sparc.ecology.uga.edu/webdocs/linx/>

Impacts of differing riparian zone geomorphology on nitrogen fluxes from a tropical rain forest to headwater streams: An investigation of N flux through the riparian zones of two tropical streams with distinctly different riparian flow paths. The key finding was that the rate, mode, and location of N processing was highly dependent on the geomorphology or the riparian zone, which in turn controlled hydrological flow paths.

Impacts of whole-tree harvesting on N₂O losses from a northern hardwood forest: Impacts of new forest harvesting method on losses of volatile forms of N from a forest ecosystem type that was known to be especially prone to soluble N loss (primarily as NO₃) in response to disturbance. The project identified a key link between hydrological transport and volatilization of N₂O to the atmosphere.

Nitrogen cycling in tidal freshwater wetland: Influence of a unique and poorly understood coastal wetland type on water quality (N level) in a river draining an urbanizing watershed. The investigation focussed on N turnover in wetland sediments, using ¹⁵N isotope dilution techniques. Major fluxes and stores of N in the wetland ecosystem were examined and quantified. Key interactions with the riverine system were identified.

Research funding

Research funding overview: Since coming to the University of Vermont I have personally generated or managed just over \$19,000,000 of direct research funding. This does not include the value of matching funding or of collaborative awards that I initiated but that were managed by others. In my career I have generated or managed just under \$35,000,000 in research funding.

Research funding – current

1. *NSF/DEB/LTER/LTER:* The Role of Biogeochemical and Community Openness in Governing Arctic Ecosystem Response to Climate Change and Disturbance. Award: NSF/DEB #1637459, \$1,004,000 (Vermont portion only) March 2017 – Feb 2023. Co-PI and Streams Research Coordinator.

Research funding – managed

3. *Lake Champlain Sea Grant Program.* In mid-2018 the National Sea Grant College Program within the National Oceanic and Atmospheric Administration designated the LCSG as a Sea Grant Institute and provided a substantial increase in annual base funding to \$1,000,000/year, which is to be matched 1:2 (Non-Federal:Federal). The annual value of this program is now \$1,500,000/year. The LSCG program combines research, outreach and education about Lake Champlain and its coastal environment. The program is a collaboration between Vermont and New York. Director.
2. *Vermont Water Resources and Lake Studies Center.* Approximately \$92,000 annually

from the U.S. Geological Survey, which has to be matched 2:1 (Non-Federal:Federal). The annual value of this program is about \$276,000. The Vermont Water Center is a competitive grants program that – with partners throughout the state – supports research on water resources in Vermont. Director.

1. *Northeastern States Research Cooperative*. Theme 1. Sustaining productive forest communities: Balancing ecological, social, and economic considerations. This program sunsetted in 2016. However, we were allocated \$45,000 in 2017-18 to generate a summary report of the accomplishments of the NSRC over its 18-year history. That report has been completed. In addition, there are still several open projects that need to be managed to completion by 2020. Historically, Theme 1 of the NSRC managed approximately \$200,000 to \$700,000 annually from the U.S. Forest Service. The NSRC was a competitive grants program that supported cross-disciplinary, collaborative research in the Northern Forest — a 26-million acre working landscape that is home to over a million residents and stretches from eastern Maine through New Hampshire and Vermont and into northern New York. A central component of the program has been the importance of the Northern Forest to society and the need for research activities to have relevance and benefit to the people who live within its boundaries, work with its resources, use its products, visit it, and care about it. Co-Principal Investigator and Director.

Research funding – pending or planned

2. Department of Energy – Arctic Natural Sciences. Spatial and temporal patterns of nutrients and DOC reveal interactions among hydrology and biogeochemistry in Arctic stream networks. In review, 2018.
1. NSF, Department of Environmental Biology – Collaborative Research: Interactions of the microbial iron and methane cycles in the tundra ecosystem. In Review, 2018.

Research funding – received and successfully completed at UVM

59. NSF EPSCoR Track 2 Award IIA-1330446. Collaborative Research: North East Water Resources Network. \$2,000,000. 2013 – 2016. Co-PI.
58. NSF Macrosystems Biology EF-1065682, Collaborative Research: Macrosystems - Scaling of Basic Ecosystem Processing Rates and Consumer Influences in Streams from Centimeters to a Continent. \$251,822 UVM portion, \$3.5 million overall. 2012-2017. Co-PI and Leader of Arctic group.
57. NSF-OPP-ARC-0806394, How will increased thermokarst activity affect aquatic resources on the foothills of the North Slope, Alaska?, 2008-2014, \$467,193. Part of a \$5 million collaborative project for which I was the overall Principal Investigator.
56. NSF/DEB/LTER-1026843, Arctic LTER: Climate Change and Changing Disturbance Regimes In Arctic Landscapes, \$943,740 UVM only, \$5,640,000 overall, National Science Foundation, 2011-2017. Co-PI and Streams Theme Leader.

55. 2012VT69B, Development of monitoring buoy system for lake studies, \$74,463 with cost-share. US Geological Survey (Vermont Water Resources and Lake Studies Center). 2012-2013
54. 2011VT58B, Use of Acoustic Doppler Current Profiler data to estimate sediment and total phosphorus loads to Lake Champlain from the Rock River, \$60,000 with cost-share from US Geological Survey (Vermont Water Resources and Lake Studies Center, 2011-2012) plus \$21,360 from the Vermont Agency of Natural Resources (2011-2013). Co-PI with Jamie Shanley, USGS.
53. NSF-ARC-0902106, How does changing seasonality affect the capacity of arctic stream networks to influence nutrient fluxes from the landscape to the ocean?, \$549,581. Part of a \$1,263,769 collaborative project. 2009-2013. Principal Investigator.
52. Vermont ANR, Stream Flow Monitoring Project, \$224,194, 2006-2013, PI.
51. University of Vermont Transportation Center, Effects of transportation networks on water quality and freshwater ecosystem integrity, 2008-2011, \$250,000. Co-Principle Investigator.
50. NPS/NETN/I&M, Evaluation and Implementation of the Northeast Temperate Network Water Quality and Quantity Monitoring Protocol, May 2007 – Dec 2011, \$273,368, PI.
49. NSF-DEB-0423385; “The Arctic LTER Project: Regional Variation in Ecosystem Processes and Landscape Linkages”; 1/15/2005-11/30/2010; \$4,920,000 (Marine Biological Laboratory; J Hobbie PI, Bowden one of 4 co-PIs). A no-cost extension to 11/30/2011 is expected. This project has been recommended for renewal from 2011-2017.
48. NPS/ARCN/I&M, Thermokarst distribution and characterization in the National Park Service Arctic Network (Phase 1), May 2007 – Dec 2009, \$145,084, PI.
47. NPS/ARCN/I&M, Thermokarst distribution and characterization in the National Park Service Arctic Network (Phase 1), May 2006 – Dec 2009, \$54,729 + \$12,000 supplement, PI.
46. NPS/ARCN/I&M, Aquatic Biodiversity, Community Composition and Ecosystem Processes in Gates of the Arctic Park and Preserve and the Noatak National Preserve (Phase 3), May 2007 – Dec 2009, \$141,644, PI.
45. NPS/ARCN/I&M, Aquatic Biodiversity, Community Composition and Ecosystem Processes in Gates of the Arctic Park and Preserve and the Noatak National Preserve (Phase 2), May 2006 – Dec 2009, \$260,713, PI.
44. NPS/ARCN/I&M, Aquatic Biodiversity, Community Composition and Ecosystem Processes in Gates of the Arctic Park and Preserve and the Noatak National Preserve (Phase 1), Co-op agreement J9840050100, May 2005 – Dec 2008, \$224,339, PI.
43. NSF/OPP, Aquatic Ecosystem Responses to Changes in the Environment of an Arctic Drainage Basin, Award #9911278, July 05 – July 07, \$ 4,563,868 (\$53,000/year PI subcontract component only)

42. NSF/DEP, LTER: The Arctic LTER Project: The Future Characteristics of Arctic Communities, Ecosystems, and Landscapes, DEB-9810222, 2005-2010, \$ 4,920,000 (unsupported co-PI)
41. EPA, Impacts of acid rain on form and transport of pollutants in urban stormwater runoff, 2004-2007, \$75,000 (graduate student support only), PI.
40. EPA, Redesigning the America neighborhood: cost-effectiveness of innovative interventions to manage stormwater at different watershed scales, Award X97137901-0, 2006-2008 (Phase 4), \$443,400, Co-PI.
39. EPA, Redesigning the America neighborhood: cost-effectiveness of innovative interventions to manage stormwater at different watershed scales, Award X97137901-0, 2005-2007 (Phase 3), \$396,800, Lead-PI.
38. NSF/OPP, Will climate change affect hyporheic processes in arctic streams? An assessment of interactions among geomorphology, hydrology, and biogeochemistry in Arctic tundra streams, Award OPP-0327440, Sep 03-Jun 07, \$608,709, Lead-PI.
37. EPA, Redesigning the America neighborhood: cost-effectiveness of innovative interventions to manage stormwater at different watershed scales (Phases 1 and 2), Award X98187601-0, \$915,000, 2004-2005, Co-PI.
36. Vermont ANR, River Management Seminar Series and Regional Workshop, 2004-2006, \$35,000, PI.
35. Vermont ANR, Geomorphic Assessment of Storm Water-Impacted Streams in Chittenden County and Developing Seminars to Define Geomorphic-Based River Management as a Component Of Integrated Storm-water Management, 2004-2006, \$93,267, PI.
34. Vermont ANR, Development of an integrated, watershed-scale, planning tool for stormwater management in Vermont, 2004-2006, \$30,755, PI.
33. Vermont ESPCoR, Equipment grant for whole-stream metabolism research. March 2004, \$8,760. Principal Investigator.
32. NSF-Office of Polar Programs, Aquatic Ecosystem Responses to Changes in the Environment of an Arctic Drainage Basin. July 1, 2000 to May 31, 2005. \$3,999,991. Co-Principal investigator. Sub-contract for 1 month

Research funding received and completed at Landcare Research in New Zealand

31. The Royal Society of New Zealand, International Science & Technology Technical Participation Programme, “US-New Zealand collaboration on research relevant to nitrogen cycling in streams”, \$4,000NZ, 2001. Travel support for Dr. Bruce Peterson to visit New Zealand, to develop a collaborative research effort.
30. Landcare Research, Internal Re-investment Funding Programme, “Predicting coastal productivity from remotely-sensed land condition data: a feasibility assessment”, \$30,000NZ, 2001-2002.

29. University of Otago, "Ecosystem consequences of an invader: brown trout in New Zealand streams", subcontract, \$10,000NZ, Associate Investigator. Part of a project (\$218,000NZ total award) from the Royal Society of New Zealand, Marsden Fund.
28. Forest Research, "Land treatment of municipal wastes" (Christchurch City Council and Selwyn Plantation Board project subcontract), \$50,000NZ, 1998-2002. Project Leader. Part of a program funded by the NZ Foundation for Research Science & Technology.
27. National Institute for Water & Atmosphere, "Water quantity and quality in river basins" (Whatawhata project subcontract), \$202,000NZ, 2000-2002. Project Leader. Part of a program funded by the NZ Foundation for Research Science & Technology.
26. New Zealand Foundation for Research Science and Technology, "Integrated management of land and water resources in complex catchments", C09X0014, \$1,629,000NZ, 2000-2002 with contract renewals through 2006. Programme Leader.
25. National Institute for Water & Atmosphere, "Water fluxes and pathways in river basins" (Mahurangi project subcontract), \$202,000NZ, 1998-2000. Project Leader. Part of a program funded by the NZ Foundation for Research Science & Technology.
24. New Zealand Foundation for Research Science and Technology, "Ecosystem processes for catchment management", C09807, \$2,147,000NZ, 1998-2000. Programme Leader. Funding for this program was reorganised in 2000 and renewed for a six year period (to 2006), in two-year contracts.
23. Tasman District Council, "Analysis of stakeholder priorities for research on water resources in the Motueka River catchment", \$2000NZ, 2000. Project director and co-author.
22. Christchurch City Council, "Soils and Geology of the Styx River basin", \$15,700NZ, 2000. Commercial contract delegated to Les Basher (Landcare Research staff and team member).
21. New Zealand Ministry for Research Science & Technology, International Science & Technology Technical Participation Programme, "US-Japanese Joint Seminar on the Hydrology and Biogeochemistry of Forested Catchments", \$5,000NZ, 2000. Invited participant and speaker.

Research funding received and completed at UNH

20. NSF-Office of Polar Programs, "Key connections in arctic aquatic landscapes", NSF-OPP-9615949, \$158,303, 1997-2000. Co-Principal investigator.
19. NSF-Ecosystems, "Nitrogen uptake, retention and cycling in stream ecosystems: An intersite N-15 tracer experiment.", \$141,649 (UNH portion only), 1996-1999 (primary activity in one month in 1997). Co-principal investigator on a multi-site group project.
18. NH Agricultural Experiment Station/Cooperative State Research, "Riparian nitrogen cycling: denitrification versus plant uptake", \$30,000, July 1996 - June 1999. Principal investigator. Withdrew from project after resigning position at UNH to take up position at Landcare Research.

17. NSF-Office of Polar Programs, "Controls of structure and function of aquatic ecosystems in the arctic", NSF OPP-9400722, \$124,500, 1994-1997. Co-Principal investigator.
16. Cooperative State Research Service/National Research Initiatives/Competitive Grants Program, "Riparian influences on water quality from natural and afforested grasslands", \$78,841, October 1993 - September 1995. Principal Investigator.
15. NH Agricultural Experiment Station (Hatch or McIntire/Stennis), "Riparian denitrification as a control on nitrate export before forest harvesting", \$10,000, July 1993 - June 1995. Principal investigator.
14. Marion and Jasper Whiting Foundation, travel supplement award, used during sabbatical leave in 1993-1994 to do research in New Zealand, \$6,500, July 1993-August 1994.
13. Scott Paper Co, Inc., "Assessing potential water quality impacts of creating topsoil with pulp and paper mill residuals", \$80,000, Feb 1990-June 1992. Co-principal investigator. Cooperative agreement with NE-158/H-317.
12. Maine DEP/Sludge Research Advisory Committee, "Mobility of chlorinated organic compounds in forest soil microcosms", \$144,136, April 89 - June 1992. Co-principal investigator. Cooperative agreement with NE-158/H-317.
11. Department of Interior/U.S. Geological Survey, "Land application of municipal sludge in New Hampshire forests: minimizing the risks to groundwater quality". July 1990 to June 1991. (Renewal) Co-principal investigator.
10. Department of Interior/U.S. Geological Survey, "Land application of municipal sludge in New Hampshire forests: minimizing the risks to groundwater quality", \$30,983, 1 July 1989-30 June 1990. Co-principal investigator.
9. Resource Conservation Services Inc., "Forest utilization of wood ash: soil chemical changes and effects on forest vegetation", \$30,000, July 1988-June 1990. Cooperative agreement with NE-158/H-317. Co-principal investigator.
8. Scott Paper Co. Inc., "Mobility of nutrients and heavy metals in forest soil microcosms treated with pulp and paper mill sludge", \$37,300 September 1988-March 1990. Cooperative agreement with NE-158/H-317. Co-principal investigator.
7. NE-158/Hatch-317 Regional CSRS project, "Utilization of sludge on forest and non-agricultural land", Oct 1986 - Sept 1991 (extended to Oct 1992). Co-principal investigator.
6. NSF, "Catastrophic disturbance in a tropical rain forest - impact of the riparian zone on nutrient export", \$150,000, July 1990 to December 1991. Co-principal investigator.
5. NSF, "Experimental studies of nitrogen cycling in tropical stream ecosystems" (BSR 8718395), \$25,674, July 1987-June 1989. Co-principal investigator.

4. NSF, "Research experiences for undergraduates at the Hubbard Brook Experimental Forest", \$39,900, November 1987-August 1989. Project leader.
3. NSF, "Long-term ecological research at the Hubbard Brook Experimental Forest", \$244,359, April 1987 - March 1994. Co-principal investigator
2. NSF, "Ecosystem reactions to disturbance: arctic streams and lakes." \$125,000, March 1991-Feb 1994. Co-principal investigator.
1. NSF, "Ecosystem reactions to disturbance: arctic streams and lakes." \$102,667, March 1988-Feb 1991. Co-principal investigator.

Undergraduate research theses and projects supervised

| <u>Name</u> | <u>Year</u> | <u>Program</u> | <u>Project</u> |
|--------------------|-------------|----------------|--|
| Meghan Christie | 2016 | (REU) | Diel cycling of nutrients in an arctic river |
| Geoffrey Gray-Loeb | 2015 | (REU) | Synoptic sampling of an agricultural watershed in Vermont |
| Ryan Sleeper | 2013 | (Research) | Whole-stream metabolism in arctic streams |
| Genna Waldvogel | 2011 | (REU) | Changing seasonality in nutrient delivery to streams |
| Trevor Gearhart | 2010 | (REU) | Characteristics of riparian vegetation in arctic watersheds |
| Samuel Parker | 2007 | (URECA!) | Invertebrate responses to stream channel evolution |
| Satish Serchan | 2007 | (McNair) | Methods in stream ecohydrology |
| Andrew Duling | 2004 | (REU) | Geomorphic controls on stream suspended sediment loads |
| Nathaniel Morse | 2003 | (REU) | Estimating re-aeration rate from sound pressure level |
| Erin Steiner | 2001 | (REU) | Estimates of oxygen re-aeration rates in Arctic streams |
| Sarah Beck | 2000 | (REU) | Extinction coefficient for total chlorophyll in aquatic mosses |
| Aimee Genung | 1999 | (REU) | Total chlorophyll-nutrient relationships in aquatic mosses |
| William Schofield | 1998 | (REU) | Bryophyte health in arctic stream reaches |
| Michael Vester | 1997 | (UROP) | Distributions of bryophytes in New Hampshire streams |
| Dena Pappathanasi | 1996 | (REU) | Decomposition of bryophyte litter in an arctic stream |
| Ken Edwardson | 1995 | (REU) | Hyporheic dynamics in arctic streams |
| Karen Missel | 1995 | (project) | Modeling soil water infiltration with the SWIM model |
| John Terninko | 1993 | (REU) | Bryophyte and microalgal distributions in arctic streams |
| Patricia Maloney | 1991 | (REU) | Bryophyte and microalgal abundances in arctic streams |
| Don Schad | 1989 | (thesis) | Modeling soil infiltration with PRZM model |
| Jacques Finlay | 1989 | (REU) | Stream nutrient concentrations in pristine arctic streams |
| Jacques Finlay | 1987 | (REU) | Denitrification in forest soil catenas at Hubbard Brook |
| Neil Bettez | 1987 | (REU) | Whole soil denitrification at Hubbard Brook |
| Abednego Barnes | 1987 | (REU) | Soil infiltration rates in sand |

Graduate student theses supervised

Master's

| <u>Student</u> | <u>Function</u> | <u>Dept</u> | <u>Expected Complete</u> | <u>Status</u> |
|-------------------|-----------------|-------------|--------------------------|-----------------------|
| Ryan Sleeper | Co-Chair | AEWS | 2018 | In progress |
| Eric Davis | Chair | AEWS | 2013 | Successfully defended |
| Lisle Snyder | Chair | AEWS | 2013 | Successfully defended |
| Joseph Bartlett | Co-chair | AEWS | 2015 | Successfully defended |
| Julie Larouche | Chair | AEWS | 2008 | Successfully defended |
| Amanda Holland | Chair | AEWS | 2007 | Successfully defended |
| Julie Foley | Chair | AEWS | 2006 | Successfully defended |
| Morgan Johnson | Chair | AEWS | 2006 | Successfully defended |
| Evan Fitzgerald | Chair | AEWS | 2006 | Successfully defended |
| Carl Cappelletti | Chair | AEWS | 2005 | Successfully defended |
| Alexander Hackman | Chair | AEWS | 2005 | Successfully defended |

| | | | | |
|-------------------|----------|-------|------|-----------------------|
| Amy Pervanas | Chair | WARM | 1999 | Withdrew (job) |
| Dave Arscott | Chair | WARM | 1997 | Successfully defended |
| Ken Edwardson | Chair | WARM | 1997 | Successfully defended |
| Jennifer Ashby | Chair | WARM | 1996 | Successfully defended |
| Sara Radasci | Member | EC | 1996 | Successfully defended |
| Willard Dyche | Member | SOIL | 1993 | Successfully defended |
| Neal Sullivan | Chair | FORS | 1992 | Successfully defended |
| Amy Suffet | Member | MICRO | 1992 | Successfully defended |
| Georgia Murray | Member | EOS | 1992 | Successfully defended |
| Chris Nash | Member | ESCI | 1992 | Successfully defended |
| Chris Catricala | Co-lead* | ESCI | 1992 | Successfully defended |
| Dave Cedarholm | Sponsor@ | CIVE | 1992 | Successfully defended |
| Mike Cuomo | Chair | SOIL | 1992 | Successfully defended |
| Mark Anderson | Member | BOT | 1991 | Successfully defended |
| Rich Hallet | Co-lead* | FORS | 1991 | Successfully defended |
| Ken Kennedy | Member | ESCI | 1991 | Successfully defended |
| Patricia Shattuck | Sponsor@ | ESCI | 1991 | Successfully defended |
| Steve Stresky | Sponsor@ | ESCI | 1991 | Successfully defended |
| David Devoe | Co-lead* | ESCI | 1990 | Successfully defended |
| Laura Medalie | Co-lead* | ESCI | 1990 | Successfully defended |
| Robert Farrel | Member | ESCI | 1989 | Successfully defended |
| Chris Pyott | Member | EOS# | 1989 | Successfully defended |

Ph.D

| <u>Student</u> | <u>Function</u> | <u>Dept</u> | <u>Expected Complete</u> | <u>Status</u> |
|--------------------|-----------------|-------------|--------------------------|-----------------------|
| Courtney Hammond | Co-Chair | NR | 2018 | Active |
| Matthew Vaughan | Co-Chair | NR | 2018 | Active |
| Samuel Parker | Chair | NR | 2018 | Active |
| Peter Isles | Member | NR | 2016 | Successfully defended |
| Julia Larouche | Chair | NR | 2015 | Successfully defended |
| Pooja Kanwar | Chair | NR | 2014 | Successfully defended |
| Joel Nipper | Chair | NR | 2014 | Successfully defended |
| Karim Chichakly | Co-chair | CS | 2012 | Successfully defended |
| Paul Lilly | Member | NR | 2010 | Successfully defended |
| Erica Gaddis | Member | NR | 2006 | Successfully defended |
| Ryan Davis | Member | WARM | 1999 | Successfully defended |
| Louis Barton | Reader | U. Waikato | 1999 | Successfully defended |
| Pam Morgan | Member | WARM | 1998 | Successfully defended |
| Dean Moosavi | Member | EOS# | 1997 | Successfully defended |
| John Portnoy (NPS) | Member | MBL | 1995 | Successfully defended |
| Steve McNulty | Member | EOS# | 1991 | Successfully defended |
| Charlie Vorosmarty | Member | EOS# | 1991 | Successfully defended |

* Primary technical research advisor with C.T. Smith, chair may be in other department
@Primary technical research advisor, providing support, chair in other department

Post Doctoral Fellows

| | | | |
|---------------|-------|---------|--|
| Andrea Pearce | RSENR | 2011-13 | Lecturer, Engineering, University of Vermont |
| Michael Flinn | RSENR | 2009-11 | Associate Professor, Murray State University |
| Wenzhi Cao | LCR | 2001-02 | Full Professor, Xaimen University, China |

Notes on graduate mentoring

Due to the nature of my own research and the lack of a graduate program in Water Resources Management within the Department of Natural Resources prior to 1993, I have found it necessary to establish close working relationships with other academic programs to attract and support graduate students on my research projects. While logistically awkward, this situation fostered interdisciplinary research among my department and other departments with complementary academic and research interests. Thus, in many cases (noted above), I was not the official chair of record for the graduate committee but *was* the primary technical advisor.

In some cases (noted) this primary technical advisor function was shared with Dr. C.T. Smith, with whom I maintained a very close research relationship on joint Agricultural Experiment Station projects from 1987 to 1992.

Between 1997 and 2002 I was employed by Landcare Research in New Zealand, a Crown Research Institute which is not a degree-granting institution. Thus, I did not have graduate students during this period of time.

Publications

** Designates a graduate student or Post-doc as lead or co-author advised by Bowden*

Designates an undergraduate lead or co-author advised by Bowden

Publications currently in review

3. Bowden, W.B., R.E. Sleeper, J.P. Beneš, and F.M. Iannucci. Long-term measurements of whole-stream metabolism in an Arctic tundra river experimentally enriched with phosphorus [In review in *Freshwater Science*, pending revisions]
2. Kendrick, M., A. Huryn, W.B. Bowden, L. Deegan, R. Findlay, A. Hershey, B.J. Peterson, J. Beneš, E. Schuett. Decadal-scale trends of dissolved nutrients and insect isotopic patterns in an Arctic river. [In second review in *Global Change Biology*]
1. Vaughan, M.C.H., B. Wemple, W.B. Bowden, J. Shanley, A. Vermilyea, and A.W. Schroth. Using in situ UV-Visible spectrophotometer sensors to predict riverine phosphorus species concentrations. [In review in *Limnology and Oceanography Methods*]

Manuscripts in development

[Status is indicated. Second number indicates priority for completion.]

- 7.6 Beneš, J., W.B. Bowden, L. Deegan, A. Huryn, M. Kendrick, and B.J. Peterson. Summary of a 34-year experimental, low-level, phosphorus fertilization of an Arctic river. [Outlined with some figures and tables drafted.]
- 6.1 Bowden, W.B., M. Gooseff, W. Wolheim, A. Wloskowski, K. Whitinghill, and C. Treat. Influences of geomorphology on stream metabolism in permafrost-dominated, Arctic tundra streams. [Manuscript has been outlined, data are complete.]
- 5.3 Bowden, W.B., C. Song, S.P. Parker, and SCALER PI Team. Scaling measurements of metabolism in stream ecosystems: challenges and approaches to estimates of reaeration. [Manuscript has been outlined, data are complete.]
- 4.4 Iannucci, F., J. Beneš, M. Christie, and W.B. Bowden. Stoichiometry of dominant bryophyte species in an Arctic tundra stream reflects their ecophysiology in response to phosphorus enrichment. [Manuscript has been outlined, data are complete.]
- 3.7 Larouche, J.R*, W.B. Bowden; M.B. Flinn.; J. Kampman. Impacts of a thermo-erosional gully on ecosystem structure and function of an arctic alluvial tundra stream, North Slope, AK. *Journal of Geophysical Research*. [Manuscript was declined due to length and must be substantially revised before resubmission.]
- 2.2 Schuett, E.B., W.B. Bowden, and J. Shanley. Use of an acoustic Doppler channel profiler (ADCP) to estimate total phosphorus loads from an agricultural watershed in the northeast, USA. [Manuscript is in final internal review prior to submission.]
- 1.5 Wollheim, W., W.B. Bowden and SCALER Team). Scaling metabolism in stream networks. [Manuscript in development.]

Peer reviewed manuscripts in print or on-line.

Resolve DOI citations at: <https://www.doi.org/>

116. Addy, K., A. J. Gold, J. A. Loffredo, A. W. Schroth, S. P. Inamdar, W. B. Bowden, D. Q. Kellogg, and F. J. B. Birgand. 2018. Stream response to an extreme drought-induced defoliation event. First on-line: 25 August 2018. <https://doi.org/10.1007/s10533-018-0485-3>
115. Parker, S.P., W.B. Bowden, M.B. Flinn, C.D. Giles, K.A. Arndt, J.P. Beneš, and D.G. Jent. 2018. Effect of particle size and heterogeneity on sediment biofilm metabolism and nutrient uptake scaled using two approaches. [Accepted and in production in *Ecosphere*.]
114. Song, C., W. K. Dodds, J. Rüegg, A. Argerich, C. L. Baker, W. B. Bowden, M. M. Douglas, K. J. Farrell, M. B. Flinn, E. A. Garcia, A. M. Helton, T. K. Harms, S. Jia, J. B. Jones, L. E. Koenig, J. S. Kominoski, W. H. McDowell, D. McMaster, S. P. Parker, A. D. Rosemond, C. M. Ruffing, K. R. Sheehan, M. T. Trentman, M. R. Whiles, W. M. Wollheim, and F. Ballantyne. 2018. Continental-scale decrease in net primary productivity in streams due to climate warming. *Nature Geoscience* 11:415-420. DOI: [10.1038/s41561-018-0125-5](https://doi.org/10.1038/s41561-018-0125-5)
113. Bowden, W.B., J. Glime, and T. Riis. 2017. Bryophytes and Macrophytes. Chapter 18 in R. Hauer and G. Lamberti. *Methods in Stream Ecology*. 3rd Edition. Academic Press. Burlington, Massachusetts, USA. [This is a thorough update and revision of entry 67.]
112. Norman, B. C., Whiles, M. R., Collins, S. M., Flecker, A. S., Hamilton, S. K., Johnson, S. L., Rosi-Marshall, E. J., Ashkenas, L. R., Bowden, W. B., Crenshaw, C. L., Crowl, T., Dodds, W. K., Hall, R. O., El-Sabaawi, R., Griffiths, N. A., Marti, E., McDowell, W. H., Peterson, S. D., Rantala, H. M., Riis, T., Simon, K. S., Tank, J. L., Thomas, S. A., von Schiller, D. and Webster, J. R. 2017. Drivers of nitrogen transfer in stream food webs across continents. 2017. *Ecology* 98(12): 3044–3055. DOI: [10.1002/ecy.2009](https://doi.org/10.1002/ecy.2009)
111. Tank, J.L., E. Martí, T. Riis, D. von Schiller, W.K. Dodds, M.R. Whiles, L. Ashkenas, W.B. Bowden, B.M. Cheever, S.M. Collins, C.L. Crenshaw, T.A. Crowl, N.A. Griffiths, N.B. Grimm, S.K. Hamilton, S.L. Johnson, W.H. McDowell, E.J. Rosi-Marshall, K.S. Simon, S.A. Thomas, J.R. Webster, W.M. Wollheim. Partitioning assimilatory nitrogen uptake in streams: an analysis of stable isotope tracer additions across continents. *Ecological Monographs* (early view late 2017). DOI: [10.1002/ecm.1280](https://doi.org/10.1002/ecm.1280)
110. Vaughan, M.C.H., W.B. Bowden, J.B. Shanley, A. Vermilyea, R. Sleeper, A.J. Gold, S. Pradhanang, S.P. Inamdar, D.F. Levia, A.S. Andres, F. Birgand, A.W. Schroth. 2017. High-frequency dissolved organic carbon and nitrate measurements reveal differences in storm hysteresis and loading in relation to land cover and seasonality. *Water Resources Research* 53, 5345–5363. DOI: [10.1002/2017WR020491](https://doi.org/10.1002/2017WR020491)
109. Bowden, W.B. 2016. Background Facts: Role of Phosphorus in Lake Champlain Pollution. *Vermont Journal of Environmental Law* 17: 501-515.

108. Abbott, B.W., J.B. Jones, E.A.G. Schuur, F.S. Chapin III, W.B. Bowden, M.S. Bret-Harte, H.E. Epstein, M.D. Flannigan, T.K. Harms, T.N. Hollingsworth, M. Mack, A.D. McGuire, S.M. Natali, A.V. Rocha, S.E. Tank, M.R. Turetsky, J.E. Vonk, K.P. Wickland, and the Permafrost Carbon Network. 2016. Biomass offsets little or none of permafrost carbon release from soils, streams, and wildfire: an expert assessment. DOI: [10.1088/1748-9326/11/3/034014](https://doi.org/10.1088/1748-9326/11/3/034014)
107. Gough, L. N.D. Bettez, K.A. Slavik, W.B. Bowden, A.E. Giblin, G.W. Kling, J.A. Laundre, and G.R. Shaver. Effects of long-term nutrient additions on arctic tundra, stream, and lake ecosystems: Beyond NPP. 2016. *Oecologia*. DOI: [10.1007/s00442-016-3716-0](https://doi.org/10.1007/s00442-016-3716-0)
106. Parker, S.P.*, W.B. Bowden, and M.B. Flinn. 2016. The effect of acid strength and post-acidification reaction time on the determination of chlorophyll a in ethanol-extracted aquatic periphyton. 2016. *Limnology and Oceanography Methods*, 14: 839–852. DOI [10.1002/lom3.10130](https://doi.org/10.1002/lom3.10130) [Posted on Early View online: DOI: [10.1002/lom3.10130/full](https://doi.org/10.1002/lom3.10130/full)]
105. Treat, C., W. Wollheim, R.K. Varner, and W.B. Bowden. Increased nitrate availability for leaching during fall in tundra soils. *Geophysical Research Letters* 11(6):064013
DOI: [10.1088/1748-9326/11/6/064013](https://doi.org/10.1088/1748-9326/11/6/064013)
104. Rueegg, J., W. K. Dodds, M. D. Daniels, K. R. Sheehan, C. L. Baker, W. B. Bowden, K. J. Farrell, M. B. Flinn, T. K. Harms, J. B. Jones, L. E. Koenig, J. S. Kominoski, W. H. McDowell, S. P. Parker, A. D. Rosemond, M. T. Trentman, M. Whiles, and W. M. Wollheim. 2016. Baseflow physical characteristics differ at multiple spatial scales in stream networks across diverse biomes. *Landscape Ecology* 31:119-136. DOI: [10.1007/s10980-015-0289-y](https://doi.org/10.1007/s10980-015-0289-y)
103. Wlostowski*, AN, MN Gooseff, W Wollheim, WB Bowden 2016. Breakthrough curve decomposition: A conceptual framework for analyzing solute transport processes in rivers, independent of 1D numerical transport models. *Limnology and Oceanography Methods*. DOI: [10.1002/lom3.10148](https://doi.org/10.1002/lom3.10148).
102. Abbott, B. W., J. B. Jones, S. E. Godsey, J. R. Larouche, and W. B. Bowden. 2015. Patterns and persistence of hydrologic carbon and nutrient export from collapsing upland permafrost. *Biogeosciences* 12:3725-3740.
101. Emerson, D., J.J. Scott, J. Benes, W.B. Bowden. 2015. Microbial iron oxidation in the arctic tundra and its implications for biogeochemical cycling. *Applied Environmental Microbiology* 81(23): 8066-8075. DOI: [10.1128/AEM.02832-15](https://doi.org/10.1128/AEM.02832-15).
100. Kanwar, P., W.B. Bowden, S. Greenhalgh. 2015. A Regional Ecological Risk Assessment of the Kaipara Harbour, New Zealand, Using a Relative Risk Model. *Human and Ecological Risk Assessment: An International Journal* 21 (4), 1123-1146. DOI: [10.1080/10807039.2014.976046](https://doi.org/10.1080/10807039.2014.976046).
99. Kanwar, P.*, S. Kaza, and W.B. Bowden. 2015. An evaluation of Māori values in multiscale environmental policies governing Kaipara Harbour in New Zealand. *International Journal of Water Resources Development*, DOI: [10.1080/07900627.2015.1018410](https://doi.org/10.1080/07900627.2015.1018410)
98. Kanwar*, P., K. Koliba, W.B. Bowden, and S. Greenhalgh. 2015. An institutional analysis of the Kaipara Harbour governance network in New Zealand. *Environmental Management*

97. Larouche, J. R., B. W. Abbott, W. B. Bowden, and J. B. Jones. 2015. The role of watershed characteristics, permafrost thaw, and wildfire on dissolved organic carbon biodegradability and water chemistry in Arctic headwater streams. *Biogeosciences* 12:4221-4233.
96. Pearce, A.R.* E.B. Rastetter, B.L. Kwiatkowski, W.B. Bowden, M.C. Mack, and Y. Jiang. 2015. Recovery of arctic tundra from thermal erosion disturbance is constrained by nutrient accumulation: a modeling analysis. *Ecological Applications*. 25(5): 1271–1289. DOI: <http://doi.org/10.1890/14-1323.1>
95. Vonk, J.E., S. E. Tank, W. B. Bowden, I. Laurion, W. F. Vincent, P. Alekseychik, M. Amyot, M. F. Billet, J. Canário, R. M. Cory, B. N. Deshpande, M. Helbig, M. Jammet, J. Karlsson, J. Larouche, G. MacMillan, M. Rautio, K. M. Walter Anthony, and K. P. Wickland. 2015. Reviews and syntheses: Effects of permafrost thaw on Arctic aquatic ecosystems. *Biogeosciences*, 12, 7129-7167, DOI:<http://doi.org/10.5194/bg-12-7129-2015>. Published on-line: 8 December 2015.
94. Abbott*, B.W., J.R. Larouche*, J.B. Jones, W.B. Bowden, and A.W. Balsler. 2014. Elevated dissolved organic carbon biodegradability from thawing and collapsing permafrost. *Journal of Geophysical Research*. On-line October 2014. DOI: [10.1002/2014JG002678](http://doi.org/10.1002/2014JG002678).
93. Bowden, W.B., B.J. Peterson, L.A. Deegan, A.D. Huryn, J.P. Benstead, H. Golden*, M. Kendrick*, S.M. Parker, E. Schuett, J. Valino, and J.E. Hobbie. 2014 Ecology of streams of the Toolik region. Chapter 7 in J.E. Hobbie and G. Kling, *Alaska's Changing Arctic*. LTER Synthesis Book. Oxford University Press, New York. (ISBN 978-0-19-986040-1)
92. Kling, G.W., H.E. Adams, N.D. Bettez, W.B. Bowden, B.C. Crump, A.E. Giblin, K.E. Judd, K. Keller, G.W. Kipphut, E.R. Rastetter, G.R. Shaver, M. Stieglitz. 2014 Land-Water Interactions. Chapter 6 in J.E. Hobbie and G. Kling, *Alaska's Changing Arctic*. LTER Synthesis Book. Oxford University Press, New York. (ISBN 978-0-19-986040-1)
91. Chichakly*, K., W.B. Bowden, M. Eppstein. 2013. Minimization of cost, sediment load, and sensitivity to climate change in a watershed management application. *Environmental Modeling and Software* 50:158-168.
90. Schuur, E. A. G., B. W. Abbott, W. B. Bowden, V. Brovkin, P. Camill, J. G. Canadell, J. P. Chanton, F. S. Chapin, III, T. R. Christensen, P. Ciais, B. T. Crosby, C. I. Czimczik, G. Grosse, J. Harden, D. J. Hayes, G. Hugelius, J. D. Jastrow, J. B. Jones, T. Kleinen, C. D. Koven, G. Krinner, P. Kuhry, D. M. Lawrence, A. D. McGuire, S. M. Natali, J. A. O'Donnell, C. L. Ping, W. J. Riley, A. Rinke, V. E. Romanovsky, A. B. K. Sannel, C. Schädel, K. Schaefer, J. Sky, Z. M. Subin, C. Tarnocai, M. R. Turetsky, M. P. Waldrop, K. M. Walter Anthony, K. P. Wickland, C. J. Wilson, and S. A. Zimov. 2013. Expert assessment of vulnerability of permafrost carbon to climate change. *Climatic Change*:1-16.
89. Snyder, L*. and W.B. Bowden. Nutrient dynamics in an oligotrophic arctic stream monitored in situ by wet chemistry methods. 2013. *Water Resources Research* 50: 2039–2049, DOI:[10.1002/2013WR014317](http://doi.org/10.1002/2013WR014317).

88. Bowden, W.B., J.R. Larouche, A.R. Pearce, B.T. Crosby, K. Krieger, M.B. Flinn, J. Kampman, M.N. Gooseff, S.E. Godsey, J.B. Jones, B.W. Abbott, M.T. Jorgenson, G.W. Kling, M. Mack, E.A.G. Schuur, A.F. Baron, and E.B. Rastetter. An Integrated Assessment of the Influences of Upland Thermal-Erosional Features on Landscape Structure and Function in the Foothills of the Brooks Range, Alaska. In: Proceedings of the Tenth International Conference on Permafrost. Edited by K.M. Hinkel. Salekhard, Russia, 24-29 June, 2012. Pages 61-66.
87. Flinn, M.B., W.B. Bowden, A.W. Balser, J.B. Jones, and M.N. Gooseff. Soil and Water Chemistry Characteristics of Thermo-Erosional Features in the Western Noatak River Basin, Alaska, USA. In: Proceedings of the Tenth International Conference on Permafrost. Edited by K.M. Hinkel. Salekhard, Russia, 24-29 June, 2012. Pages 101-106.
86. Larouche*, J.R., W.B. Bowden, R. Giordano, M.B. Flinn, and B.C. Crump. 2012. Microbial biogeography of streams in the Feniak Lake region, Noatak National Preserve, Alaska: Exploring influences of lithology and habitat. *Frontiers in Microbiology* 3:article 309. DOI: [10.3389/fmicb.2012.00309](https://doi.org/10.3389/fmicb.2012.00309).
85. Fitzgerald*, E., W.B. Bowden, and M. Kline. Urban impacts on streams are scale-dependent with nonlinear influences on their physical and biotic recovery in Vermont, United States. *Journal of the American Water Resources Association* [Early View, Article first published online: 28 Feb 2012].
84. Schuur, E.A.G., B. Abbott, and the Permafrost Carbon Network, including W.B. Bowden. 2011. High Risk of Permafrost Thaw. *Nature (Comment)* 480:32-33.
83. Prowse, T., K. Alfredsen, S. Beltaos, B.R. Bonsal, W.B. Bowden, C.R. Duguay, A.Korhola, J. McNamara, W.F. Vincent, V. Vuglinsky, K.M. Walter Anthony, G.A. Weyhenmeyer. 2011. Effects of Changes in Arctic Lake and River Ice. *Ambio* 40:63–74. DOI: [10.1007/s13280-011-0217-6](https://doi.org/10.1007/s13280-011-0217-6)
82. Prowse, T., K. Alfredsen, S. Beltaos, B. Bonsal, C. Duguay, A. Korhola, J. McNamara, W.F. Vincent, V. Vuglinsky, G. Weyhenmeyer, K. Walter Anthony, W.B. Bowden, V. Buzin, Y. Dibike, N. Gantner, L. Hinzman, L. Lia, T. Ouarda, R. Pienitz, J.D. Reist, M. Stickler, J. Weckström, F. Wrona. 2011. Changing lake and river ice regimes: trends, effects and implications. Chapter 6. In: *Snow, water, ice, and Permafrost in the Arctic. An assessment report from the Arctic Monitoring and Assessment Programme (AMAP)*. Published by the AMAP Secretariat, Arctic Council, Oslo. ISBN ISBN 978-82-7971-071-4. Xii+538pp.
81. Bowden, W.B. 2010. Climate Change in the Arctic – Permafrost, Thermokarst, and Why They Matter to the Non-Arctic World. 2010. *Geography Compass* 4(10): 1553–1566. DOI: [10.1111/j.1749-8198.2010.00390.x](https://doi.org/10.1111/j.1749-8198.2010.00390.x). Article first published online: 3 October 2010.
80. Hilary K. McMillan, H.K., M.P. Clark, W.B. Bowden, M.D. Duncan, and R.A. Woods. 2010. Hydrological field data from a modeller’s perspective: Part 1. Diagnostic tests for model structure. *Hydrological Processes*. DOI: [10.1002/hyp.7841](https://doi.org/10.1002/hyp.7841)
79. Phillips C., W. Allen, A. Fenemor, B. Bowden and R. Young. 2010. Integrated catchment management research: lessons for interdisciplinary science from the Motueka Catchment, New Zealand. *Marine and Freshwater Research* 61(7): 749-763.

78. Brosten, T.R., J.H. Bradford, J.P. McNamara, M.N. Gooseff, J.P. Zarnetske, W.B. Bowden, and M.E. Johnston. 2009. Multi-offset GPR methods for hyporheic zone investigations Near Surface Geophysics 7(4 - Special Issue): 247-257.
77. Brosten, T.R., J.H. Bradford, J.P. McNamara, M.N. Gooseff, J.P. Zarnetske, W.B. Bowden, and M.E. Johnston. 2009. Estimating 3D variation in active-layer thickness beneath arctic streams using ground-penetrating radar. Journal of Hydrology 373(3-4): 479-486.
76. Gooseff, M.N., A. Balsler, W.B. Bowden, and J.B. Jones. 2009. Effects of Hillslope Thermokarst in Northern Alaska. Eos 90(4): 29-36. (27 January 2009)
75. Zarnetske, J.P., M.N. Gooseff, W.B. Bowden, M.J. Greenwald, T.R. Brosten, J.H. Bradford, and J.P. McNamara. 2008. Influence of morphology and permafrost dynamics on hyporheic exchange in arctic headwater streams under warming climate conditions. Geophysical Research Letters 35: L02501, DOI:[10.1029/2007GL032049](https://doi.org/10.1029/2007GL032049).
74. Gooseff, M.N., R.A. Payn, J.P. Zarnetske, W.B. Bowden, J.P. McNamara, and J.H. Bradford. 2008. Comparison of flushing behavior of dead zones during instantaneous and constant-rate stream tracer additions – implications for design and interpretation of non-conservative tracer experiments. Journal of Hydrology 357: 112– 124.
73. Bowden, W.B., M.J. Greenwald, M.N. Gooseff, J.P. Zarnetske, J.P. McNamara, J. Bradford, and T. Brosten. 2008. Carbon, nitrogen, and phosphorus interactions in the hyporheic zones of arctic streams that drain areas of continuous permafrost. In: D.L. Kane and K.M. Hinkel (eds.), pp. 165-171, Proceedings, Ninth International Congress on Permafrost. Fairbanks, 29 June-3 July, 2008.
72. Cao, W., W.B. Bowden, T. Davie and A. Fenemor. 2008. Modelling impacts of land cover change on critical water resources in the Motueka River catchment, New Zealand. Water Resources Management. DOI: [10.1007/s11269-008-9268-2](https://doi.org/10.1007/s11269-008-9268-2). Published on-line first, print version in press.
71. Payn, R. A., M. N. Gooseff, D. A. Benson, O. A. Cirpka, J. P. Zarnetske, W. B. Bowden, J. P. McNamara, and J. H. Bradford. 2008. Comparison of instantaneous and constant-rate stream tracer experiments through non-parametric analysis of residence time distributions. Water Resour. Res., 44, W06404, DOI:[10.1029/2007WR006274](https://doi.org/10.1029/2007WR006274)
70. Greenwald, M. J.*, W. B. Bowden, M. N. Gooseff, J. P. Zarnetske, J. P. McNamara, J. H. Bradford, and T. R. Brosten.* 2008. Hyporheic exchange and water chemistry of two arctic tundra streams of contrasting geomorphology. J. Geophysical Research (Biogeosciences). DOI:[10.1029/2007JG000549](https://doi.org/10.1029/2007JG000549).
69. Zarnetske, J.P.*, M.N. Gooseff, T.R. Brosten*, J.H. Bradford, J. P. McNamara, and W.B. Bowden. 2007. Transient storage as a function of geomorphology, discharge, and permafrost active layer conditions in Arctic tundra streams. Water Resour. Res., 43, DOI:[10.1029/2005WR004816](https://doi.org/10.1029/2005WR004816).
68. Benstead, J.P., A.C. Green, L.A. Deegan, B.J. Peterson, K. Slavik, W.B. Bowden, and A.E. Hershey. 2007. Recovery of three arctic stream reaches from experimental nutrient enrichment. Freshwater Biology 52:1077–1089. DOI: [10.1111/j.1365-2427.2007.01723.x](https://doi.org/10.1111/j.1365-2427.2007.01723.x).

67. Bowden, W.B., J. Glime, and T. Riis. 2007. Bryophytes and Macrophytes. Chapter 18 in R. Hauer and G. Lamberti. *Methods in Stream Ecology*. 2nd Edition. Academic Press. Burlington, Massachusetts, USA. ISBN: 9780123329080
66. Mulder, K.* and W.B. Bowden. 2007. Organismal stoichiometry and the adaptive advantage of variable nutrient use and production efficiency in *Daphnia*. *Ecological Modeling*. 202: 427–440. DOI:[10.1016/j.ecolmodel.2006.11.007](https://doi.org/10.1016/j.ecolmodel.2006.11.007)
65. Morse, N.#, W.B. Bowden, A. Hackman*, C. Pruden, E. Steiner#, and E. Berger. 2007. Using weighted average sound pressure to estimate reaeration in stream reaches. *Journal of the North American Benthological Society* 26(1):28–37.
64. Cole, A., W.A. Allen, M. Kilvington, A. Fenemor, and B. Bowden. 2007. Participatory modelling with an influence matrix and the calculation of whole-of-system sustainability values. *International Journal of Sustainable Development* 10(4): 282-401.
63. Brosten*, T, JH Bradford, JP McNamara, JP Zarnetske, MN Gooseff, WB Bowden. 2006. Temporal thaw depth beneath two arctic stream types using ground-penetrating radar. *Permafrost and Periglacial Processes*. 17: 341–355. DOI: [10.1002/ppp.566](https://doi.org/10.1002/ppp.566)
62. McIntosh, A., W.B. Bowden, E. Fitzgerald*, A. Hackman*, B. Kirk*, J. Todd, H. Vladich, A. Voinov. 2006. RAN: Working with neighborhoods to manage stormwater. *Stormwater*, May/June, pp. 95-99.
61. Fitzgerald, E*. and W.B. Bowden. 2006. Quantifying increases in stream power and energy using flow duration curves for Potash Brook, South Burlington, Vermont. *Stormwater*, March/April, pp 88-94.
60. Young, R.G., A.J. Quarterman, R.F. Eyles, R.A. Smith, and W.B. Bowden. 2005. Water quality and thermal patterns across a complex catchment: interacting influences of land cover, geology and longitudinal position. *New Zealand Journal of Marine & Freshwater Science*. 39: 803–825.
59. Simon*, K.S., C.R. Townsend, B.J.F. Biggs and W.B. Bowden. 2005. Temporal variation of N and P uptake in 2 New Zealand streams. *Journal Of The North American Benthological Society* 24(1): 1-18.
58. Cao*, W., W.B. Bowden, T. Davie, and A. Fenemor. 2006. Multi-variable and multi-site calibration and validation of SWAT in a large mountainous catchment with high spatial variability. *Hydrological Processes*. *Hydrol. Process.* 20, 1057–1073. Published online 18 October 2005 in Wiley InterScience (www.interscience.wiley.com). DOI: [10.1002/hyp.5933](https://doi.org/10.1002/hyp.5933).
57. Bradford, J.H., J.P. McNamara, W.B. Bowden, and M.N. Gooseff. 2005. Measuring thaw depth beneath arctic streams using ground-penetrating radar. *Hydrological Processes*. 19: 2689–2699.
56. Bernhardt, E.S., G.E. Likens, R.O. Hall, D.C. Buso, S.G. Fisher, T.M. Burton, J.L. Meyer, W.H. McDowell, M.S. Mayer, W.B. Bowden, S.E.G. Findlay, K.H. MacNeale, R.S. Stelzer, and W.H. Lowe. 2005. Can't see the forest for the stream? - In-stream processing and terrestrial nitrogen exports. *BioScience* 55(3): 219-230.

55. Benstead, J. P., L.A. Deegan, B.J. Peterson, A.D. Huryn, W.B. Bowden, K. Suberkropp, K.M. Buzby, A.D. Green, and J.A. Vacca. 2005. Responses of beaded Arctic stream to short-term N and P fertilization. *Freshwater Biology* 50, 277–290.
54. Watson, A.J. T.J.A. Davie, W.B. Bowden, and J.J. Payne. 2004. Drainage to shallow groundwater under a closed-canopy Radiata pine plantation on the Canterbury Plains, South Island, New Zealand *Journal of Hydrology (NZ)* 43(2): 111-122.
53. Slavik, K., B.J. Peterson, L.A. Deegan, W.B. Bowden, A.E. Hershey, John Hobbie. 2004. Long-term responses of the Kuparuk River to phosphorus fertilization. *Ecology* 85(4):939-954.
52. Simon*, K.S., C.R. Townsend, B.J.F. Biggs, W.B. Bowden, and R.D. Frew. 2004. Habitat-specific nitrogen dynamics in New Zealand streams containing native or invasive fish. *Ecosystems* 7:1-16.
51. Dodds, W.K, E. Martí, J.L. Tank, J. Pontius, S.K. Hamilton, N.B. Grimm, W.B. Bowden, W.H. McDowell, B.J. Peterson, H. M. Valett, J.R. Webster, S. Gregory. 2004. Carbon and nitrogen stoichiometry and nitrogen cycling rates in streams. *Oecologia* 140: 458–467.
50. Bowden, W.B., A. Fenemor, N. Deans. 2004. Integrating water and catchment research for the public good: the Motueka River-Tasman Bay initiative, New Zealand. UNESCO/HELP special publication. *Water Resources Development* 20(3): 311-323.
49. Webster J.R., P.J. Mulholland, J.L. Tank, H.M. Valett, W.K. Dodds, B.J. Peterson, W.B. Bowden, C.N. Dahm, S. Findlay, S.V. Gregory, N.B. Grimm, S.K. Hamilton, S.L. Johnson, E. Marti, W.H. McDowell, J.L. Meyer, D.D. Morrall, S.A. Thomas, W.M. Wollheim. 2003. Factors affecting ammonium uptake in streams - an inter-biome perspective. *Freshwater Biology* 48 (8): 1329-1352.
48. Edwardson, K.J.*, W.B. Bowden, C. Dahm, J. Morrice. 2003. The hydraulic characteristics and geochemistry of hyporheic and parafluvial zones in Arctic tundra streams, North Slope, Alaska. *Advances in Water Resources* 26:907-923.
47. Mulholland P.J., J.L. Tank, J.R. Webster, W.B. Bowden, W.K. Dodds, S.V. Gregory, N.B. Grimm, S.K. Hamilton, S.L. Johnson, E. Marti, W.H. McDowell, J.L. Merriam, J.L. Meyer, B.J. Peterson, H.M. Valett, W.M. Wollheim. 2002. Can uptake length in streams be determined by nutrient addition experiments? Results from an interbiome comparison study. *Journal of the North American Benthological Society* 21(4): 544-560.
46. Findlay, S., J. Tank, S. Dye, H.M. Valett, P. Mulholland, W.H. McDowell, S. Johnson, S.K. Hamilton, J. Edmonds, W.K. Dodds, W.B. Bowden. 2002. Bacterial and fungal biomass in detritus-based microhabitats of headwater streams. *Microbial Ecology* 43:55-56.
45. Dodds, W.K., A.J. López, W.B. Bowden, S. Gregory, N.B. Grimm, S.K. Hamilton, A.E. Hershey, E. Martí, W.H. McDowell, J.L. Meyer, D. Morrall, P.J. Mulholland, B.J. Peterson, J.L. Tank, H.M. Valett, J.R. Webster, W. Wollheim, 2002. Nitrogen uptake as a function of concentration in streams. *Journal of the North American Benthological Society* 21(2) 206–220.
44. Mulholland, P.J., C.S. Fellows, J.L. Tank, N.B. Grimm, J.R. Webster, S.K. Hamilton, E. Marti, L. Ashkenas, W.B. Bowden, W.K. Dodds, W.H. McDowell, J.L. Meyer, and B.J. Peterson. 2001. Inter-biome comparison of factors controlling stream metabolism. *Freshwater Biology* 46(11):1503-1517.

43. Bowden, W.B. 2001. Ecological engineering at the catchment-scale for water management: the Motueka River initiative. Proceedings of the International Ecological Engineering Conference. Lincoln, New Zealand. November 2001.
42. Wollheim, W.M., B.J. Peterson, L.A. Deegan, J.E. Hobbie, B. Hooker, W.B. Bowden, K.J. Edwardson, D.B. Arscott, A.E. Hershey, and J. Finlay. 2001. Influence of stream size on ammonium and suspended particulate nitrogen processing. *Limnology and Oceanography* 46:1-13.
41. Peterson, B. J., W. Wollheim, P. J. Mulholland, J. R. Webster, J. L. Meyer, J. L. Tank, N. B. Grimm, W. B. Bowden, H. M. Valett, A. E. Hershey, W. B. McDowell, W. K. Dodds, S. K. Hamilton, S. Gregory and D. J. D'Angelo. 2001. Stream processes alter the amount and form of nitrogen exported from small watersheds. *Science* 292: 86-90.
40. Bowden, W.B., B.D. Fahey, J. Ekanayake, and D.L. Murray. 2001. Hillslope and wetland hydrodynamic in a tussock grassland, South Island, New Zealand. *Hydrological Processes* 15:1707-1730.
39. Tank, J.L., P.J. Mulholland, J.L. Meyer, W.B. Bowden, J.R. Webster, B.J. Peterson, and D. Sanzone. 2000. Contrasting food web linkages for the grazing pathways in 3 temperate streams, using ¹⁵N as a tracer *Verh. Internat. Verein. Limnol.* Proceedings of the XXVII Congress of the International Association of Theoretical and Applied Limnology, Dublin, Ireland, 1998.
38. Hobbie, J.E. B.J. Peterson, N. Bettez, L. Deegan, W.J. O'Brien, G.W. Kling, G.W. Kipphut, W.B. Bowden, and A.E. Hershey. 1999. Impact of global change on the biogeochemistry and ecology of an Arctic freshwater system. *Polar Research* 18 (2):207-214
37. Arscott, D.B.*, W.B. Bowden, and J.C. Finlay. 2000. Effects of desiccation and temperature/irradiance on the metabolism of 2 Arctic stream bryophyte taxa. *Journal of the North American Benthological Society* 19(2):263-273.
36. Wollheim, W.M., B.J. Peterson, L.A. Deegan, M. Bahr, M. J.E. Hobbie, D. Jones, W.B. Bowden, A.E. Hershey, G.W. Kling, and M.C. Miller. 1999. A coupled field and modelling approach for the analysis of nitrogen cycling in streams. *Journal of the North American Benthological Society* 18(2) 199-212.
35. The Stream Bryophyte Group (Bowden, organizer and lead author). 1999. Roles of bryophytes in stream ecosystems. *Journal of the North American Benthological Society*. 18(2):151-184.
34. Hallet, R.*, C.T. Smith, and W.B. Bowden. 1999. Nitrogen dynamics in forest soils after municipal sludge additions. *Water, Air and Soil Pollution*. 112: 259-278.
33. Sullivan, N*, W.B. Bowden, W.H. McDowell. Short-term decomposition of foliar litter from three tropical tree species before and after hurricane disturbance. 1999. *Biotropica*. 31(3): 382-393.
32. Harvey, C.J., B.J. Peterson, W.B. Bowden, A.E. Hershey, M.C. Miller, L.A. Deegan, and J.C. Finlay. 1998. Biological responses of Oksrukuyik Creek, a tundra stream, to fertilization. *Journal of the North American Benthological Society* 17(2): 190-209.

31. Fahey, B.; W.B. Bowden; J. Smith; and D.L. Murray. 1998. Hillslope-wetland hydrological linkages in the headwaters of a tussock grassland catchment at Glendhu, South Island, New Zealand. pp. 157-164 in K. Kovar; U. Tappeiner ; N.E. Peters; and R.G. Craige (eds.), Hydrology, water resources and ecology in headwaters. Proceedings of HeadWater'98, Meran-Merano, Italy, 20-23 April 1998. IAHS Press. Wallingford, UK.
30. Ashby, J*, W.B. Bowden, P. Murdoch. 1998. Controls on denitrification in headwater catchments of a hardwood forest in the Catskill Mountains, New York. *Soil Biology and Biochemistry* 30(7): 853-864.
29. Arscott, D.B*, W.B. Bowden, J.C. Finlay#. 1998. Comparison of epilithic algal and bryophyte metabolism in an arctic tundra stream, Alaska. *Journal of the North American Benthological Society* 17(2): 210-227.
28. Hershey, A., W.B. Bowden, L. Deegan, J.E. Hobbie, B.J. Peterson, G. Kipput, G. Kling, M. Lock, M. Miller, R. Vestal. 1997. The Kuparuk River: a long-term study of biological and chemical processes in an arctic river. In: A. Milner and M. Oswood (eds.). *Freshwaters of Alaska. Ecological Synthesis. Ecological Studies Series, Volume 119.* Springer-Verlag. New York.
27. Harvey, C.J., B.J. Peterson, W.B. Bowden, L.A. Deegan, J.C. Finlay, A.E. Hershey, and M.C. Miller. 1997. Organic matter dynamics in the Kuparuk River, a tundra river in Alaska, USA. *Journal of the North American Benthological Society* 16:18-23.
26. McDowell, W.H., C.P. McSwiney*, and W.B. Bowden. 1996. Effects of Hurricane Hugo on groundwater chemistry and riparian function in a tropical rain forest. *Biotropica* 28(4a):577-584.
25. Catricala*, C., W.B. Bowden, C.T. Smith, W.H. McDowell. 1996. Chemical characteristics of leachate pulp and paper mill residuals used to reclaim sandy soils. *Water Air and Soil Pollution* 89:1-21.
24. Bowden, W.B. 1996. Best management practices for sustainable forestry: the functioning wetland interface. *Proceedings of the Society of American Foresters*, pp. 115-120.
23. Hobbie, J. E., L. A. Deegan, B. J. Peterson, E. B. Rastetter, G. R. Shaver, G. W. Kling, W. J. O'Brien, F. S. T. Chapin, Michael C. Miller, G. W. Kipphut, W. B. Bowden, A. E. Hershey and M. E. McDonald. 1995. Long-term measurements at the Arctic LTER site, pp. 391-409. In: T. M. Powell and J.H. Steele (eds.), *Ecological Time Series.* Chapman and Hall, New York.
22. Finlay, J.C# and W.B. Bowden. 1994. Controls on production of bryophytes in an arctic tundra stream. *Freshwater Biology* 32:455-466.
21. Bowden, W.B., J.C. Finlay# and P.E. Maloney#. 1994. Long-term effects of PO₄ fertilization on the distribution of bryophytes in an arctic stream. *Freshwater Biology* 32:445-454.
20. Medalie*, L., W.B. Bowden, and C.T. Smith. 1994. Nutrient leaching following land application of municipal sewage sludge in a mixed northern hardwood forest. *J. Env. Qual.* 28:130-138.

19. Smith, C.T., W.B. Bowden, T.E. Howard. 1993. Matching forest soils research with northeastern land use trends. Chapter 7 in T. Sims (ed.) *Agricultural research in the northeastern United States: a critical review*. Proceedings of the Northeast Branch of the American Society of Agronomy, 1992. American Society of Agronomy. Madison, Wisconsin.
18. Bormann, B.T., F.H. Bormann, W.B. Bowden, R.S. Pierce, S. Hamburg, M. Snyder, D. Wang and R. Ingersoll. 1993. Rapid N₂ fixation in pines, alder, and locust: evidence from the sandbox ecosystem study. *Ecology* 74:583-598.
17. Bowden, W.B., McDowell, W.H., C.E. Asbury, and A.M. Finley. 1992. Riparian nitrogen dynamics in two geomorphologically distinct tropical rain forest watersheds: nitrous oxide fluxes. *Biogeochemistry* 18:77-99.
16. McDowell, W.H., W.B. Bowden, and C.E. Asbury. 1992. Riparian nitrogen dynamics in two geomorphologically distinct tropical rain forest watersheds: subsurface solute dynamics. *Biogeochemistry* 18:53-75
15. Bowden, W.B., B.J. Peterson, J. Finlay#, and J. Tucker. 1992. Epilithic oxygen production and consumption in a fertilized arctic stream. *Hydrobiologia* 240:121-131. Also reprinted in W.J. O'Brien (ed.) *Toolik Lake: Ecology of an Aquatic Ecosystem in Arctic Alaska*. Development in Hydrobiology. Volume 78. Kluwer Academic Publishers. Boston.
14. Smith, C.T., S.D. McMahon, D.R. Devoe*, and W.B. Bowden. 1992. Silvicultural and environmental aspects of wastewater sludge utilization. Proceedings of a workshop on "The use of wastes and by-products as fertilizer and soil amendments for pastures and crops". Massey University, Fertilizer and Lime Research Centre, Palmerston North, New Zealand. 19-20 February 1992.
13. Bowden, W.B., C.J. Vorosmarty, J.M. Morris, B.J. Peterson, J.E. Hobbie, P.S. Steudler, and B. Moore. 1991. Transport and processing of nitrogen in a tidal freshwater wetland. *Water Resources Research* 27(3):389-408.
12. Bowden, R.D., G. Geballe, and W.B. Bowden. 1989. Foliar uptake of ammonium and nitrate from fog water by *Picea rubens*. *Can. J. Forestry Res.* 19: 382-386.
11. Bowden, W.B. 1987. The biogeochemistry of nitrogen in freshwater wetlands. *Biogeochemistry* 4: 313-348.
10. Bormann, F.H., W.B. Bowden, R.S. Pierce, S.P. Hamburg, R.C. Ingersoll, G.E. Likens, and G.K. Voigt. 1987. The Hubbard Brook Sandbox experiment. In: W.R. Jordan, M.E. Gilpin, and J.D. Aber (eds.) *Restoration ecology: a synthetic approach to ecological research*. Cambridge University Press.
9. Bowden, W.B., and F.H. Bormann. 1986. Soil water transport and loss of nitrous oxide after forest clearcutting. *Science* 233: 867-869.
8. Bowden, W.B. 1986. Gaseous nitrogen emissions from undisturbed terrestrial ecosystems: an assessment of their impacts on local and global nitrogen budgets. *Biogeochemistry* 2: 49-279.

7. Weathers, K.C., G.E. Likens, F.H. Bormann, J.S. Eaton, W.B. Bowden, F.L. Andersen, D.A. Cass, J.N. Galloway, W.C. Keene, K.D. Kimball, P. Huth, and D. Smiley. 1986. A regional acidic cloud/fog water event in the eastern United States. *Nature* 319: 657-658.
6. Morris, J.T. and W.B. Bowden. 1986. A mechanistic, numerical model of sedimentation, mineralization, and decomposition for marsh sediments. *Soil Sci. Soc. Am. J.* 50: 96-105.
5. Bowden, W.B. 1986. Nitrification, nitrate reduction, and nitrogen immobilization in a tidal freshwater marsh sediment. *Ecology* 67: 88-99.
4. Bowden, W.B. 1984. A nitrogen-15 isotope dilution study of ammonium production and consumption in the sediments of a tidal freshwater marsh. *Limnol. Oceanogr.* 29:1004-1015.
3. Bowden, W.B. 1984. Nitrogen and phosphorus in the sediments of a tidal freshwater marsh in Massachusetts (USA). *Estuaries* 7: 108-118.
2. Vorosmarty, C.J., B. Moore, W.B. Bowden, J.E. Hobbie, and B.J. Peterson. 1982. The transport and processing of nitrogen in a tidal freshwater marsh and river ecosystem: modeling the roles of water movement and biotic activity in determining water quality. p. 689-698 in W. Lauenroth, G.V. Skogerboe, and M. Flug (eds.). *Analysis of ecological systems: state-of-the-art in ecological modeling*.
1. Bowden, W.B. 1977. A comparison of two direct-count techniques for quantitatively enumerating aquatic bacteria. *Appl. Env. Microbiol.* 13: 1229-1232.

Substantial reports, book reviews, thesis, and dissertation

47. Bowden, W.B., A. Lavalley, W.H. McDowell, D. Newman, A. Weiskittel, M. Ferguson, M. Schattick, E. Schuett, and C. Woodall. 2018. Business Report: The Northeastern States Research Cooperative. A summary of the 20-year history and future prospects for the NSRC. Prepared for the USDA Forest Service, Northern Research Station. Newton Square, Pennsylvania. [In production.]
46. Lake Champlain Sea Grant Program Staff. 2017. Briefing Book: Lake Champlain Sea Grant Program. Prepared for the LSCG Institute Site Review Team from the National Sea Grant College Program, National Sea Grant Office, NOAA. Silver Springs, Maryland.
45. Lake Champlain Sea Grant Program Staff. 2015. Briefing Book: Lake Champlain Sea Grant Program. Prepared for the program Site Review Team from the National Sea Grant College Program, National Sea Grant Office, NOAA. Silver Springs, Maryland.
44. Bowden, W.B. and J. Bartlett*. 2014. Influences of road type and network density on the structure and function of streams on an urban to rural gradient in Chittenden County, Vermont, USA. Final project report to the UVM Transportation Research Center, Burlington, VT
43. Davis, E.*, W.B. Bowden, and B. Mitchell. Seasonal changes in mercury stocks and methylation ratios in vernal pools in the northeastern United States. Final project report to the Northeastern Temperate Network (NETN) of the U.S. Park Service.

42. Schuett, E. and W.B. Bowden. 2014. Use of Acoustic Doppler Current Profiler data to estimate sediment and total phosphorus loads to Lake Champlain from the Rock River. A report submitted to the Vermont Department of Environmental Conservation. Montpelier. [In review]
41. Bowden, W. B., J. Nipper, M. Clayton, and E. Davis. 2014. Comparison of discharge measured in selected watersheds using two different flow monitoring protocols. A report submitted to the Lake Champlain Basin Program and the Vermont Department of Environmental Conservation. Montpelier.
40. Bowden, W.B., and J. Nipper. 2012. Redesigning the American Neighborhood: Cost Effectiveness of Interventions in Stormwater Management at Different Scales Project Year 4 (2008-2010). Addendum to Final Report on Project No. EM97155901 for the Environmental Protection Agency, Region 1, Boston. 12 November 2012.
39. Bowden, W.B., A.McIntosh, W. Kuentzel, J. Nipper, and A. Kofstad. 2010. Redesigning the American Neighborhood: Cost Effectiveness of Interventions in Stormwater Management at Different Scales Project Year 4 (2008-2010). Final Report on Project No. EM97155901 for the Environmental Protection Agency, Region 1, Boston. 7 December 2010
38. Bowden, W.B. and M. Clayton. 2010. Vermont Stormwater Flow Monitoring Project: Annual Report - 2006-2008. Prepared for the Stormwater Section, Water Quality Division, Department of Environmental Conservation, Agency of Natural Resources. Waterbury.
37. Bowden, W.B., M.N. Gooseff, J.B. Jones, A. Balsler, and M.B. Flinn. 2010. Biogeochemical characteristics of soil and water in thermokarst failures within the western Noatak River basin, Alaska. Final Report to the National Park Service, Arctic Network. Fairbanks, Alaska.
36. Larouche, J., W.B. Bowden, and R. Giordano. 2009. Microbial biogeography of streams in the Feniak Lake region, Noatak National Preserve, Alaska: Exploring influences of lithology and habitat. Final Report to the National Park Service, Arctic Network. Fairbanks, Alaska. 31 December 2009. (This report is being considered for peer-reviewed publication.)
35. Balsler, A., M.N. Gooseff, J.B. Jones, W.B. Bowden. 2009. Thermokarst distribution and relationships to landscape characteristics in the Feniak Lake region, Noatak National Preserve, Alaska. Final Report to the National Park Service, Arctic Network. Fairbanks, Alaska. 31 December 2009.
34. Allen, A.R., B.J. Peterson, A. Hury, and W.B. Bowden. 2009. Foodweb characteristics based on stable isotopic analyses of carbon and nitrogen from streams in the central and upper Noatak River basin: Gates of the Arctic Park and Preserve and the Noatak National Preserve, Alaska. Final Report to the National Park Service, Arctic Network. Fairbanks, Alaska. 31 December 2009.
33. Flinn, M.B., W.B. Bowden, B.J. Peterson, C. Luecke, A. Balsler, A.R. Allen, and J.R. Larouche. 2009. The influence of lithology on physical, chemical, and biological characteristics of headwater streams in the Feniak Lake region, Noatak National Preserve, Alaska. Final Report to the National Park Service, Arctic Network. Fairbanks, Alaska. 31 December 2009.

32. Bowden, W.B., A. Balsler, A. Huymn, C. Luecke, G. Burkart, J. Larouche, S. Parker, B.J. Peterson, and M. Flinn. 2009. Aquatic biodiversity, community composition and ecosystem processes in upper Noatak River basin: Gates of the Arctic Park and Preserve and the Noatak National Preserve, Alaska. Final Report to the National Park Service, Arctic Network. Fairbanks, Alaska. 31 December 2009. [2005 report]
31. Bowden, W.B. 2009. Book review: Changes in latitude – impacts of climate change in the arctic. *Ecology* 90:2963–2965. [DOI:10.1890/0012-9658-90.10.2963]
30. Bowden, W.B., A. McIntosh, J. Nipper, J. Todd, A. Voinov, A. Hackman, B. Kirk, H. Vladich, E. Fitzgerald. 2008. Redesigning the American Neighborhood: Cost effectiveness of interventions in stormwater management at different scales. Annual report for project year 3 (2006-2007). Grant No. EPA X-97137901. Prepared by the Rubenstein School of Environment and Natural Resources and the Gund Institute for Ecological Economics, University of Vermont, Burlington for the U.S. Environmental Protection Agency, Region 1, Boston. 8 December 2008.
29. Bowden, W.B. and M. Curling. 2008. Vermont flow monitoring project: Annual report 2007. Vermont Agency of Natural Resources, Department of Environmental Conservation, Stormwater Section. Waterbury.
28. Flinn, M.B., W. B. Bowden, B. J. Peterson, C. Leucke, A. Balsler, G. Burkhart, S. Miller, J. R. Larouche, A. Allen. 2007. Streams and lake monitoring protocol Arctic Network national parks and preserves, Alaska. Final Report to the National Park Service, Arctic Network. Fairbanks, Alaska. 31 December 2009.
27. Bowden, W.B. and M. Curling. 2007. Vermont flow monitoring project: Annual report 2006. Vermont Agency of Natural Resources, Department of Environmental Conservation, Stormwater Section. Waterbury. October 4, 2007.
26. Bowden, W.B., M.N. Gooseff, J.P. McNamara, and J.H. Bradford. 2007. Arctic Hyporheic Project. Final Report, project OPP-0327440. Arctic Natural Sciences Program, Office of Polar Programs, National Science Foundation. Washington, D.C. (Drafted for submission July 2007).
25. Goodrich, D.C., E.Z. Stakhiv, A. Browning-Aiken, K. Vache, J.R. Ortiz-Zayas, J.F. Blanco, F.N. Scatena, R.G. Varady, W.B. Bowden, W. Howland. 2006. The HELP Experience in North America. Proceedings, American Society of Civil Engineers.
24. Bowden, W.B. and M. Curling (Clayton). 2007. Vermont Stormwater Flow Monitoring Project: Annual Report - 2006. Prepared for the Stormwater Section, Water Quality Division, Department of Environmental Conservation, Agency of Natural Resources. Waterbury.
23. Foley J. and W.B. Bowden. 2006. University of Vermont Stormwater Project: GIS and Statistically Based Risk Assessment. Vermont Agency of Natural Resources, Department of Environmental Services, Stormwater Program. Waterbury. April 3, 2006.

22. Bowden, W.B., A. McIntosh, J. Todd, R. Costanza, A. Voinov, A. Hackman, B. Kirk, H. Vladich, and T. White. 2006. Redesigning the American Neighborhood: Cost effectiveness of interventions in stormwater management at different scales. Annual report for project years 1 and 2 (2003-2005). Grant No. X 98187601. Prepared by the Rubenstein School of Environment and Natural Resources and the Gund Institute for Ecological Economics, University of Vermont, Burlington for the U.S. Environmental Protection Agency, Region 1, Boston. 27 November 2006
21. Foley J. and W.B. Bowden. 2005. University of Vermont Stormwater Project: Statistical Analysis of Watershed Variables. Vermont Agency of Natural Resources, Department of Environmental Services, Stormwater Program. Waterbury. October 28, 2005.
20. Bowden, W.B., M.N. Gooseff, J.P. McNamara, and J.H. Bradford. 2005. Arctic Hyporheic Project. Annual Report, project OPP-0327440. Arctic Natural Sciences Program, Office of Polar Programs, National Science Foundation. Washington, D.C.
19. Bowden, W.B., M.N. Gooseff, J.P. McNamara, and J.H. Bradford. 2004. Arctic Hyporheic Project. Annual Report, project OPP-0327440. Arctic Natural Sciences Program, Office of Polar Programs, National Science Foundation. Washington, D.C.
18. Water Resources Board, Assessment Method Working Group. 2004. A draft assessment method for stormwater management in Vermont. Part of the final report of the Water Resources Board Investigative Docket on Stormwater Management in Vermont.
17. Basher, L. 2003. The Motueka and Riwaka Catchments Technical Report. Contributor and co-author (with A. Fenemor) of the report Preface. Landcare Research Technical Report series. Lincoln, New Zealand.
16. Bowden, W.B. (2001, updated 2002). A field guide to the environment and issues of the Motueka River and Tasman Bay, New Zealand. Prepared and updated for a variety of national and international field days.
15. Bowden, W.B., J. Payne, R. McLaren, and A. Watson. 2001. Biosolids joint research programme: progress report for 2000/01. Prepared for Forest Research. July 2001.
14. Bowden, W.B. and R. Wilkinson. 2000. Analysis of stakeholder priorities for research on water resources in the Motueka River catchment. Prepared for the Tasman District Council, Richmond, New Zealand.
13. Bowden, W.B. 2000. Report on the Joint US-Japan Seminar on Hydrology and Biogeochemistry in Forested Catchments. For the New Zealand Ministry for the Environment, International Science and Technology/Technical Participation Programme. Report on a workshop convened by Drs. J. McDonnell and T. Tanaka, at the East-West Center, Honolulu, Hawai'i, 1-4 February, 2000.
12. Bowden, W.B. 1999. Integrated catchment management: a way forward toward sustainable land management. An internal position paper circulated among key science providers and stakeholders to explain and promote this area of research.

11. Bowden, W.B. 1999. Integrated catchment management rediscovered: an essential tool for a new millennium. Presentation at the national conference, "Cherishing the Land", Te Papa, Wellington, 21-23 April 1999. Published on the Landcare Research New Zealand web site at <http://www.landcare.cri.nz/conferences/manaakiwhenua/papers/index.shtml?bowden>
10. Bowden, W.B., C.T. Smith, W.H. McDowell, and C. Catricala. 1992. Assessing potential water quality impacts of creating synthetic topsoil from pulp and paper mill residuals. Final report submitted to S.D. Warren Paper Co., Inc. a division of Scott Paper Co., Inc.
9. Bowden, W.B., and C.T. Smith. 1992. Forest utilization of wood ash: soil chemical changes and effects on forest vegetation. Final project report to North Country Resource Conservation and Development, Inc.
8. Bettez, N., et al. (Bowden, W.B., editor). 1990. A resource inventory of the Exeter River watershed. Report for the Exeter River Watershed Association prepared by students in the WaRM 775 Land Use Seminar.
7. Bowden, W.B., C.T. Smith, and L. Medalie. 1988. Forest utilization of pulp and paper mill sludge and biomass boiler ash: an annotated bibliography. Final report submitted to S.D. Warren Paper Co., Inc. a division of Scott Paper Co., Inc.
6. Smith, C.T., W.B. Bowden, L. Medalie. 1988. Forest utilization of pulp and paper mill sludge and biomass boiler ash: a literature review and research assessment. Final report submitted to S.D. Warren Paper Co., Inc. a division of Scott Paper Co., Inc.
5. Bowden, W.B. 1988. Book review: "Acidification of Freshwaters" by Cresser and Edwards. Bull. Am. Meteorol. Soc., p. 527.
4. Ingersoll, R.C., F.H. Bormann, W.B. Bowden, S.P. Hamburg, and R.D. Bowden. 1987. Then Sandbox experiment notebook. Unpublished report from the School of Forestry and Environmental Studies, Yale University, New Haven, CT.
3. Bowden, W.B. 1982. Nitrogen cycling in the sediments of a tidal freshwater marsh. Ph.D. dissertation. North Carolina State University. Raleigh, NC.
2. Bowden, W.B. 1977. A comparison of two direct-count techniques for quantitatively enumerating aquatic bacteria. M.S. thesis. North Carolina State University. Raleigh, NC.
1. Bowden, W.B., and J.E. Hobbie. 1977. Nutrients in Albemarle Sound. Sea Grant Tech. Bull. UNC-SG-75-25.

Editorials and Commentary

2. Lajtha, K. and Biogeochemistry Editorial Board (including Bowden). 2017. Brave New World. A commentary of the need for good science. Biogeochemistry DOI 10.1007/s10533-017-0316-y
1. Bowden, W.B. 2016. Seeking Certainty About an Uncertain Future for Lake Champlain. Burlington Free Press and Vermont Digger.

Web design and development and commentary

9. Development of personal website for teaching and research dissemination (created personally)
<http://www.uvm.edu/~wbowden>
8. Development of Bowden Watershed Research Lab website (code by S. Halik)
<http://www.uvm.edu/bwrl>
7. Development of Vermont Water Resources and Lakes Students Center website (coded by M. MacLean), including regular commentary. <http://www.uvm.edu/envnr/vtwater/>
6. Development of the Northeastern States Research Cooperative website (designed by K. Baldwin and coded by S. Halik). <http://www.uvm.edu/envnr/nsrc/index.php>
5. Development of the Redesigning the American Neighborhood Project website (Created originally by A. Voinov, redesigned personally, coded by S. Halik)
4. Database contributions to US Arctic LTER programme archive.
http://ecosystems.mbl.edu/arc/data_doc/streams/streamsdefault.htm
3. Integrated land and water resource management in complex catchments programme. [Abstract]
<http://www.landcareresearch.co.nz/research/rurallanduse/integratedlandprog.asp>
2. Motueka Integrated Catchment Management Programme web site. [Co-developer of site.]
<http://icm.landcareresearch.co.nz>
1. Commentary on Integrated Catchment Management:
(Current: http://icm.landcareresearch.co.nz/programme_leader/programme_leader_update.htm)
(Archive: http://icm.landcareresearch.co.nz/programme_leader/archive_hot_topics.htm)

What is 'broken' in the Motueka catchment that needs fixing?
Recent research provides essential information to help protect valuable recreational fisheries in New Zealand.
Commentary on the "Muddied waters: estimating the national cost of soil erosion and sedimentation in New Zealand"
Motueka ICM partner wins Environmental Reporting award
Motueka ICM earns prestigious UNESCO designation
Introduction to the Motueka ICM web site

Professional activities

Presentations and published abstracts

(Not fully up to date for 2011-2017, typically 3-5 presentations per year)

151. Larouche, J.L., Abbott, B.W., Jones, J.B., Bowden, W.B. 2011. Amount and lability of dissolved organic carbon entering arctic streams from landscapes disturbed by fire and thermokarst terrain, North Slope, Alaska. American Geophysical Union. San Francisco, California. Poster presentation.

150. Abbott, B.W., Jones, J.B., Larouche, J.L., W.B. Bowden. May 2011. The effects of thermokarst on terrestrial-aquatic linkages and stream chemistry in arctic Alaska. North American Benthological Society Annual Meeting. Providence, Rhode Island. Poster Presentation.
149. Bowden, W.B. March 1, 2011. Designing your research questions. Contribution to the Association of Polar Early Career Scientists international webinar on “Career Development”, sponsored by the NSF ARCSS Thermokarst Project . Published on-line at <http://apecs.is/careers/career-development-webinars/watch-past-webinars?start=11>
148. Bowden, W.B. March 8, 2011. Selecting and designing your research methods. Contribution to the Association of Polar Early Career Scientists international webinar on “Career Development”, sponsored by the NSF ARCSS Thermokarst Project . Published on-line at <http://apecs.is/careers/career-development-webinars/watch-past-webinars?start=11>
147. Bowden, W.B., T. Jorgenson, A.W. Balsler. September 7, 2011. Introduction to Arctic System Science and an overview of permafrost and thermokarst. Introduction to Association of Polar Early Career Scientists international webinar on “Changing Permafrost in the Arctic Landscape sponsored by the NSF ARCSS Thermokarst Project . (<http://apecs.is/careers/career-development-webinars/permafrost-course>)
146. Bowden, W.B., Larouche, J.R., Kampman, J.R. November 9, 2011. Arctic Streams in a Changing Environment. Contribution to the Association of Polar Early Career Scientists international webinar on Changing Permafrost in the Arctic Landscape sponsored by the NSF ARCSS Thermokarst Project . (<http://apecs.is/careers/career-development-webinars/permafrost-course>)
145. Allen, A.R., W.B. Bowden, G.W. Kling, E. Schuett, J.M. Kostrzewski, A.C. Kolden, and R.H. Findlay. 2010. Tundra fire alters stream water chemistry and benthic invertebrate communities, North Slope, Alaska. Poster abstract GC43A-0958 presented at the 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
144. Bowden, W.B. 2010. Spatial and Temporal Influences of Thermokarst Failures on Surface Processes in Arctic Landscapes. State of the Arctic 2010. Arctic Research Consortium of the United States (ARCUS). Maimi. 16-19 March 2010.
143. Bowden, W.B., C. Maki, E. Schuett, A.R. Allen, J.R. Larouche, and G.W. Kling. 2010. Impacts of a Large and Intense Tundra Wildfire on the Hydrological Export of Carbon, Nitrogen and Phosphorus Abstract GC51J-08 presented at the 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
142. Flinn, M., J. Kampman, J.R. Larouche, W.B. Bowden. 2010. The impacts of thermokarst on sediment, organic matter, and macroinvertebrate community dynamics in arctic headwater streams. Poster abstract H41B-1089 presented at the 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.

141. Gooseff, M.N., K.E. Bencala, W.B. Bowden, B.L. McGlynn, R.A. Payn, K. Singha, A.S. Ward, A.N. Wlostowski, and W.M. Wollheim. 2010. Context Conundrums: Observations and Conceptual Models are Primary Controls on Interpretations of Temporal and Spatial Scales of Stream-Groundwater Interactions. Invited presentation abstract H33J-01 presented at the 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
140. Kling, G.W., C. Johnson, A.W. Balsler, T. Coolidge, W.B. Bowden, A. Giblin. 2010. The Impacts of Thermokarst Failures on Lakes: Rapid Attenuation of Major Impacts gives way to Potential Long-term Effects on Benthic Processes. Abstract GC52A-04 presented at the 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
139. Larouche, J.R., W.B. Bowden, M.B. Flinn, J. Kampman. 2010. Thermokarst Influences on Stream Biogeochemistry in Arctic Alaska. Poster abstract H41B-1085 presented at the 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
138. Wlostowski, A.N., M.N. Gooseff, W.B. Bowden, W.M. Wollheim, M. Herstand, C.C. Treat, and B.L. McGlynn. 2010. Channel water balances in Arctic tundra streams. Poster abstract H31D-1032 presented at the 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
137. Bowden, W.B. 2009. Influences of Thermokarst Failures on Surface Processes in Arctic Landscapes. *Eos Transactions AGU*, 90(52), Fall Meeting Supplement, Abstract U41C-0042
136. Bowden, W.B. 2009. Interactions of hydrology, biology, and geochemistry in arctic landscapes: thermokarst as agents of landscape change in a rapidly warming climate. Poster presented at the Gordon Conference on Catchment Science: Interactions of Hydrology, Biology & Geochemistry, Proctor Academy, July 12-17, 2009
135. Chichakly, K.J. M.J. Eppstein, and W.B. Bowden. 2009. Optimizing Stormwater Management to Reduce Phosphorus Loads to Lake Champlain. Vermont EPSCoR Annual Meeting. Burlington, Vermont.
134. Gooseff, M.N., A. Balsler, J. Jones, and W.B. Bowden. 2009. Increased occurrence of hillslope thermokarst in northern Alaska over the past 30 years. Abstract for European Geophysical Union presentation in session CR10.1/CL40/NH7.3 - Climate change impacts on glaciers, permafrost and related hazards. Convener: C. Huggel; Co-Conveners: A. Kääh, B. Raup, and C. Schneider.
133. Nipper, J and W.B. Bowden. 2009. Estimating the Contributions of Surface Wash-off and Channel Erosion to Total Sediment and Solute Loads in a Small Mixed Land Use Watershed. *Eos Transactions AGU*, 90(52), Fall Meeting Supplement, Abstract H51I-0876.
132. Park, E.S., J.H. Bradford, and W.B. Bowden. 2009. Investigating subsurface characteristics of thermokarst features using ground-penetrating radar. *Eos Transactions AGU*, 90(52), Fall Meeting Supplement, Abstract C51A-0450.

131. Balser, A.W., W.B. Bowden, J.B. Jones, M.N. Gooseff, D.M. Sanzone, A. Bouchier, and A. Allen. 2008. Thermokarst distribution in the Noatak Basin, Alaska: Increased frequency and correlations with local and regional landscape variables. Presented at the 2008 Alaska Park Science Symposium in conjunction with the Beringia Days 2008 International Conference, October 14-16, 2008, Fairbanks.
130. Bouchier, A., M.N. Gooseff, J.B. Jones, A.W. Balser, W.B. Bowden, and R.A. Payn. 2008. Influence of thermokarst failures on hillslope and stream water quality. *Eos Transactions of the American Geophysical Union* 89(53), Fall Meeting Supplement, Abstract C51A-0543. San Francisco.
129. Bowden, W.B., M.B. Flinn, B.J. Peterson, A.W. Balser, J.R. Larouche, and A.R. Allen. 2008. Physical, chemical, and biological characteristics of streams in the central noatak national preserve: an assessment of current status for future trends. Arctic Parks Science Symposium. National Park Service. Fairbanks.
128. Clayton, M. and W.B. Bowden. 2008. The Vermont Flow Monitoring Project. Lake Champlain: Our Lake, Our Future. A research conference about the Lake Champlain Basin. January 8 and 9, 2008, Sheraton Conference Center. Burlington. (Poster)
127. Gooseff, M.N., W.B. Bowden, A. Balser, J. Jones, A. Rinehart, and A. Bouchier. 2008. Permafrost degradation impacts on soils, hydrology, and aquatic biogeochemistry in the Brooks Range, Alaska. 1st International Conference on Hydropedology, University Park, PA.
126. Holland, A.K. and W.B. Bowden. 2008. Soil dynamics in an urban landscape: linking anthropogenic influences to soil processes. Lake Champlain: Our Lake, Our Future. A research conference about the Lake Champlain Basin. January 8 and 9, 2008, Sheraton Conference Center. Burlington. (Poster)
125. Jones, J.B., W.B. Bowden, M.N. Gooseff, A.W. Balser, A.J. Rinehart, and A. Bouchier. 2008. The impacts of hillslope thermokarst formation on soils structure in the Noatak National Preserve. Arctic Parks Science Symposium. National Park Service. Fairbanks.
124. Allen, A.R., B.J. Peterson², W.B. Bowden, A.D. Hury, M.B. Flinn, J.R. Larouche, K.L. Rattenbury, and D. Sanzone. 2007. Do autochthonous food resources dominate mid-order Arctic stream food webs? Annual meeting of the North American Benthological Society. Charleston.
123. Balser, A.W., W.B. Bowden, J.B. Jones, M.N. Gooseff, D.M. Sanzone, A. Bouchier, A. and Allen. 2007. Thermokarst distribution in the Noatak Basin, Alaska: Increased frequency and correlations with local and regional landscape variables. *Eos Transaction of the American Geophysical Union*, 88(52), Fall Meeting Supplement, Abstract C32A-08. San Francisco.

122. Balsler, A.W., W.B. Bowden, J.B. Jones, M.N. Gooseff, D.M. Sanzone, J. Larouche and A. Allen. 2007. Thermokarst characterization and distribution in a transitional arctic biome: New discoveries and possible monitoring directions in a climate change scenario. State of the Arctic Parks – SOAP Symposium, Fairbanks, Alaska. Also presented at the Permafrost Young Researchers Network (PYRN) Inaugural Meeting, Abisko, Sweden.
121. Bouchier, A. M.N. Gooseff, W.B. Bowden, J.B. Jones, and A. Balsler. 2007. Increased active layer development associated with thermokarst activity in continuous permafrost region in the Brookes Range foothills, Alaska. *Eos Transaction of the American Geophysical Union*, 88(52), Fall Meeting Supplement, Abstract C21A-0055 (Poster). San Francisco.
120. Bowden, W.B. 2007. Indicators supporting freshwater vital signs for the Arctic Network of parks: Results and experiences from the 2005 and 2006 field initiatives for rivers and streams. Presented at the State of the Arctic Parks symposium, 15-16 February, 2007, Fairbanks, AK.
119. Bowden, W.B., A.B. Balsler, M.N. Gooseff, J.B. Jones, D.S., J.R. Larouche, and A.R. Allen. 2007. Does Increased Thermokarst Activity in the Foothills of the Brooks Range, Alaska Affect Ecosystem Structure and Function in Arctic Tundra Streams?. Annual meeting of the North American Benthological Society. Charleston.
118. Bowden, W.B., M.J. Greenwald, M.N. Gooseff, J.P. McNamara, J.H. Bradford, J.P. Zarnetske, T.R. Brosten. 2007. Stoichiometry of carbon, nitrogen, and phosphorus regeneration interactions in the hyporheic zones of arctic streams draining areas of continuous permafrost. *Eos Transaction of the American Geophysical Union*, 88(52), Fall Meeting Supplement, Abstract B42A-05. San Francisco.
117. Brosten, T.R., J.H. Bradford, J.P. McNamara, J.P. Zarnetske, M.N. Gooseff, W.B. Bowden, and M.J. Johnston. 2007. Estimating 3D variation in active-layer thickness beneath arctic streams using ground- penetrating radar. *Eos Transaction of the American Geophysical Union*, 88(52), Fall Meeting Supplement, Abstract H21B-0509 (Poster). San Francisco.
116. Fitzgerald, E.P., W.B. Bowden, S.P. Parker and M.B. Flinn. 2007. Biotic response to channel evolution processes in small urban watersheds: Is full recovery possible following restoration? Annual meeting of the North American Benthological Society. Charleston.
115. Flinn, M.B., W.B. Bowden, B.J. Peterson, A.B. Balsler, J.R. Larouche, A.R. Allen, and D. Sanzone. 2007. The influence of contrasting lithologies on physical, chemical, and biological characteristics of oligotrophic streams in the Noatak Arctic Preserve, Alaska. Annual meeting of the North American Benthological Society. Charleston.
114. Flinn, M.B., W.B. Bowden, B.J. Peterson, A.W. Balsler, J.R. Larouche, A.R. Allen, and D. Sanzone. 2007. The influence of contrasting lithologies on physical, chemical, and biological characteristics of oligotrophic streams in the Noatak Arctic Preserve, Alaska. Presented at the annual meetings of the North American Benthological Society, 2-8 June 2007, Columbia, SC.

113. Gooseff, M.N., M.B. Cardenas, J.P. Zarnetske, W.B. Bowden, M. Greenwald-Johnston, J.P. McNamara, J.H. Bradford, and T.R. Brosten. 2007. Channel-streambed interactions over and under ice. *Eos Transaction of the American Geophysical Union*, 88(52), Fall Meeting Supplement, Abstract H23J-02 . San Francisco.
112. Larouche, J.R., W.B. Bowden, R. Giordano, and G.K. Druschel. 2007. Genetic diversity of microbial communities in arctic stream ecosystems of the Noatak National Preserve, Alaska. Presented at the State of the Arctic Parks symposium, 15-16 February, 2007, Fairbanks, AK.
111. Larouche, J.R., W.B. Bowden, R. Giordano, G.K. Druschel, and M.B. Flinn. 2007. Indicators of genetic diversity in microbial communities of contrasting arctic stream ecosystems. Presented at the workshop on High-Latitude Ecosystems in a Changing Climate, Abisko Sweden, 11-15 September 2007.
110. Zarnetske, J.P., M.N. Gooseff, W.B. Bowden, M.J. Greenwald, T.R. Brosten, J.H. Bradford, and J.P. McNamara. 2007. Influence of morphology and permafrost dynamics on surface water - groundwater exchange in arctic headwater streams under present and enhanced thaw conditions. *Eos Transaction of the American Geophysical Union*, 88(52), Fall Meeting Supplement, Abstract H31G-0740 (Poster). San Francisco.
109. Balsler, A.W., D.M. Sanzone, W.B. Bowden, C. Luecke, B.J. Peterson, A.D. Huryn, G. Burkart, and J.R. Larouche. 2006. Freshwater ecosystems of the Arctic wilderness: The challenge of inventory and monitoring in Alaska's National Parks. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
108. Balsler, A.W., D.M. Sanzone, W.B. Bowden, C. Luecke, B.J. Peterson, A.D. Huryn, G. Burkart, and J.R. Larouche. 2006. Freshwater ecosystems of the Arctic wilderness: The challenge of inventory and monitoring in Alaska's National Parks. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
107. Balsler, A.W., M.N. Gooseff, J.B. Jones, W.B. Bowden, D.M. Sanzone, A. Allen, and J.R. Larouche. 2006. Thermokarst characteristics and distribution in a transitional arctic biome: new discoveries and possible monitoring directions in a climate change scenario. *Eos Transactions, American Geophysical Union*, 87(52), Fall Meeting Supplement, Abstract C51B-0428.
106. Balsler, A.W., M.N. Gooseff, J.B. Jones, W.B. Bowden, D.M. Sanzone, A. Allen, and J.R. Larouche. 2006. Thermokarst characteristics and distribution in a transitional arctic biome: new discoveries and possible monitoring directions in a climate change scenario. *Eos Transactions, American Geophysical Union*, 87(52), Fall Meeting Supplement, Abstract C51B-0428. Poster.
105. Brosten, T.R., J.H. Bradford, J.P. McNamara, M.N. Gooseff, W.B. Bowden. 2006. Using multi-offset GPR data to estimate porosity variations beneath stream channels. *Eos Transactions of the American Geophysical Union* 87(52), Fall Meeting Supplement, Abstract H43G-07.

104. Cappelletti C.K. and W.B. Bowden. 2006. Implications of global warming on photosynthesis and respiration in an Arctic tundra river: consequences to the C cycle. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
103. Cozzetto, K., M.N. Gooseff, R. Neupauer, J.P. McNamara, T.R. Brosten, J.H. Bradford, W.B. Bowden. 2006. Investigations of hyporheic temperature regimes in arctic Alaska streams using time series analysis techniques. *Eos Transactions of the American Geophysical Union* 87(52), Fall Meeting Supplement, Abstract B23A-1062.
102. Fitzgerald, E.P., W.B. Bowden, and J.E. Foley. 2006. Linking urban land use to stream geomorphology and biotic integrity in the Lake Champlain Basin, Vermont. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
101. Foley, J.E., W.B. Bowden, and E.P. Fitzgerald. 2006. Stormwater management in Vermont: linking hydrologic and land use assessment in a practical framework for permitting. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
100. Hackman, A. and W.B. Bowden. 2006. Structural and Functional Assessment of Stormwater-Impaired Streams in Vermont. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
99. Johnston-Greenwald, M.E. W.B. Bowden, J.P. Zarnetske, M.N. Gooseff, J.P. McNamara, J.H. Bradford, and T.R. Brosten. 2006. Hyporheic biogeochemical processes in arctic tundra streams: A comparison of two geomorphically distinct streams. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
98. Larouche, J.R., W.B. Bowden, D.M. Sanzone, A.W. Balsler, C. Luecke, B.J. Peterson, A.D. Huryn, and G. Burkhart. 2006. A baseline survey of stream ecosystems along the Noatak River, Alaska. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
97. Sanzone, D.M., B.J. Peterson, H.S. Wilcox, W.B. Bowden, J.P. Benstead, L.A. Deegan, A.D. Huryn, and S.M. Parker. 2006. Nitrogen uptake and retention in arctic spring and mountain stream foodwebs. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
96. Zarnetske, J.P., M.N. Gooseff, M.E. Johnston-Greenwald, W.B. Bowden, J.P. McNamara, J.H. Bradford, and T.R. Brosten. 2006. Transient Storage Dynamics in Arctic Tundra Streams: A comparison of two geomorphically distinct streams. Presented at the Annual Meeting of the North American Benthological Society. Anchorage, Alaska.
95. Zarnetske, J.P., M.N. Gooseff, W.B. Bowden, T.R. Brosten, J.P. McNamara, J. H. Bradford. 2005. Relating Transient Storage to Varied Geomorphic, Discharge, and Hyporheic Conditions in Arctic Tundra Streams. Paper No. 90-5. Presented at the 2005 Geological Society of America meetings. Salt Lake City.

94. Bowden, W.B., C. Cappelletti, A. Hackman, and M. McBride. 2004. A simple model to explore the consequences of ecological stoichiometry in stream food webs. Annual meetings of the North American Benthological Society. Vancouver. June 2004.
93. Bowden, W.B., M.N. Gooseff, J.H. Bradford, and J.P. McNamara. 2004. Potential impacts of increased thermokarst activity on aquatic ecosystems in Arctic landscapes. American Geophysical Union meetings, San Francisco, 13-17 December 2004.
92. Brosten, T.R., J. H. Bradford, J.P. McNamara, W.B. Bowden, and M.N. Gooseff. 2004. Time lapse imaging of thaw-bulb development beneath Arctic streams using ground-penetrating radar. American Geophysical Union meetings, San Francisco, 13-17 December 2004.
91. Gooseff, M.N., J.H. Bradford, J.P. McNamara, and W.B. Bowden. 2004. Imaging potential hyporheic zone extent beneath arctic streams using ground-penetrating radar. Annual meetings of the North American Benthological Society. Vancouver. June 2004.
90. Green, A.C., H.M. Rantala, H.S. Wilcox, B.J. Peterson, A.D. Huryn, W.B. Bowden, L.A. Deegan, J.P. Benstead, and S.M. Parker. 2004. Stream network characteristics of the Upper Kuparuk watershed, North Slope, Alaska. Annual meetings of the North American Benthological Society. Vancouver. June 2004.
89. N.B. Morse, W.B. Bowden, C. Pruden, E. Steiner, and E. Berger. 2004. Using weighted average sound pressure to estimate reaeration in stream reaches. Annual meetings of the North American Benthological Society. Vancouver. June 2004.
88. Wilcox, H.S., D.M. Sanzone, B.J. Peterson, J.P. Benstead, L.A. Deegan, W.B. Bowden, S.M. Parker, A.D. Huryn, and A.C. Green. 2004. Nitrogen retention in mountain and spring Arctic streams. Annual meetings of the North American Benthological Society. Vancouver. June 2004.
87. Zarnetske, J. P., M.N. Gooseff, W.B. Bowden, J.H. Bradford, J.P. McNamara, and K.R. Hill. 2004. Seasonal evolution of hyporheic zones in Arctic tundra streams, North Slope, Alaska. American Geophysical Union meetings, San Francisco, 13-17 December 2004.
86. Bowden, W.B., C.P. Crockett, J.L. Mosher, C. Pruden, and E. Steiner. 2003. Linking stream form to whole-stream metabolism in an Arctic tundra landscape. Annual meeting of the North American Benthological Society, Athens, 27-31 May 2003. (Special session on Functional Bioassessment in Streams)
85. Bowden, W.B., R. Lawford, T.A. Endreny, R.G. Varady, S. Eden, and A. Browning-Aiken. 2003. Hydrology for Environment, Life, and Policy (*HELP*): A new UNESCO program generated by the hydrologic community to address sustainability and equitability issues. American Geophysical Union Chapman Conference on Ecosystem Responses to Land Use Change. Santa Fe, New Mexico, 13-18 June 2003.
84. Bradford, J.H., J.P. McNamara, W.B. Bowden, M.N. Gooseff. 2003. Imaging depth-of-thaw beneath arctic streams using ground-penetrating radar. American Geophysical Union meetings. San Francisco, December 2003.

83. Cao, W., W.B. Bowden, T. Davie, and A. Fenemor. 2003. Application of SWAT in a large mountainous catchment with high spatial variability. SWAT2003 International SWAT Conference, Bari, Italy, 1-4 July 2003
82. Cao, W., W.B. Bowden, T. Davie, and A. Fenemor. 2003. Modeling impacts of land cover change on critical water resources in the Motueka River Catchment, New Zealand. American Geophysical Union Chapman Conference on Ecosystem Responses to Land Use Change. Santa Fe, New Mexico, 13-18 June 2003.
81. Dodds, W.K., E. Martí, J.L. Tank, J. Pontius, S.K. Hamilton, P.J. Mulholland, N.B. Grimm, W.B. Bowden, W.H. McDowell, B.J. Peterson, H.M. Valett, J.R. Webster, J.L. Meyer, and S.V. Gregory. 2003. Nitrogen cycling rates and carbon and nitrogen stoichiometry in streams. Annual meeting of the North American Benthological Society, Athens, 27-31 May 2003.
80. Green, A.C., B.J. Peterson, L.A. Deegan, J.P. Benstead, W.B. Bowden, A.D. Huryn, S.M. Parker, J.A. Vacca, C.P. Crockett, and J.L. Mosher. 2003. Effects of nutrient fertilization on a small, beaded tundra stream on the North Slope of Alaska. Annual meeting of the North American Benthological Society, Athens, 27-31 May 2003.
79. Lawford, R., W.B. Bowden, and F.N. Scatena. Hydrology for Environment, Life, and Policy (*HELP*): A new UNESCO program of interest to stream ecologists. 2003. Annual meeting of the North American Benthological Society, Athens, 27-31 May 2003. (Poster)
78. Sanzone, D.M., B.J. Peterson, K.H. Barnes, J.P. Benstead, L.A. Deegan, C.P. Crockett, W.B. Bowden, S.M. Parker, A.D. Huryn, and A.C. Green. 2003. Nitrogen uptake and transformation in arctic spring and mountain streams. Annual meeting of the North American Benthological Society, Athens, 27-31 May 2003.
77. Sanzone, D.M., J.L. Meyer, J.L. Tank, E.P. Gardiner, B.J. Peterson, P.J. Mulholland, S.V. Gregory, N.B. Grimm, W.H. McDowell, W.B. Bowden, W.K. Dodds, and J.R. Webster. 2002. Stable isotopes provide evidence that stream subsidies influence the spatial distribution of terrestrial predators in eight biomes. 2002 Annual meeting of the North American Benthological Society, Pittsburg, 28 May – June 2002.
76. Bowden, W.B. An introduction to integrated catchment management. 2001. An invited presentation for the New Zealand Ministry for the Environment workshop supported by the Sustainable Management Fund on 'Bringing integrated catchment management to the community level'. October 2001, Wellington.
75. Bowden, W.B. Integrated catchment management in the Motueka Catchment. 2001. Tasman District Council 'Ecofest 2001'. November 2001, Motueka.
74. Bowden, W.B., J. Payne, A. Watson, R. Jackson and R. McLaren. 2001. Mobility of constituents from municipal biosolids applied to plantation forest land on the Canterbury Plains. Joint meetings of the New Zealand Hydrological and Limnological Societies. Palmerston North, 20-23 November 2001.

73. Dymond, J, R. Andrew, and Bowden, W.B. Raster-based hydrological modeling of the Motueka catchment. 2001. Joint meetings of the New Zealand Hydrological and Limnological Societies. Palmerston North, 20-23 November 2001.
72. Bidwell, V., W.B. Bowden, B. Fahey, L. Basher, M. Stewart, R. Woods, V. 2000. Subsurface flow dynamics in a pasture hillslope: an alternative hypothesis. Fresh Perspectives Conference. First joint meeting of the New Zealand Hydrological, Meteorological, and Limnological Societies, Christchurch, New Zealand, 20-24 November 2000.
71. Bowden, W.B., A. Pearce, J. Harding, P. Gillespie, A. Fenemor, T. Dunne, and G. Likens. 2000. Integrating biophysical, ecological, and social research for catchment-scale management: The Motueka River Initiative. Fresh Perspectives Conference. First joint meeting of the New Zealand Hydrological, Meteorological, and Limnological Societies. Christchurch, New Zealand, 20-24 November 2000.
70. Bowden, W.B., B. Fahey, L. Basher, M. Stewart, R. Woods, and V. Bidwell. 2000. Subsurface flow dynamics in a pasture hillslope, North Island, New Zealand. Annual meetings of the American Geophysical Union, San Francisco, 14-19 December 2000.
69. Bowden, W.B., B. Fahey, L. Basher, M. Stewart, R. Woods, and V. Bidwell. 2000. Subsurface flow dynamics in a pasture hillslope, North Island, New Zealand. Fresh Perspectives Conference, Christchurch, New Zealand, 20-24 November 2000.
68. Bowden, W.B., B. Fahey, L. Basher, M. Stewart, R. Woods, V. Bidwell. 2000. Subsurface flow dynamics in a pasture hillslope, Mahurangi River. Fresh Perspectives Conference. First joint meeting of the New Zealand Hydrological, Meteorological, and Limnological Societies, Christchurch, New Zealand, 20-24 November 2000.
67. Bowden, W.B., K. J. Edwardson, C. Pruden, G. Kling, and K. J. Riseng. 2000. Controls on nutrient processing in hyporheic substrates from an arctic tundra stream. Poster presented at the annual meetings of the North American Benthological Society, Keystone Colorado, 28 May - 1 June, 2000.
66. D'Angelo, D. J., S. C. Christman, B. J. Peterson, P. J. Mulholland, C. S. Fellows, J. L. Tank, S. K. Hamilton, E. Marti, L. R. Ashkenas, W. B. Bowden, W. K. Dodds, W. B. McDowell, J. L. Meyer, and J. R. Webster. 2000. A comparison of nitrogen processing in the P&G experimental stream facility with natural streams in the LINX study using stable isotopes. Paper presented at the annual meetings of the North American Benthological Society, Keystone Colorado, 28 May - 1 June, 2000.
65. Fox, M.K., B. J. Peterson, W. B. Bowden, A. E. Hershey, K. Slavik, and C. Pruden. 2000. Nitrogen cycle of a first order peaty tundra stream. Paper presented at the annual meetings of the North American Benthological Society, Keystone Colorado, 28 May - 1 June, 2000.
64. McGlynn, B.L., J.J. McDonnell, and W.B. Bowden. 2000. Dissolved organic carbon dynamics at multiple catchment scales: the role of hydrogeomorphic units. Annual meetings of the American Geophysical Union, San Francisco, 14-19 December 2000.

63. Mulholland, P.J., C. S. Fellows, J. L. Tank, S. K. Hamilton, E. Marti, L. R. Ashkenas, W. B. Bowden, W. K. Dodds, W. H. McDowell, J. L. Meyer, B. J. Peterson, and J. R. Webster. 2000. Controls on stream metabolism determined by an interbiome comparison study. Paper presented at the annual meetings of the North American Benthological Society, Keystone Colorado, 28 May - 1 June, 2000.
62. Peterson, B.J., W. M. Wollheim, P. J. Mulholland, J. R., Webster, J. L. Tank, J. L. Meyer, N. B. Grimm, E. Marti, W. B. Bowden, J. Merriam, H. M. Valett, A. E. Hershey, W. H. McDowell, W. K. Dodds, S. K. Hamilton, S. L. Johnson, L. R. Ashkenas, and D. J. D'Angelo. 2000. Control of din export from small watersheds by headwater stream nitrogen processing. Paper presented at the annual meetings of the North American Benthological Society, Keystone Colorado, 28 May - 1 June, 2000.
61. Peterson, B.J., W. Wollheim, P.J. Mulholland, J.R Webster, J. L. Tank, J.L. Meyer, N. B. Grimm, E. Marti, W.B. Bowden, J. Merriam, H.M. Vallet, A.E. Hershey, K. Rezenka, W.M. McDowell, W.K. Dodds, S.K. Hamilton, S.L. Johnson, L. Askenans, and D.J. D'Angelo. An intersite comparison of nitrification in streams. Annual meeting of the North American Benthological Society Meetings. Duluth, Minnesota. June 1999.
60. Wollheim, W., B.J. Peterson, P.J. Mulholland, J.R Webster, J. L. Tank, J.L. Meyer, N. B. Grimm, E. Marti, W.B. Bowden, J. Merriam, H.M. Vallet, A.E. Hershey, K. Rezenka, W.M. McDowell, W.K. Dodds, S.K. Hamilton, S.L. Johnson, L. Askenans, and D.J. D'Angelo. An intersite comparison of nitrogen regeneration in streams. Annual meeting of the North American Benthological Society Meetings. Duluth, Minnesota. June 1999.
59. Wollheim, W.M., B. J. Peterson, P. J. Mulholland, J. R. Webster, J. L. Tank, J. L. Meyer, N. B. Grimm, E. Marti, W. B. Bowden, J. Merriam, H. M. Valett, A. E. Hershey, W. H. McDowell, W. K. Dodds, S. K. Hamilton, S. L. Johnson, L. R. Ashkenas, and D. J. D'Angelo. 2000. Estimates of nitrogen loading to streams using in-stream processing rates. Paper presented at the annual meetings of the North American Benthological Society, Keystone Colorado, 28 May - 1 June, 2000.
58. Bowden, W.B. and K.J. Edwards. 1999. Controls on nutrient processing in hyporheic substrates from an arctic tundra stream. Annual meeting of the North American Benthological Society Meetings. Duluth, Minnesota. June 1999.
57. Slavik, K., B.J. Peterson, L.A. Deegan, A.E. Hershey, W.B. Bowden, and M.C. Miller. Biological responses to long-term fertilization of the Kuparuk River, Alaska. Annual meeting of the North American Benthological Society Meetings. Duluth, Minnesota. June 1999.
56. Bowden, W.B., J. Merriam, J. Tank, R. Hall, K. MacNeale, E. Bernhardt, P. Mulholland, J. Webster, and B. Sichel. 1998. The Hubbard Brook LINX Project: Nitrogen transformations in a northern hard forest stream. Annual meeting of the North American Benthological Society Meetings. Prince Edward Island, Canada. June 1998.

55. Edwardson, K.J, W.B. Bowden, K. Slavik, D.B. Arscott, B.J. Peterson, and W. Schofield. 1998. Biogeochemistry of spring streams in the tundra foothills, North Slope, Alaska. Annual meeting of the North American Benthological Society Meetings. Prince Edward Island, Canada. June 1998.
54. Mulholland, P.J, N.B. Grimm, E. Marti, W.B. Bowden, M. Vallett. Terrestrial biomes and stream hydrology. 1998. Annual meeting of the North American Benthological Society Meetings. Prince Edward Island, Canada. June 1998.
53. Peterson, B.J., Wollheim W.M, W.B. Bowden, N.B. Grimm, J.L. Meyer, D. Sanzone, P.J. Mulholland, J.L. Tank, and J.R. Webster. 1998. Transformations and export of ammonium nitrogen during $^{15}\text{NH}_4$ tracer additions to streams. Annual meeting of the North American Benthological Society Meetings. Prince Edward Island, Canada. June 1998.
52. Slavik, K., Peterson, B.J., D.B. Arscott, W.B. Bowden, R.L. Lowe. 1998. Comparison of primary production in spring, mountain and tundra streams on the North Slope of Alaska. Annual meeting of the North American Benthological Society Meetings. Prince Edward Island, Canada. June 1998.
51. Tank, J.L., P.J. Mulholland, J.L. Meyer, W.B. Bowden, J.R. Webster, B.J. Peterson, and D. Sanzone. 1998. Nitrogen cycling in grazing versus detrital pathways in 3 temperate forested streams. Annual meeting of the North American Benthological Society Meetings. Prince Edward Island, Canada. June 1998.
50. Wollheim, W.M., B.J. Peterson, W.B. Bowden, N.B. Grimm, J.L. Meyer, D. Sanzone, P.J. Mulholland, J. L. Tank, and J.R. Webster. 1998. Estimating ammonium Sw using ^{15}N -biota and water column $^{15}\text{NH}_4$ during tracer additions to streams. Annual meeting of the North American Benthological Society Meetings. Prince Edward Island, Canada. June 1998.
49. Arscott, D.B., W.B. Bowden, and J.C. Finlay. 1997. Stress effects on physiologically contrasting bryophytes in an arctic stream. Annual meeting of the North American Benthological Society Meetings. San Marcos, Texas. June 1997.
48. Bowden, W.B. and K.J. Edwardson. 1997. Hyporheic processing at various scales in an arctic landscape. Annual meeting of the North American Benthological Society Meetings. San Marcos, Texas. June 1997.
47. Edwardson, K.J. and W.B. Bowden. 1997. Hyporheic processing in contrasting arctic stream reaches. Annual meeting of the North American Benthological Society Meetings. San Marcos, Texas. June 1997.
46. Arscott, D.B., W. B. Bowden and J.C. Finlay. 1996. A comparison of primary production by epilithic algae and bryophytes in control and fertilized reaches of a tundra stream, Alaska. Special Session on the "Roles of Bryophytes in Stream Ecosystems". Annual meeting of the North American Benthological Society Meetings. Kalispell, Montana. June 1996.

45. Bowden, W.B. and D. Pappathanasi. 1996. Decomposition of aquatic bryophytes. Special Session on the "Roles of Bryophytes in Stream Ecosystems". Annual meeting of the North American Benthological Society Meetings. Kalispell, Montana. June 1996.
44. Bowden, W.B. 1996. Introduction. Special Session on the "Roles of Bryophytes in Stream Ecosystems". Annual meeting of the North American Benthological Society Meetings. Kalispell, Montana. June 1996.
43. Finlay, J.C., W.B. Bowden, and D.B. Arscott. 1996. Production by bryophytes in aquatic ecosystems. Special Session on the "Roles of Bryophytes in Stream Ecosystems". Annual meeting of the North American Benthological Society Meetings. Kalispell, Montana. June 1996.
42. Wollheim, W.M., J. C. Finlay, B. J. Peterson, W. B. Bowden, D. Arscott. 1996. Nitrogen uptake by bryophytes in reference and fertilized reaches of an arctic tundra river. Special Session on the "Roles of Bryophytes in Stream Ecosystems".
41. Edwardson, K.E., W.B. Bowden, J.C. Finlay, and B.J. Peterson. 1995. Synoptic study of metabolism, nutrient transport, discharge, and transient storage in a lake-dominated, arctic tundra stream. Poster presentation at the annual meetings of the North American Benthological Society. Keystone, Colorado.
40. Kling, G.W., G.W. Kipphut, W.B. Bowden, and C. Dahm. 1995. Using SF₆ to estimate the flux of CO₂ and CH₄ from Arctic streams. Presentation at the annual meetings of the American Society of Limnology and Oceanography.
39. Smith, C.T. and W.B. Bowden. 1995. Forest Utilization of wood ash: soil chemical changes and effects on forest vegetation. Presented at the Symposium on land application of wood-fired and combination boiler ashes. NCASI. 2-3 August, 1995. Asheville, North Carolina.
38. W.B. Bowden, J.C. Finlay, and J. Terninko. 1995. Distribution and production of bryophytes in two fertilized, arctic, tundra streams. Presentation at the annual meetings of the North American Benthological Society. Keystone, Colorado.
37. Peterson, B.J., J.E. Hobbie, L.A. Deegan, W.J. O'Brien, M.E. McDonald, A.E. Hershey, and W.B. Bowden. 1994. Global change effects on arctic freshwater: predictions from whole-system experiments. Global Change Workshop. Woods Hole.
36. Finlay, J.C. and W.B. Bowden. 1993. Controls on production of bryophytes in an arctic tundra stream. Poster presentation at the 1993 annual meetings of the North American Benthological Society. Calgary, Alberta, Canada. May 1993.
35. Bowden, W.B., J.C. Finlay, and P.E. Maloney. 1993. Long-term effects of po₄ fertilization on the distribution of bryophytes in an arctic stream. Presentation at the 1993 annual meetings of the North American Benthological Society. Calgary, Alberta, Canada. May 1993.

34. Pardo, L.H, C-Y. Li, B.T. Bormann, R.H. Bormann, W.B. Bowden, R.S. Pierce, M.C. Snyder, and D.Wang. 1992. Associative nitrogen fixation in two expermienda Pinus ecosystems. Poster presentation at the annual meeting of the Ecological Society of America. Hawaii. August 1992.
33. Bowden, W.B. and W.H. McDowell. 1991. Interactions among plants, microbes, and water and their influences on N dynamics in the riparian zones of two geomorphologically distinct forested tropical watersheds. Poster presented at the 1991 Gordon Conference on Hydrological-Geochemical-Biological Interactions in Forested Catchments.
32. McDowell, W.H. and W.B. Bowden. 1991. Impact of Hurricane Hugo on stream and groundwater chemistry in a tropical rain forest. North American Benthological Society. Santa Fe, NM.
31. Bowden, W.B. 1990. Hillslope hydrology research within the LTER network: three case examples. Poster presented at the triennial All-Scientists LTER Workshop. Estes Park, Colorado. September 1990.
30. Bowden, W.B., McDowell, W.H., C.E. Asbury, and A.M. Finley. 1990. Nitrous oxide emissions from the riparian zone of a tropical stream. Annual meeting of the Ecological Society of America. Snowbird, UT.
29. Hallet, R., C.T. Smith, W.B. Bowden. 1990. Nitrogen mineralization in forest soils after municipal sludge additions. Presented at the annual meeting of the Soil Science Society of America, San Antonio, Texas, October 1990.
28. Hallet, R., Medalie, L., C.T. Smith, and W.B. Bowden. 1990. Two posters presented at the 1990 Earth Day celebrations, University of New Hampshire.
27. Hallett, R., C.T. Smith, and W.B. Bowden. 1990. Forest response after municipal sludge additions. In: Smith, C.T. (ed.), Forestry abstracts: proceedings of the technical poster session of the New England Society of American Foresters 70th Annual Winter Meeting, p. 10. Manchester, NH.
26. McDowell, W.H., W.B. Bowden, C.E. Asbury, and A.M. Finley. 1990. Impact of hurricane Hugo on groundwater and stream water chemistry in a tropical watershed. Annual meeting of the North American Benthological Society.
25. Medalie, L., C.T. Smith, and W.B. Bowden. 1990. Forest land application of municipal sludge: the biotic barrier to nutrient leaching. Presented at the annual meeting of the Soil Science Society of America, San Antonio, Texas, October 1990.
24. Medalie, L., C.T. Smith, and W.B. Bowden. 1990. Forest land utilization of municipal sludge: the biotic barrier to nutrient leaching. In: Smith, C.T. (ed.), Forestry abstracts: proceedings of the technical poster session of the New England Society of American Foresters 70th Annual Winter Meeting, p. 11. Manchester, NH.

23. Smith, C.T., W.B. Bowden, L. Medalie, and R. Hallett. 1990. Forest ecosystem responses to municipal sludge application. Invited presentation. Northeastern Branch of the American Society of Agronomy and the Eastern Section of the Canadian Society of Agronomy. Durham, NH.
22. Bowden, W.B., A. Federer, S. Shepard, and S. Russell. 1989. Hillslope hydrology at the Hubbard Brook Experimental Forest. American Geophysical Union, Chapman Conference. September, 1989. Bar Harbor, ME.
21. Devoe, D.R., C.T. Smith, and W.B. Bowden. 1989. Sludge C/N ratio controls forest soil microcosm elemental fluxes. Annual Meeting of the Soil Science Society of America. 15-20 October 1989. Las Vegas, NV.
20. McDowell, W.H., W.B. Bowden, A. Finley, C.E. Asbury, and F. Scatena. 1989. Influence of groundwater hydrology on nitrogen transformation at the stream-groundwater interface of a tropical stream. Annual Meeting of the Ecological Society of America. 6-10 August 1989. Toronto, Ontario.
19. Bowden, W.B., C.P. McSwiney, and F.H. Bormann. 1988. Potential losses of N₂O and N₂ by nitrification and denitrification in northern hardwood forest soils at the Hubbard Brook Experimental Forest. Annual Meeting, Ecological Society of America. August 1988. Davis, CA.
18. Smith, C.T., and W.B. Bowden. 1988. Quantifying the mobility of sludge-derived nutrients and metals with forest soil microcosms. NCASI Northeast Regional Meeting. October 1988. Boston.
17. Bowden, R.D., G.T. Geballe, and W.B. Bowden. 1987. Foliar uptake of ¹⁵N- labelled cloud/fogwater by red spruce (*Picea rubens*) seedlings. Presentation at the annual meeting of the Ecological Society of America. Columbus, Ohio. 9-14 August, 1987.
16. Bowden, W.B., C.P. McSwiney, and F.H. Bormann. 1987. Gaseous, ionic, and organic nitrogen balance of soils from the Hubbard Brook Experimental Forest. Presentation at the annual meeting of the Ecological Society of America. Columbus, Ohio. 9-14 August, 1987.
15. Bowden, W.B. 1986. Nitrous oxide evolution from northern hardwood forests. Invited lecture delivered at NASA/Ames Research Laboratory, Moffett Field, California. 10 April, 1986.
14. Bowden, W.B. 1986. The biogeochemistry of nitrogen in freshwater wetlands. Keynote presentation at the International Symposium on the Ecology and Management of Wetlands. Charleston, SC. 16-20 June, 1986.
13. Bowden, W.B. and F.H. Bormann. 1986. Flux of nitrous oxide from a northern hardwood forest spodosol before and after whole-tree harvesting. Poster presentation at the Fourth International Congress of Ecology. Syracuse, NY. August, 1986.

12. Vorosmarty, C.V., W.B. Bowden, J.M. Morris, B. Moore, J.E. Hobbie, and B.J. Peterson. 1986. The nitrogen budget for a tidal, freshwater marsh. Symposium on Wetland Ecosystems. Charleston, SC. 26-30 March, 1986.
11. Bowden, W.B. 1985. Are nitrogen gas emissions important in natural ecosystems: a critical review. Delivered at the Annual Meetings of the Ecological Society of America. Minneapolis, MN. Organizer and Chairman for invited symposium on "The Nitrogen Cycle: Central Issues for Research and Management". See Ecological Bulletin Spring 1985.
10. Bowden, W.B. and F.H. Bormann. 1985. Spatial and temporal variability of nitrous oxide emissions from northern hardwood spodosols. Delivered at the International Union of Forestry Research Organizations symposium on Spatial and Temporal Variability of Water and Nutrient Movement in Soils. Hampton Beach, NH. Sept 1985. Moderator of session on Water Movement in Soils.
9. Bowden, W.B. 1983. A nitrogen budget for ammonium in a tidal freshwater marsh. Delivered at the Biennial Estuarine Research Federation Meeting. Virginia Beach, VA. Organizer and Chairman for invited symposium on "Tidal Freshwater Marshes". See Estuaries 6: 277-279.
8. Bowden, W.B. 1983. Is assimilatory nitrate reduction important in marsh sediments? Delivered at the New England Estuarine Research Society Meeting 22-23 April 1983. Portland, Maine.
7. Bowden, W.B. 1982. Conservative recycling of ammonium in a freshwater, tidal marsh sediment: Massachusetts, USA. Delivered at the Annual Meeting of the American Society of Limnology and Oceanography, Raleigh, NC.
6. Hobbie, J.E., C.V. Vorosmarty, B. Moore, B.J. Peterson, and W.B. Bowden. 1982. A hydrobiological model of nutrient cycling in a freshwater, tidal marsh: the North River, Mass., U.S.A. Delivered at the Annual Meeting of the American Society of Limnology and Oceanography, Raleigh, NC.
5. Bowden, W.B. 1981. Nitrogen remineralization in the sediments of a freshwater, tidal marsh. Delivered at the Biennial meeting of the Estuarine Research Federation, Gleneden Beach, OR. See Estuaries 4(3):295.
4. Bowden, W.B. 1981. Methods and preliminary estimates of nitrogen mineralization and immobilization in a freshwater, marsh sediment. Delivered at the Annual Meeting of the American Society of Limnology and Oceanography, Milwaukee, WI.
3. Daukas, P., B.J. Peterson, and W.B. Bowden. 1981. The potential influence of a mussel population on the phytoplankton community of a freshwater tidal marsh. Delivered at the Annual Meeting of the Marine Biological Laboratory. See Biol. Bull., October 1981.
2. Bowden, W.B. and J. Waterbury. 1980. Nitrifier populations in salt marsh sediments treated with sewage sludge. Delivered at the Annual Meeting of the American Society of Limnology and Oceanography, Knoxville, TN.

1. Bowden, W.B. 1976. A comparison of two direct-count techniques for quantitatively enumerating aquatic bacteria. Delivered at the Annual Meeting of the American Society of Limnology and Oceanography, Savannah, GA.

Invited lectures, seminars, and testimony

49. Invited Speaker. An Introduction to the Environment, Ecology, and Water Resources Issues of the Lake Champlain Basin, Vermont. Chinese Delegation of Environmental Judges. Vermont Law School & University of Vermont. 10 January 2017. Burlington, VT.
48. Invited Participant. National Science Foundation Arctic Program, Committee of Visitors. A blue-ribbon panel convened to evaluate the Arctic Program. 17-19 May 2016.
47. Invited Seminar Speaker. Interactions among biogeochemistry, hydrology, and stream ecology in permafrost-dominated arctic watersheds...and why this matters to the non-arctic world. Intersections Seminar Series. Department of Geography. University of Toronto. Toronto. 29 March 2014.
46. Invited Keynote Speaker. Interactions among biogeochemistry, hydrology, and stream ecology in permafrost-dominated arctic watersheds. THAW 2014 Thermokarst Impacts on Aquatic and Wetland Systems. Climate and Cryosphere (CLiC) Workshop. Laval University, Quebec City. 13 March 2014.
45. Invited Speaker. Climate change in the arctic: Permafrost, thermokarst, and why they matter to the non-arctic world. Biological and Environmental Science Colloquium. University of Rhode Island. Kingston. 18 October 2014
44. Invited testimony. Shoreland protection act. Vermont Senate Committee on Energy and Natural Resources. Montpelier, Vermont. 10 April 2013.
43. Invited Speaker. 2nd International Conference on Hydrology and Ground Water Expo" (Hydrology-2013), August 26-27, 2013, Raleigh North Carolina, USA, hosted by OMICS Group Conferences. Declined due to schedule conflict with classes.
42. Invited Keynote Speaker. Watershed process discoveries made possible by emerging sensor technologies. 22nd National NSF EPSCoR Conference. Couer d'Alene, Idaho. 25 October 2011.
41. Invited participant and speaker, NSF National Science Board workshop on the Role of Mid-Scale Research in NSF's Investment Portfolio. Arlington, VA. 5 June 2011.
40. Invited Speaker. Ecohydrological perspective of climate change aspects of northern catchments. North-Watch workshop on Simple models for complex problems - using empirical data and models in a learning framework for prediction in northern catchments. McGuire, K., J. Shanley, and D. Tetzlaff, organizers. Hubbard Brook, New Hampshire, US, 14-17 April, 2011

39. Invited Seminar. Hyporheic processes in Arctic streams: How will climate warming affect biogeochemical dynamics in high-latitude stream ecosystems? Department of Biology, University of Maine – Orono. 22 February 2008.
38. Invited speaker. Physical, chemical, and biological characteristics of streams in the central Noatak National Preserve: an assessment of current status for future trends. Arctic Parks Science Symposium. National Park Service. Fairbanks. October 2008.
37. Invited speaker. Opportunities for Research on the Environment: Stormwater. Annual meeting of the Vermont ESPCoR Program. March 2004.
36. Invited speaker. Defining stormwater water management in Vermont. Symposium on Stormwater Management in Vermont. September 2003.
35. Invited speaker. Integrated catchment management for community stakeholders. Ministry for the Environment, Sustainable Management Fund. 29-30 October 2001.
34. Invited participant and speaker. Engaging the public in complex science. Royal Society of New Zealand. 18-19 October 2001
33. Invited speaker, “The Motueka Integrated Catchment Management Programme”. Tasman District Council EcoFest. 5 November 2001.
32. Lecture. Integrated Catchment management. Lecture to students and faculty from EcoQuest International. April 2000 and 2001.
31. Seminar. Hillslope hydrology of tussock grassland, South Island, New Zealand. Seminar at the Department of Natural Resources, Durham, New Hampshire, USA. March, 2000.
30. Invited speaker. Hillslope and wetland hydrodynamics on a tussock grassland, South Island, New Zealand. Invited presentation at the Joint US-Japan Seminar on Hydrology and Biogeochemistry in Forested Catchments. For the New Zealand Ministry for the Environment, International Science and Technology/Technical Participation Programme. Report on a workshop convened by Drs. J. McDonnell and T. Tanaka, at the East-West Center, Honolulu, Hawai’i, 1-4 February, 2000.
29. Invited speaker. National Landcare Research conference, “Cherishing the Land”, Te Papa, Wellington, New Zealand, 21-23 April 1999. Presentation on integrated catchment management rediscovered: an essential tool for a new millennium.
28. Invited speaker. The Lotic Intersite Nitrogen Experiment. Seminar presented to the Zoology Department, University of Otago. 1998.
27. Invited speaker. Landcare Research Board of Directors. New directions in integrated catchment management. 1998.
26. Invited participant. NSF/LTER workshop on hydrological processes in forested catchments. H.J. Andrews Forest. 1997.

25. Participant. Gordon Conference on Forest Hydrology, Geochemistry, and Biology. New London, NH. 1997.
24. Invited participant. Workshop on future directions in hillslope hydrology research in New Zealand. Manaaki Whenua Landcare Research. 1997.
23. Invited speaker. Biosolids management in the northeast. Workshop of sludge and septage managers. New England Interstate Water Pollution Control Commission. 1996.
22. Invited speaker. Best management practices for sustainable forestry: the functioning wetland interface. Special technical session on sustainable forestry practices. Annual meeting of the Society of American Foresters. 1996.
21. Participant. Gordon Conference on Forest Hydrology, Geochemistry, and Biology. New London, NH. 1995.
20. Invited participant. Transport and cycling of biologically important solutes in streams: a cross-biome comparison. NSF/LTER funded workshop. July 1995. Coweeta Experimental Forest, North Carolina.
19. Panel member. NSF/EPA special joint program for research on Water and Watersheds. June 1995.
18. Invited participant. Workshop on the environment of the Antarctic Dry Valleys, McMurdo Sound. 14-17 March, 1995. Santa Fe, New Mexico.
17. Wetlands as landscape ecotones: effects on hydrology and nutrient biogeochemistry. 1995. Keynote address presented at the annual meeting of the New Hampshire Association of Wetlands Scientists. 11 February, 1995. Durham, New Hampshire.
16. Wetlands as components in landscapes and landscape-scale models. 1994. Modelling the delivery of terrestrial materials to freshwater and coastal ecosystems. International Global Biosphere Program. Inter-Core Project Workshop. 5-7 December 1994. Durham, New Hampshire.
15. Does the terrestrial nitrogen cycle really matter? A perspective on the role of riparian ecosystems. 1994. Seminar on nitrogen cycling. Institute for the Study of Earth, Oceans, and Space. Durham, New Hampshire.
14. Participant. Gordon Conference on Forest Hydrology, Geochemistry, and Biology. Holderness, NH. 1993.
13. Effects of phosphorus and nitrogen fertilization in a pristine arctic stream. 1991. University of Maine, Orono.
12. The influences of riparian wetlands on water quality: nitrogen in the North River, Massachusetts. 1991. Seminar Series on Estuarine Studies. Jackson Estuarine Laboratory, University of New Hampshire.

11. Participant. Gordon Conference on Forest Hydrology, Geochemistry, and Biology. Holderness, NH. 1991.
10. Workshop on global trace gas emissions. EPA/LINETI. Lisbon. 1990. (Declined due to other commitments.)
9. Workshop on global trace gas emissions. Dahlem Conference. Berlin. 1989. (Declined due to other commitments.)
8. Invited speaker, Acid rain panel discussion sponsored by University of New Hampshire Outing Club and GAIA for Earth Week (1989)
7. Participant. Hillslope hydrology and biogeochemical cycling in forested watersheds. American Geophysical Union. Chapman Conference. Bar Harbor, Maine. (September 1989)
6. N₂O emissions for clearcut northern hardwood forests, Boston University. April, 1989.
5. Effects of acid rain on watershed chemistry, Society of American Foresters national convention, Technical Workshop C-3 (1988)
4. Invited speaker, "Wetlands as a resource", Speaker's Bureau presentation to Salmon Falls River Watershed Association (1988)
3. Emissions of nitrous oxide from temperate forests. Informal invited presentation at an EPA sponsored workshop on "Biogenic and combustion sources of nitrous oxide." Boulder, CO. 15-16 September 1987.
2. The biogeochemistry of nitrogen in freshwater wetlands. Delivered at the International Symposium on the Ecology and Management of Wetlands. Charleston, SC. 16-20 June, 1986.
1. Nitrous oxide evolution from northern hardwood forests. Delivered at NASA/Ames Research Laboratory, Moffett Field, California. 10 April, 1986.

Interviews

Numerous interviews given to newspapers, magazines, radio and TV between 1980 and the present. Recent examples include:

- The Economist, NPR, and BBC on permafrost thaw in the arctic. (2009)
- Quoted regularly on stormwater and other environmental issues in the Burlington Free Press (2004 to present)
- The Scientist, September 13, 2004, *What lies beneath*, by Eugene Russo. On effects of Arctic climate warming on permafrost thaw.
- Solon.com on-line magazine, September 10, 2004, *Baked Alaska*, by Rebecca Clarren. On climate warming in the Arctic.

- Rutland Herald, New directions for integrated teaching and research in the Rubenstein School of Environment and Natural Resources. (April 2004)
- National Public Radio, New directions for stormwater management in Vermont. (Oct 2003)
- Vermont Quarterly, Shedding light on watersheds. (Spring 2003)

Service Activities and Experience

Institutional Activities

- Chair, Grievance Committee (2017)
- Member, Limnologist Search Committee (2016)
- Member, Institute of the Environment Visioning Committee (2014-15)
- Member, Incentive-Based Budget Steering Committee, University of Vermont (2013 to present)
- Chair, Incentive-Based Budget Subcommittee for Fees and Other Revenue, University of Vermont (2013)
- Member, Search Committee and Faculty Panel, Provost, University of Vermont (2013)
- Member, Envisioning Environment Working Group, University of Vermont (2012-13)
- Member, Professional Standards Committee, University of Vermont (2010-13)
- Chair, Search Committee, Director of the Rubenstein Ecosystems Science Lab and Associate Professor of Aquatic Ecology, Rubenstein School of Environment and Natural Resources (2010-2011).
- Member, Business Services Advisory Committee (2010-present)
- Member, Aquatic Ecology and Watershed Science Graduate Concentration (2005-present). Chair, 2009-2011.
- Member, Environmental Sciences Faculty (2002-present)
- Participant, Admitted Students Visitation days (Regularly participate)
- Participant, Alumni and other VIP research outreach days (Regularly participate)
- Chair, Search Committee, Managing Director of the Gund Institute of Ecological Economics, Rubenstein School of Environment and Natural Resources (2009).
- Member, Business Manager Search Committee, School of Natural Resources (2005)
- Chair, Faculty Standards Committee, Rubenstein School of Environment and Natural Resources (member 2004-08, Chair 2006-08). Led successful redraft of the Rubenstein School's By-Laws and protocols for Review, Promotion, and Tenure.
- Active in the development and leadership of the Applied Ecology and Watershed Sciences graduate concentration (2004 to present)
- Member, Associate Dean's Search Committee, School of Natural Resources, University of Vermont (2003)
- Member, Panel, Jumpstart for Juniors, University of Vermont (2003)
- Member, Faculty Senate, Rubenstein School of Environment and Natural Resources, University of Vermont (2003 - to present)
- Member, Wildlife Faculty Search Committee, Department of Natural Resources (1996)
- Member, Earth Oceans and Space Institute Review Committee (1993)
- Member, College of Life Sciences and Agriculture Planning Commission (1993-1996)
- Chair, College of Life Sciences and Agriculture Planning Commission (1993)
- Member, Policy Faculty Search Committee, Department of Natural Resources (1992)
- Charter member, University of New Hampshire Research Advisory Board (1991-1995)
- Member, Remote Sensing faculty search committee, Department of Natural Resources (1991)
- Member, review group, Biology Program option in Marine and Freshwater Biology (1991)

- Advisor, Eric Schwab and Lauren Guillet, high school environmental research projects (1990)
- Member, College of Life Sciences and Agriculture Distinguished Ecologist Seminar planning committee (1990)
- Member, Biology Building and Department Resources committee (1990)
- Participant, University System of New Hampshire Environment Symposium, Manchester, New Hampshire (1989)
- Participant, College of Life Sciences and Agriculture Super-Science Saturday (1989)
- Participant, Department of Forest Resources Natural Resources Seminar for high school students interested in environmental issues (1989)
- Participant, Natural Resources Ph.D. External Review Visit (1989)
- Chair, Water Resources Management faculty search committee (1989)
- Member, Natural Resources Management Ph.D. Executive Committee (1989 to present)
- Member, Department of Forest Resources ad hoc Biology Committee (1988-1990)
- Participant, Faculty-Undergraduate mixer sponsored by University of New Hampshire Mini-dorms (1988)
- Member, Department Graduate Committee (1988-present)
- Member, ROTC Scholarship Interview Panel (1988)
- Member, *ad hoc* Natural Resources Ph.D. Committee (1987-1988)
- Member, College of Life Sciences and Agriculture Dean Search Committee (1988)
- Member, College of Life Sciences and Agriculture Strategic Planning Committee - Natural Resources (1988)
- Member, College of Life Sciences and Agriculture Strategic Planning Committee - Biology (1988)
- Member, University of New Hampshire Undergraduate Research Opportunities Program (1987-1990)
- Member, University of New Hampshire Honors Program (1987-1990)
- Curriculum Coordinator, Water Resources Management Program, Department of Forest Resources, University of New Hampshire (1987-1997)

State and Regional Activities

- Member, Technical Advisory Committee, Lake Champlain Basin Program (2004 to 2012, 2015 to present), Chair (2010-2012).
- Invited Member, Curriculum Review Committee, Curriculum in Environment and Ecology, University of North Carolina – Chapel Hill, North Carolina. 25-27 March 2013.
- Inaugural Member, Water Quality Advisory Committee, Vermont Department of Conservation, 2012-present)
- Director, Lake Champlain Sea Grant Program (2012-present)
- Director, Theme 1, Northeastern States Research Cooperative (2008-present)
- Director, Vermont Water Resources and Lake Studies Center (2004-present)
- Member, Vermont EPSCoR Advisory Committee (2004 to present)
- Co-Leader, Lake Champlain Basin USENSCO/HELP program (2003-present)
- Co-Chair, Working Group on Assessment Approaches, Water Resources Board Investigative Docket (2003-2004)
- Member, Water Resources Board Investigative Docket on Stormwater (2003-2004)
- Co-Organizer and Chair, "Panel discussion on urban sprawl issues in Vermont". University of Vermont (2003)
- Advisor, wetland resource management, various agencies.

- Advisor, sludge application in forest lands, various agencies.
- Participant, Workshop to produce a video on sludge and septage management in New Hampshire (1992)
- Advisor, New Hampshire Timber Owners Association exhibit for Farm and Forest Exposition (1989)
- Director, Administrator, and Advisor for NSF sponsored Research Experiences for Undergraduates program at Hubbard Brook (1987-1988)
- Advisor, Coos County Extension - Effects of municipal watershed forest thinning on water quality and flooding potential (1988)
- Committee member, NH State Non-Point Source Pollution Advisory Committee (1988)
- Co-Organizer and Co-Chairman for workshop on "Sludge and ash application in forest lands: research needs". New England Center. Durham, New Hampshire (1987)
- Advisor, NH Department of Resource Economics and Development, Division of Forests and Lands - Forest Water Resources Trends Analysis (1987)
- Co-organizer, Workshop on Sludge and Ash Application in Forest Lands (1987)

National and International Activities

- Associate Editor, Biogeochemistry (peer-reviewed journal, impact factor 3.488) (2015 to present).
- Reviewer for proposals and manuscripts for numerous professional journals and federal funding agencies.
- Member, SEARCH (Search for Arctic Change) Science Steering Committee (2011-2018).
- Member, Toolik Field Station Science Steering Committee (2004 to present).
- Invited participant, NSF National Science Board workshop on the Role of Mid-Scale Research in NSF's Investment Portfolio, June 2011.
- Invited Associated Editor, Special Issue of New Zealand Journal of Marine and Freshwater Science. (2010-2011).
- Chair, Domain Science, Education, and Communication Committee, Arctic Domain (D-18), National Environmental Observatory Network. 2009 to present.
- Member, Understanding the Arctic, National Science Foundation Task Force. 2009 to 2010.
- Member, Pre-Proposal and Full-Proposal Panels, NSF Frontiers in Biological Research Panel (2005)
- Panel Member. NSF/FIBR Panel (pre-proposals). November (2004)
- Member, Consortium of Universities for the Advancement of Hydrological Sciences, Hydrologic Measurement Facility development team (2004-present)
- Founding Member and co-Director, Lake Champlain Basin UNESCO/HELP Initiative (2004 to present)
- Founding Advisory Board Member, EcoQuest International. A study abroad program based in New Zealand (1999 to 2002)
- Founding Member and Chair. Cooperative Research Group for Integrated Catchment Management. New Zealand (1999 to 2002)
- Organizer and Chairman for invited symposium on "The Role of Bryophytes in Stream Ecosystems". North American Benthological Society (1996)
- Invited panelist, NSF/EPA proposal evaluation panel for Water and Watersheds Program (1995)
- Invited Workshop Participant, EPA Workshop on N₂O emissions from non- agricultural lands (1987)
- Organizer and Chairman for invited symposium on "The Nitrogen Cycle: Central Issues for Research and Management". June 1985. Ecological Society of America. See Ecological Bulletin Spring (1985)
- Organizer and Chairman for invited symposium on "Tidal Freshwater Marshes". Estuarine Research Society. See Estuaries 6: 277-279. (October 1983)

Local Activities

- Member, Durham Conservation Commission. Drafted text for pamphlets on Wetland Resources and Shoreline Protection and text to update current town Wetland Ordinance. (1990 to 1997)
- Member, Durham Congregational Church, Nominating Committee (1997)
- Volunteer, Oyster River Youth Hockey rink work crew (1996)
- Member, Durham Congregational Church, Christian Education Cabinet (1995-1996)
- Coach and Referee, Oyster River Youth Association soccer (1990-1991)
- Member, Moharimet School playground construction crew (1990)

Other experience

Consulting projects not identified earlier

- Advisor, Styx River (Christchurch) Integrated Catchment Management. Christchurch City Council. 2000.
- Participant, EPA workshop on Combined Sewer Overflows during Wet-Weather Events. Washington, D.C. 2 July 1992.
- Comments on EPA technical assessment of nitrogen cycling in wetlands ecosystems. April 1990.
- Discussion of likely problems with a storm sewer design in New Haven harbor for proposed Long Wharf Condominium development. September 1986.
- Comments on effects of the Sunbeach condominium development on groundwater quality and quantity in East Hampton, Long Island, New York. Fall 1986.
- Comments on connections between development of the Laurel Hills Golf Course, Hamden Connecticut, and flooding in the Hill Street area. Fall 1986.
- Comments on effects of the Monument Stables development on the Bethany Bogs, Bethany, Connecticut. February 1986.
- Comments on effects of the proposed North Haven Mall on flooding and marsh vegetation along the Quinnipiac River. Fall 1985.

Major professional self-improvement activities

- Sabbatical leave (2017-18)
- Optical sensors in stream ecology workshop. Consortium for the Advancement of Hydrological Sciences, Ins., Gainesville, Florida. 14-16 February 2013.
- Sabbatical leave (2009-10)
- Executive Improvement workshops. Landcare Research. 2001 and 2002.
- 7-Habits of Highly Effective People workshop. Franklin Institute and Landcare Research. 2000.
- Executive staff management course. New Zealand Institute of Management. 1999.
- Riparian influences on water quality from natural and afforested grasslands. USDA-funded sabbatical leave. 1993-1994.
- Wetland restoration and creation workshop. National Wildlife Federation. Washington, D.C. 5-7 (October 1987)
- Stable isotope workshop. The Ecosystems Center. Marine Biological Laboratory. Woods Hole, MA. (17-22 May 1987)
- Teaching workshop. Department of Forest Resources, University of New Hampshire. (1987)
- Post-doctoral fellow. Yale University (1982-1984)
- Ph.D. dissertation. North Carolina State University (1979-1982)

- Writing workshop. Marine Biological Laboratory. Woods Hole, MA. (1983)
- M.S. thesis, North Carolina State University. (1974-1976)
- Research cruise: R/V Knorr - Nutrient studies in Humbolt Current, Peru. (January-February 1978)