

Statement of Experience
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Leadership Experience

I have successfully led personal as well as collaborative initiatives in academic, research, and community spheres. I have been responsible for hiring, motivating, counseling, and evaluating personnel in complex programs. I lead by example and through a collaborative and consultative process. I understand that I cannot do everything myself and so I enable a competent, self-starting team and endeavor to ensure that everyone knows their role and understands that their contributions are valued. In my career I have developed academic programs at multiple levels, led strategic planning initiatives, managed programs with many personnel and large budgets, and directed national and international research teams.

Strategic Planning

I have led strategic planning initiatives at institutional, national, and international levels. While at the University of New Hampshire, I was appointed by the Dean of the College of Life Sciences and Agriculture to chair a Strategic Planning Commission. The Commission included representatives from each department in the college and over the initial year of the Commission’s existence the committee and I met with the entire faculty of every department to identify their concerns about the past and aspirations for the future. I facilitated all these meetings and then organized the Commission’s report. This report became a blueprint for the future directions of the College. After my departure from UNH several of the organizational changes we suggested in this report were implemented by the current and later Deans.

In my role as Programme Leader at Landcare Research in New Zealand I was required to create a vision for an entirely new research program in Integrated Catchment Management. No such program had existed in New Zealand before. I worked with colleagues at Landcare Research, other Crown Research Institutes, national universities, and within local, regional, and national government to create a vision for this new research program. The program we developed operated as a successful research collaborative for ten years, even after I left as the program leader. Elements of the original program were incorporated into several new national research initiatives and the concepts and operating principles of integrated catchment management are now deeply ingrained in natural resources research and management in New Zealand.

I have served on several national-level, strategic planning committees focused on the impacts of climate change on Arctic systems, the primary area of my professional research. I served on several committees during the formative years leading up to the establishment of the National Environmental Observing Network (NEON). I was a member of the working group that vetted the Freshwater Instrumentation to be used by NEON. I was a member and at times the co-lead for the Stream Ecological Observing Network (STREON), and from 2009-2014 I chaired the Domain 19 (Arctic) Science, Education, and Communication Committee that sought to coordinate NEON activities during the startup phase. From 2011 to 2018 I served on the Science Steering Committee (SSC) for the Search for Arctic Change (SEARCH) initiative and was responsible for the “Permafrost” theme, one of four thematic areas in the SEARCH strategic plan. SEARCH is a strategic visioning committee funded by the National Science Foundation and focused on interagency and international coordination of research in the Arctic. The goal of SEARCH is to utilize national and international research funding efficiently to address key issues that are of critical strategic interest regarding climate change in the Arctic and impacts on the

global environment. Previously, from 2009-2010 I served on the Understanding Arctic Change task force, a sub-committee of SEARCH that was tasked to develop a general strategic plan for Arctic research.

Program Development

I have program development experience at the institutional, national and international level. In 1987 I was invited to create and establish a new undergraduate major in Water Resources Management within the Department of Forest Resources at the University of New Hampshire. I developed all the documentation for this new major and guided it through the review process to successful implementation. I was able to hire a new faculty colleague in this program and in 1989 Dr. William McDowell and I established the M.S. program in Water Resources Management in the newly organized Department of Natural Resources at UNH. I subsequently organized a set of meetings that ultimately led to the establishment of an inter-departmental Ph.D. program in Natural Resources Management at UNH.

In 1997, after being awarded tenure and promotion at UNH, I was offered and accepted a position as Team Leader of Catchment and Biospheric Processes at Landcare Research, in New Zealand. Landcare Research is a Crown Research Institute (CRI) with offices throughout New Zealand. At the time I accepted this position the CRI model was a new and unique research structure for New Zealand and so the move to New Zealand was an opportunity to participate in a bold new national experiment to generate research, science and technology knowledge for the public good. Shortly after arriving at Landcare Research, I was also appointed as Programme Leader for Integrated Catchment Management. In these dual roles I led a complete transformation of the forest catchment hydrology research program at Landcare Research, into a multi-institutional and inter-disciplinary program of research focused on the environment, economy, and communities of the Motueka River and Tasman Bay. This unique, stakeholder-driven research program took a 'ridge tops to the sea' perspective on water resources management, integrating land management issues with both river and coastal waters issues in a combination of applied and basic research. As a part of this effort, I created and Chaired the Co-operative Research Group for Integrated Catchment Management, a national group of research program leaders with related interests in integrated environmental management.

From 2001 to 2002 I led an initiative to include the Motueka River in a new international initiative led by UNESCO. The Hydrology for Environment Life and Policy (HELP) program was designed to share knowledge and experience about integrated catchment management among research and stakeholder groups around the world. It was recognized that the level of expertise and knowledge within individual catchment management groups varied considerably, with some groups having advanced capabilities and knowledge, while others were disadvantaged or developing. The goal of the program was to identify leading catchment groups who could provide experience and examples for developing catchment groups. The Motueka Integrated Catchment Management project was identified as one of only a few lead teams in the HELP international program. Shortly after arriving at UVM in 2002, I noted that Lake Champlain could serve a similar purpose and co-wrote a proposal that was successful in having the Lake Champlain Basin Program identified as a HELP lead team as well.

Program Administration

I have administrative experience managing several different, complex, multi-institutional programs. In my role as the Program Leader for Integrated Catchment Management at Landcare Research in New Zealand, I managed a research collaboration that involved Landcare Research, other national laboratories (the National Institute for Water and Atmosphere, the Institute for Geological and Nuclear Sciences, and the Cawthron Institute), and regional stakeholders (the Tasman District Council). I was responsible for the intellectual as well as the financial management of this national research program that involved roughly 40 collaborators working on 10 interacting themes.

At the University of Vermont, I directed three independent, federally funded research programs. As Director of the Lake Champlain Sea Grant program, I managed and developed resources for research,

education, and outreach relevant to the mission of NOAA's National Sea Grant College Program. As Director and Principal Investigator for Theme 1 of the USDA Forest Service's Northeastern States Research Collaborative I managed an interdisciplinary research program on the integration of resource management and socio-economic concerns in the northern forests of the New England region. As Director of the Vermont Water Resources and Lake Study Center supported by the U.S. Geological Survey, I managed and developed resources to support research on water resources of the state of Vermont and the Lake Champlain region. Each of these programs has a different federal client. As the Director of these programs I am responsible for developing annual budgets, running a competitive grants program, selecting suitable projects to support, tracking the progress of funded projects, and reporting to the relevant federal clients. Over my tenure as director of these programs I was able to grow the federally funds component of these programs from about \$1,000,000 annually to about \$6,500,000 annually with matching funds of an additional \$3,000,000.

External Relationships

Throughout my career I have interacted with stakeholders external to the programs or organizations of which I've been a member. In my early career I interacted with the pulp and paper mill industry and with state environmental agencies to help identify the potential risks of applying biosolids in forest lands. In my role as Programme Leader at Landcare Research in New Zealand I interacted with competing and collaborating research organizations; universities; local, regional, and national government; and NGOs. I also interacted directly and significantly with leaders in the indigenous Māori tribes.

After moving to the University of Vermont in 2002, I interacted with city, regional, and state stakeholders. For many years I was a member of the Technical Advisory Committee of the Lake Champlain Basin Program (LCBP). For three years I was Chair of this Committee, and was a de facto member of the LCBP Executive Committee and Steering Committee. As the Director of the Lake Champlain Sea Grant Program, I continued to have a seat on the LCBP Steering Committee. In these capacities I have had the opportunity to work with key university partners including the Commissioner of the Department of Environmental Conservation; the Secretary of the Agency Agriculture, Food and Markets; and with Vermont-based and DC-based staff of the Vermont congressional delegations. In the non-governmental sectors I worked closely with leaders of NGOs such as the Lake Champlain Basin Program, ECHO Lake Aquarium and Science Center on the Leahy Campus, and the Lake Champlain Committee. In addition, I have worked directly with key, private donors on projects of mutual interest in research and outreach.

Synergistic Activities

In addition to committee assignments noted above, I have developed and facilitated opportunities to stimulate communication and collaboration on research, training, and outreach at institutional, state, and national levels. I was a member of the Envisioning Environment working group that developed a vision for environmental research and education at UVM, to build on our environmental mission. I was a Senior Science Advisor for Vermont EPSCoR initiatives including the Complex System, Research on Adaptation to Climate Change, and the related Northeastern Water Sensor Network projects. I was an inaugural member of the Vermont Water Quality Advisory Committee.

From 2010 to 2023 I was the Streams Research Coordinator for the Arctic Long-Term Ecological Research project. This collaborative and integrated research project includes approximately a dozen researchers at 5 independent institutions across the US. I have been the long-term representative for UVM in the Consortium of University Scientists for the Advancement of Hydrologic Sciences, Inc. (CUAHSI) and served for many years on the Hydrologic Measurement Facility working group. In 2011, I was invited to participate in and present at a workshop organized by the National Science Board's Task Force on Mid-Scale Research, convened by the National Academy of Sciences.

Teaching interests and experience

Over my career I have developed nearly 20 different courses, largely in the areas of watershed science and water resources research and planning. In 1989 and again in 1993 I was awarded the Teaching Excellence Award in the Department of Forest Resources and the Department of Natural Resources, respectively, and in 1991 I was identified as the Outstanding Assistant Professor at the University of New Hampshire. In 2008 I was nominated for the Kroepsch-Maurice Teaching Award, but was unable to act on my nomination because of other obligations.

Professional Research Interests

My research has focused on interactions between hydrological and biogeochemical processes, especially as these processes are influenced by land use practices and land cover characteristics at catchment scales. I have authored or co-authored over 130 peer-reviewed, scientific publications and nearly 50 peer-reviewed technical reports. I have participated in hundreds of professional presentations and dozens of invited presentations.

Throughout my career my research has focused on climate change impacts in the arctic, especially the North Slope of Alaska. Most of this work has been collaborative research involving multiple institutions and colleagues. For example, in 2008 I initiated a collaborative project with colleagues across the United States and in Canada to use a systems approach to quantify the environmental consequences of thawing permafrost on the structure and function of the arctic landscape. Other recent collaborative arctic research efforts that I have led or co-led include a project to investigate the ecological consequences of a highly unusual tundra wildfire, research on the ecological effects of changing seasonality in the arctic, and research on altered hydrology and geochemistry of arctic streams and rivers.

Another theme of my research has focused on research relevant to adaptive management of land and water resources in urban and intensively-utilized rural catchments. This research focuses on surface-water/groundwater interactions, land use impacts on river water quality, characterization of riparian structure and function, catchment scale hydrological modeling, coastal biogeochemical processes, and development of publicly-accessible knowledge bases linked to GIS databases and Web interfaces.

Earlier in my career I led projects to identify the hydrodynamics of runoff processes in landscapes under different land use, environmental impacts of applying municipal biosolids in forest lands, comparative studies of nitrogen cycling in streams, influences of riparian zone geomorphology on nitrogen fluxes from tropical rain forests, impacts of whole-tree harvesting on nitrous oxide losses from northern hardwood forests, and nutrient cycling in tidal freshwater wetlands.

In my career I generated or managed just under \$35,000,000 in research funding.

Education

Ph.D. 1982 North Carolina State University, Raleigh, NC
M.S. 1976 North Carolina State University, Raleigh, NC
B.S. 1973 University of Georgia, Athens, GA.

Previous Professional Positions

2022 to present, *Robert & Genevieve Patrick Professor of Watershed Science & Planning Emeritus*

2002-2022, *Robert & Genevieve Patrick Professor of Watershed Science & Planning*, Rubenstein School of Environment and Natural Resources, Burlington, Vermont. Provided 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.

2020 to 2022, *Interim Associate Dean for Research and Faculty Development*, Rubenstein School of Environment and Natural Resources, Burlington, Vermont. Provided strategic support for research and faculty development, including annual review of faculty; reappointment, promotion, and tenure; and administration of the graduate programs in the school.

2008-2023, *Director and Principal Investigator*, Theme 1, Northeastern States Research Collaborative, Rubenstein School of Environment and Natural Resources, Burlington, Vermont. Developed and managed an interdisciplinary research program on the integration of resource management and socio-economic concerns in the northern forests of the New England region.

2012 to 2022, *Director*, Lake Champlain Sea Grant program. Developed and managed resources for research, education, and outreach relevant to the mission of the National Sea Grant Organization.

2004-2022, *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.

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. Lead the development of new M.Sc. and Ph.D. programs in Natural Resources Management.

1987-1992, *Assistant Professor and Curriculum Coordinator*, Water Resources Management, Department of Natural Resources, University of New Hampshire, Durham, NH. Developed a new undergraduate major in Water Resources Management.