General Information

Products

Journal articles


Theses/dissertations


Press Releases


Presentations


Fernandez, I. J., Norton, S. A., Nelson, S. J., and Patel, K., 2019, Trajectories of recovery from acid rain over 31 years (ambient) and 2 years (experimental) at the Bear Brook Watershed in Maine (BBWM), USA (oral): Annual meeting of the Society of Freshwater Science, Salt Lake City, Utah.


Norton, S. and Fernandez, I. J., 2019, Influences of discharge, pH, and DOC on Rare Earth Element concentrations during recovery from acid rain at the Bear Brook Watershed in Maine (BBWM) (poster): Annual Meeting of the Society of Freshwater Science, Salt Lake City, Utah.


Potter, J., A. Wymore, and W.H. McDowell. 2018. Greenhouse gas fluxes from aquatic ecosystems along a rural to urban gradient are driven by N loading. Society for Freshwater Science, Detroit, MI May 2018


Rodríguez-Cardona, B. 2019. Signed up as a “Skype a Scientist” participant. Skype a Scientist matches scientists with classrooms around the world. (https://www.skypeascientist.com/)


Taylor, V.; Buckman, K.; Chen, C.; Cottingham, K. Effects of dissolved organic carbon on methylmercury loading and bioavailability in stream ecosystems. Oral presentation at the Association for the Study of Limnology and Oceanography Meeting, Victoria, British Columbia, Canada, 12 June 2018. (Special Symposium 63)


Other


McDowell, W.H. 2018. Graduate short course on watershed biogeochemistry, Beijing Normal University, 11-14 April 2018

McDowell, W.H. 2018. Served on a panel for as part of a Pathway to Professorship program workshop. A panel of full professors shared their insights with Associate Professors who are interested putting a case forward for promotion. October 19, 2018.

Shattuck, M.D. 2019. Guest speaker at Epping Middle School. Talked with 6th graders about the importance of cleaning up the Lamprey River and keeping it clean. Demonstrated use of field meters to determine water quality. April 15, 2019.


Snyder, L. 2019. Met with a group of 15 Girl Scouts (4th-6th grade) at site DCF in Deerfield, NH as part of their capstone project to discuss the NH water quality sensor network and how seasonality, watershed characteristics and human activity affects water quality. Lisle demonstrated how salt (particularly road salt) affects water quality.

**Information Transfer Program**

The Information Transfer project provided salary for the Center's Director and Associate Director to meet with state representatives, local town officials, watershed groups, scientists and the general public to discuss NH WRRC findings regarding the impacts of population growth on potable water supply and ecosystem health in New Hampshire and the region. The NH WRRC website (http://www.wrrc.unh.edu/) is used to disseminate information on water resources and is also maintained with funding provided by this project.

This project also provided salary for the NH WRRC Associate Director to participate on the planning committee of the NH Water and Watershed Conference (NHWWC) and to organize the Annual Lamprey River Symposium. The annual NHWWC is designed to meet the information and networking needs of watershed groups, environmental organizations, volunteers, municipal board and staff members, consultants, elected officials, planners, policy makers, scientists, educators, and students. The state conference typically draws over 250 people. The goal of the Annual Lamprey River Symposium is to facilitate discussion and collaboration among scientists working in the Lamprey River basin and to engage local, state and federal officials, watershed organizations, and concerned citizens with the science and its implications for Great Bay and the entire coastal watershed. The symposium attracts approximately 90 attendees. The Lamprey River is the largest tributary to Great Bay and the recent impairment of Great Bay for elevated nitrogen has prompted significant focus on reducing nitrogen loading to the bay. Both the Director and Associate Director have participated in numerous discussions around this topic.
Student Support

Undergraduate students 11
Graduate students 8
Post-docs 2

Notable Achievements and Awards

Adam Wymore was awarded $28,649 from the University of New Hampshire Collaborative Research Excellence (CoRE) Initiative for the project: Watershed Informatics: Integrating big data to understand watersheds in a changing world.

Allison Herreid was selected as an ASLO Limnology and Oceanography Research Exchange (LOREX) program participant. This NSF-funded graduate student program was initiated in order to further connect ASLO members through international research collaboration. Allison will be assessing the influence of N cycling processes on greenhouse gas production (CO2, N2O, and CH4) in streams using steady state nutrient releases in Abisko, Sweden. Summer 2019.

Projects

Determining the effectiveness of the Clean Air Act and Amendments on the recovery of surface waters in the northeastern US

Project Type: Coordination Grant Project ID: EPA/USGS agreement # DW-014-92478401-0 USGS/UNH agreement # G18AP00030

Project Impact: This project continues the important work of the Regionalized Long-Term Monitoring program (RLTM) of the US Environmental Protection Agency (EPA) Long-Term Monitoring (LTM) Network. The RLTM program is operated through EPA’s Clean Air Markets Division (CAMD) and RLTM data are incorporated with the other LTM programs to monitor chemical trends and potential environmental responses from the Clean Air Act Amendments of 1990 (CAAA) and subsequent emissions reductions programs. Progress on objectives is reported below: Objectives 1 and 9 are complete for 2018. Sampling and analysis proceeded as described in the QAPP and final data has been submitted to EPA CAMD for 16 RLTM, 12 HELM and 1 Bear Brook Watershed in Maine (BBWM) sites. Objectives 2, 3, 4, 7 are in progress. The following objectives are accomplished and ongoing: Objective 5: Document changes in dissolved organic carbon (DOC), water clarity, and lake thermal structure (Gavin et al. 2018) Objective 6: Analyze optical properties of DOC (SUVA and fluorescence) Objective 8: Evaluate precipitation and other hydrologic indices across the Maine study region (Gavin et al. 2018) This information is fundamental for EPA to meet the Congressional mandate for reporting on the effectiveness of the CAAA. The highly effective combination of site-specific data within a regional context will provide for the recognition of trends and understanding of processes relating to declining SO₄, base cation depletion, and changes in N-saturation or DOC contributions to acid-base status. The results are central to the decisions on additional emission changes.

Effects of dissolved organic carbon on methylmercury bioavailability in stream ecosystems

Project Type: National Competitive Grant Project ID: 2016NH205G

Project Impact: Our work to date has advanced understanding of how combined landscape and chemical parameters drive levels of methylmercury, a potent neurotoxin, in streams. Watersheds in the Northeastern U.S. are prone to high levels of methylmercury, which can bioaccumulate to toxic levels in stream biota and be transferred to downstream water bodies. In field comparisons of 27 streams across a single watershed, we found that high levels of methylmercury in stream water were most strongly associated with elevated levels of dissolved organic carbon and iron. Stream chemistry was also strongly related to landscape parameters, where streams draining from small lakes had more microbially-mediated dissolved organic carbon and lower levels of methylmercury, whereas streams with wetlands in their catchments had more humic dissolved organic carbon and higher levels of methylmercury. In longitudinal sampling of 3 focal streams, methylmercury, iron, and dissolved organic carbon varied temporally. Methylmercury concentrations in wetland-draining streams were highest when temperatures were warm, promoting reducing conditions in watershed soils and wetlands. As such, this project identified conditions related to elevated methylmercury concentrations in streams on both a spatial and temporal scale, which is important to identifying and monitoring environments sensitive to mercury accumulation. In addition to field work, we have developed protocols for growing natural assemblages of biofilm in stream mesocosms, which are being applied to ongoing experiments on mercury uptake in the presence of different concentrations and characteristics of dissolved organic carbon. Results are being shared with the Lake Sunapee Protective Association and the association’s Science Advisory Committee.

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

Project Type: Annual Base Grant Project ID: 2003NH21B

Project Impact: This project documents long-term changes to water quality in three of New Hampshire’s rapidly developing watersheds: the Ossipee River watershed in central NH and the Lamprey and Oyster River watersheds located in southeast NH. Samples are collected by staff, students and volunteers and analyzed in the NH Water Quality Analysis Laboratory at by staff and students. In the Lamprey and Oyster River watersheds where we have
more than 15 years of data, we have begun to document changes in water quality. We have documented a statistically significant long-term increase in mean annual NO3- in the Lamprey River from 2000-2017. In both the Lamprey and Oyster River watersheds, we have documented a dramatic increase in Na+ and Cl- over a longer time period in response to increased road salt application in these watersheds (Daley et al. 2009 and recent data). Continued long-term monitoring of these sites is necessary to determine if the direction and magnitude of these documented changes will continue with ongoing changes in land use, watershed management practices and climate variability. The Lamprey River is the largest tributary to NH’s most significant estuary, the Great Bay estuary. Most of the estuarine waters of the Great Bay were classified as “impaired” by elevated nitrogen in 2009. Our long-term monitoring of surface waters throughout the Lamprey and Oyster watersheds complement existing Great Bay datasets and will provide necessary monitoring data to assess whether future management strategies to reduce the nitrogen load delivered to Great Bay are effective.