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New Hampshire WRRRC Information Transfer 2015

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New Hampshire WRRC Information Transfer

Basic Information

Title:	New Hampshire WRRC Information Transfer
Project Number:	2008NH97B
Start Date:	3/1/2014
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Focus Category:	Management and Planning, Education, Non Point Pollution
Descriptors:	None
Principal Investigators:	William H. McDowell, Michelle Daley Shattuck

Publications

1. Baillio, J. 2012. 2012. Controls on variability of dissolved greenhouse gas concentration and emissions from small streams in southeastern New Hampshire. M.S. Dissertation, Department of Natural Resources & the Environment, College of Life Science and Agriculture, University of New Hampshire, Durham, NH, 111 pages.
2. Daley, M.L. and W.H. McDowell, In Preparation, Human impacts on stream nitrogen chemistry and watershed N retention across a wide range of rural to urban catchments, Ecological Applications.
3. Hope, A.J., W.H. McDowell, W.M. Wollheim, Submitted, Ecosystem metabolism and nutrient uptake in an urban, piped headwater stream, Biogeochemistry.
4. Liptzin, D., M.L. Daley, and W.H. McDowell. Accepted. A comparison of wet deposition collectors at a coastal rural site. Submitted to Water, Air, & Soil Pollution. April 2013.
5. Parham, L. 2012. Spatial and temporal variation in degradation of dissolved organic carbon on the main stem of the Lamprey River. M.S. Dissertation, Department of Natural Resources & the Environment, College of Life Science and Agriculture, University of New Hampshire, Durham, NH, 66 pages.
6. Hope, A.J., W.H. McDowell, W.M. Wollheim. 2013. Ecosystem metabolism and nutrient uptake in an urban, piped headwater stream. Biogeochemistry. September 2013. DOI 10.1007/s10533-013-9900-y
7. Liptzin, D., M.L. Daley, and W.H. McDowell. 2013. A comparison of wet deposition collectors at a coastal rural site. Water, Air, & Soil Pollution. 224(5):1558. 2013.
8. Heffernan, J.B., P.A. Soranno, M.J. Angilletta, L.B. Buckley, D.S. Gruner, T.H. Keitt, J.R. Kellner, J.S. Kominoski, A.V. Rocha, J. Xiao, T.K. Harms, S.J. Goring, L.E. Koenig, W.H. McDowell, H. Powell, A.D. Richardson, C.A. Stow, R. Vargas, K.C. Weathers. 2014. Macrosystems ecology: understanding ecological patterns and processes at continental scales. *Frontiers in Ecology and the Environment* 12: 5-14.
9. Kaushal, S.S., W.H. McDowell, and W.M. Wollheim. 2014. Tracking evolution of urban biogeochemical cycles: past, present, and future. *Biogeochemistry* 121:1-21.
10. Koenig, L.E., A.J. Baumann, and W.H. McDowell. 2014. Improving automated phosphorus measurements in freshwater: an analytical approach to eliminating silica interference. *Limnology and Oceanography: Methods*. *Limnology and Oceanography: Methods*. 12:223–231. DOI: 10.4319/lom.2014.12.223. March 2014.
11. McDowell, W.H. 2014. NEON and STREON: opportunities and challenges for the aquatic sciences. *Freshwater Science* 34:386-391.

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12. Meyer, A. 2014. Response of ammonium uptake to carbon availability in an agriculturally influenced first order stream. M.S. Dissertation, Department of Natural Resources & the Environment, College of Life Science and Agriculture, University of New Hampshire, Durham, NH, 50 pages.
13. Shonka, N. 2014. Water quality sensors provide insight into the suspended solids dynamics of high flow storm events in the Lamprey River. M.S. Dissertation, Department of Natural Resources & the Environment, College of Life Science and Agriculture, University of New Hampshire, Durham, NH, 93 pages.
14. Sullivan, M. 2014. Groundwater nitrogen attenuation in suburban and urban riparian zones. M.S. Dissertation, Department of Natural Resources & the Environment, College of Life Science and Agriculture, University of New Hampshire, Durham, NH, 94 pages.
15. Appling, A. Leon, M. and McDowell, W.H. 2014. Reducing bias and quantifying uncertainty in watershed flux estimates: The R package loadflex. Submitted December 2014 to Ecosphere.
16. Appling, A.P., Leon, M.C. and McDowell, W.H. 2015. Reducing bias and quantifying uncertainty in watershed flux estimates: The R package loadflex. Ecosphere. 6(12): Article 269. DOI: 10.1890/ES14-00517.1 .
17. Kaushal, S.S., McDowell, W.H., Wollheim, W.M., Newcomer Johnson, T.A., Mayer, P.M., Belt, K.T. and Pennino, M.J. 2015. Urban Evolution: The Role of Water. *Water*. 7:4063-4087. doi: 10.3390/w7084063.
18. McDowell, W.H. 2015. NEON and STREON: opportunities and challenges for the aquatic sciences. *Freshwater Science*. 34:386-391. DOI: 10.1086/679489.
19. Pellissier, P.A., S.V. Ollinger, L.C. Lepine, M.W. Palace, and W.H. McDowell. 2015. Remote sensing of foliar nitrogen in cultivated grasslands of human dominated landscapes. *Remote Sensing of Environment*. 167:88-97.
20. Rodriguez-Cardona, B. 2015. Nitrate uptake kinetics in streams: Is carbon the driver? M.S. Dissertation, Department of Natural Resources & the Environment, College of Life Science and Agriculture, University of New Hampshire, Durham, NH, 67 pages.
21. Rodriguez-Cardona, B., Wymore, A.S. and McDowell, W.H. 2016. DOC:NO₃ ratios and NO₃ uptake in forested headwater streams. *Journal of Geophysical Research: Biogeosciences* . 121(1):205-217. doi:10.1002/2015JG003146.
22. Wymore A.S., Rodriguez-Cardona B. and McDowell, W.H. 2015. Direct response of dissolved organic nitrogen to nitrate availability in headwater streams. *Biogeochemistry* . 126:1-10. DOI 10.1007/s10533-015-0153-9.

Information Transfer

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

This project provided salary for the Center's Director and Associate Director to meet with state representatives, local town officials, watershed groups, school groups, the general public and scientists to discuss WRRC findings that relate to population growth, land use change and climate variability. Over the past year, the NH WRRC meet with the following groups to discuss water resource issues: NH Fish and Game, Natural Resources Conservation Service (NRCS), Trout Unlimited (TU), Southeast Watershed Alliance, The Nature Conservancy, Piscataqua Region Estuaries Partnership, NH Department of Environmental Services and the NH Geological Survey. The NH WRRC website (<http://www.wrrc.unh.edu/>) is also used to disseminate information on water resources, and is updated and maintained by salary provided by this project. The Director and Associate Director dedicate time discussing current and future research in the Lamprey River Hydrologic Observatory, which is partially funded by the longstanding 104B project "Water Quality and the Landscape: Long-term monitoring of a rapidly developing suburban watershed". On January 8, 2016 the NH WRRC funded and organized the **Ninth Annual Lamprey River Symposium** (see also below). Presentations focused on nutrients and other solutes, bacteria, sediment, hydrology, groundwater, climate and land use change, water quality indicators and monitoring programs in coastal New Hampshire. The symposium attracted approximately 90 attendees, including scientists, regional leaders, town officials, members of state agencies, and federal agencies. The agenda can be found on the NH WRRC Lamprey River Hydrologic Observatory Symposium [website](#). This annual symposium and other discussions in which the Center's Director and Associate Director participate further the research and information transfer goals of the NH WRRC.

2016 Information Transfer Activities Supported by Section 104b Funding and Matching Funds

Data sharing with Lamprey River watershed local advisory committee

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

Nitrogen Data in New Hampshire's Great Bay watershed

Over the last seven years, there has been significant focus on nitrogen loading to New Hampshire's largest estuary, the Great Bay estuary, and the impairment to aquatic life it has caused. In August 2009, Great Bay, Little Bay and the tidal rivers were added to the New Hampshire 2008 303d list of impaired waters rendering them in violation of the federal Clean Water Act. Based on the most recent "State of Our Estuaries Report" prepared by the Piscataqua Region Estuaries Partnership (PREP 2013), 32% of the nitrogen entering Great Bay and Little Bay is from point sources; the majority (68%) enters via non-point sources of pollution. The Lamprey River is the largest tributary to Great Bay, and thus the long-term data provided by the NH WRRC from the LRHO are of considerable value for watershed management. The NH WRRC provides the best dataset in NH for assessing the spatial and temporal variability in N concentrations and export in response to suburbanization and changes in land use. These 15+ years of data will be instrumental in assessing the success of current and future efforts to reduce non-point sources of nitrogen pollution reaching Great Bay. There is much interest in LRHO datasets from NH Department of Environmental Services (DES), PREP, the Environmental Protection Agency (EPA) and other municipal, regional, state and federal agents. Many of the presentations and meetings listed below focused on transferring information on nutrient cycling to stakeholders throughout NH's coastal watershed and beyond. The NH WRRC has received several phone calls and meeting requests to discuss the Great Bay nitrogen issue. The NH WRRC has also been asked by PREP to help update the nutrient loading indicator for the 2017 State of Our Estuaries report.

Water quality monitoring advice for wood restoration projects in NH streams

The Natural Resources Conservation Service and TU have selected 23 Wetlands Reserve Program (WRP) properties in NH for wood loading restoration work. The project involves adding wood into small segments of 1st and 2nd order stream channels (averaging about 1,000 feet) with a primary goal of recreating and increasing fish spawning and rearing habitat as well as preventing bank erosion and improving stream geomorphology. A supplemental goal of this work is to study the changes in water quality and nutrient uptake which may be enhanced by adding carbon (in the form of wood) to streams. The NH WRRC Director, Associate Director and the WQAL manager have been advising the NRCS and TU on how to best understand changes in water quality and nutrient dynamics with existing financial resources. With collaboration between the NRCS, TU and the NH WRRC, baseline water quality monitoring began in 2014. Wood installations began in the summer of 2015 and 10 properties have been identified for restoration in 2016.

Drinking water quality in New Hampshire

The recent Perfluorooctanoic Acid (PFOA) contamination of southern NH drinking water has prompted several inquiries to the NH WRRC and the Water Quality Analysis Laboratory (WQAL) from residents and local media concerned with drinking water quality in the state.

Symposia, Conferences and Seminars Organized and Funded

The NH WRRC funded and organized the "**Ninth Annual Lamprey River Symposium**" held January 8, 2016 in Durham, NH. The symposium is dedicated to exchanging the results of recent research on the water quality, hydrology, water resources issues, and management of the Lamprey River basin. The Symposium is a vehicle for researchers to share data and insights with other researchers, as well as those in the management and policy arena who would benefit from exposure to the latest research on the watershed. The symposium drew approximately 90 attendees, including researchers, legislators, water system operators, town officials, regional leaders and government officials. The symposium contained 13 presentations split up over three sessions. There was a poster session during and after lunch where 10 posters and displays were exhibited. The day ended with an open discussion on research priorities in the Lamprey watershed and southeast NH. This event was funded and organized by the NH WRRC. NH EPSCoR assisted with registration and printing. Survey results indicate that most of the attendees found the topics covered to be either helpful or very helpful.

The NH WRRC sponsored the "**NH Water and Watershed Conference**" which was held in combination with the 39th annual New England Association of Environmental Biologists (NEAB) meeting on March 18-20, 2015 in Bartlett, NH. The NEAEB conference serves as a platform for water resource experts, state and federal regulators, watershed organizations and other parties invested in environmental biology to share their first-hand experiences and knowledge as well as to discuss important issues affecting the world's waters. The NEAEB conference comes to New Hampshire only once every seven years thus this was a unique opportunity to combine these complementary events. The NH WRRC co-sponsored this conference along with Plymouth State University and the Center for the Environment, United States Environmental Protection Agency, New England Water Pollution Control Commission, and New Hampshire Department of Environmental Services. Two days of the conference were dedicated to concurrent sessions and workshops. One day was devoted to several relevant plenary presentations intermixed with a poster session and roundtable discussions. The Center's Associate Director also serves on the planning committee for the annual NH Water and Watershed Conference.

Publications

Appling, A.P., Leon, M.C. and McDowell, W.H. 2015. Reducing bias and quantifying uncertainty in watershed flux estimates: The R package loadflex. *Ecosphere*. 6(12): Article 269. DOI: 10.1890/ES14-00517.1.

Kaushal, S.S., McDowell, W.H., Wollheim, W.M., Newcomer Johnson, T.A., Mayer, P.M., Belt, K.T. and Pennino, M.J. 2015. Urban Evolution: The Role of Water. *Water*. 7:4063-4087. doi: 10.3390/w7084063.

McDowell, W.H. 2015. NEON and STREON: opportunities and challenges for the aquatic sciences. *Freshwater Science*. 34:386-391. DOI: 10.1086/679489.

Pellissier, P.A., S.V. Ollinger, L.C. Lepine, M.W. Palace, and W.H. McDowell. 2015. Remote sensing of foliar nitrogen in cultivated grasslands of human dominated landscapes. *Remote Sensing of Environment*. 167:88-97.

- Rodriguez-Cardona, B. 2015. Nitrate uptake kinetics in streams: Is carbon the driver? M.S. Dissertation, Department of Natural Resources & the Environment, College of Life Science and Agriculture, University of New Hampshire, Durham, NH, 67 pages.
- Rodriguez-Cardona, B., Wymore, A.S. and McDowell, W.H. 2016. DOC:NO₃ ratios and NO₃ uptake in forested headwater streams. *Journal of Geophysical Research: Biogeosciences*. 121(1):205-217. doi:10.1002/2015JG003146.
- Wymore A.S., Rodriguez-Cardona B. and McDowell, W.H. 2015. Direct response of dissolved organic nitrogen to nitrate availability in headwater streams. *Biogeochemistry*. 126:1-10. DOI 10.1007/s10533-015-0153-9.

Conference Proceedings & Abstracts:

- Appling, A., Leon, M. and McDowell, W.H. 2015. Optimizing watershed flux estimates: the R package 'loadflex'. Society for Freshwater Science Annual Meeting. Milwaukee, WI. May 17-21, 2015.
- Contosta, A., A.C. Adolph, D. Burchsted, M. Green, W.H. McDowell, and the New Hampshire EPSCoR Ecosystems & Society Sensor Team. The Vernal Window Flow Path: a Cascade of Ecological Transitions Delineated at Scales from Points to Pixels. American Geophysical Union Fall Meeting. San Francisco, CA. December 2015.
- Dodds, W.K., J. Rüegg, K. Sheehan, C. Song, F. Ballantyne, C. Baker, W.B. Bowden, K. Farrell, M.B. Flinn, E. Garcia, T. Harms, J. Jones, L. Koenig, J.S. Kominoski, W.H. McDowell, D. McMaster, S. Parker, M.T. Trentman, M. Whiles, W.M. Wollheim, A. Argerich and B. Penaluna. 2015. Biome Context and Lotic Ecosystem Rates. American Geophysical Union Fall Meeting. San Francisco, CA. December 2015.
- Koenig, L., L.E. Snyder, W.H. McDowell and C.W. Hunt. 2015. The contribution of aquatic metabolism to CO₂ emissions from New Hampshire streams. American Geophysical Union Fall Meeting. San Francisco, CA. December 2015.
- McDowell, W.G., Webster, K, Nelson, S, McDowell, W.H. and Haney, J. 2015. Regulation and results: biotic and abiotic changes to northeastern lakes following tightening of air emissions rules. Society for Freshwater Science Annual Meeting. Milwaukee, WI. May 17-21, 2015.
- McDowell, W.H. 2015. Aquatic sensor networks: Is there regional coherence in the response of stream chemistry to seasonal and hydrologic drivers? (abstract #90) HydroEco 2015, 5th International Conference on Hydrology and Ecology. Vienna, Austria, 13-16 April 2015.
- McDowell, W.H. 2015. International Critical Zone Science: Opportunities to Build a Global Understanding of Land-Water Linkages. American Geophysical Union Fall Meeting. San Francisco, CA. December 2015.
- McDowell, W.H., Potter, J, Snyder, L, Daley, M., Appling, A., Koenig, L, Rodriguez-Cardona, B., Wymore, A. and Brereton, R. 2015. Using a sensor network to understand drivers of nutrient and organic matter concentrations at multiple spatial and temporal scales. Society for Freshwater Science Annual Meeting. Milwaukee, WI. May 17-21, 2015.

- McDowell, W.H., Potter, J., Nelson, S.J. 2015. DOC concentrations of New England (USA) lakes: Is there a response to changing atmospheric deposition? Acid Rain 2015. Rochester, NY. October 19-23, 2015.
- Potter, J, McDowell, W.H. and Snyder, L. 2015. Patterns and drivers of specific conductance in New Hampshire rivers. Society for Freshwater Science Annual Meeting. Milwaukee, WI. May 17-21, 2015.
- Rodriguez-Cardona, B. and McDowell, W.H. 2015. Influences of DOC on nitrate uptake in suburban streams. Society for Freshwater Science Annual Meeting. Milwaukee, WI. May 17-21, 2015.
- Rodriguez-Cardona, B., A. Wymore, L. Koenig, A.A. Coble and W.H. McDowell. 2015. Response of non-added solutes during nutrient addition experiments in streams. American Geophysical Union Fall Meeting. San Francisco, CA. December 2015.
- Rueegg, J., Sheehan, K., Baker, C., Daniels, M., Dodds, W., Farrell, K., Flinn, M., Gido, K., Harms, T., Jones, J., Koenig, L., Kominoski, J., McDowell, W.H., Bowden, W., Rosemond, A.D., Trentman, M., Whiles, M., Wollheim, W. and Parker, S.P. 2015. Baseflow patterns of geomorphic heterogeneity in stream networks across biomes. Society for Freshwater Science Annual Meeting. Milwaukee, WI. May 17-21, 2015.
- Schade, J.D., J. Bailio, and W.H. McDowell. Nitrate loading and CH₄ and N₂O Flux from headwater streams. American Geophysical Union Fall Meeting. San Francisco, CA. December 2015.
- Snyder, L. 2015. NH EPSCoR Intensive Aquatic Sensor Network. Joint NEAEB/NH Water & Watershed Conference: Partnerships for Environmental Progress. Bartlett, NH. March 19, 2015.
- Wymore, A., Rodriguez-Cardona, B. and McDowell, W.H. 2015. Patterns of dissolved organic nitrogen (DON) production and consumption with the addition of nitrate (NO₃): Insights into the controls on DON cycling. Society for Freshwater Science Annual Meeting. Milwaukee, WI. May 17-21, 2015.
- Zeglin, L., Cooper, S, Utz, R., Ardon-Sayao, M., Bixby, R., Burdett, A., Dodds, W., Griffiths, N.A., Harms, T., Johnson, L., Johnson, S., Jones, J., Kominoski, J., McDowell, W.H., Rosemond, A.D., Trentman, M., Follstad Shah, J., Van Horn, D. and Ward, A. 2015. Synthesis of stream ecosystem responses to nutrient enrichment at multiple trophic levels. Society for Freshwater Science Annual Meeting. Milwaukee, WI. May 17-21, 2015.

Presentations/Information Transfer

- Coble, A., Shattuck, M.D., Potter, J.D., McDowell, W.H. 2016. Concentration discharge relationships and long-term trends of solute fluxes vary among flood periods. Annual Lamprey River Science Symposium. University of New Hampshire, Durham, NH. January 8, 2016.
- Koenig, L. 2015. Served as the instructor for the STEM mini-course offered August 24-28th through the CONNECT program at UNH (<http://www.unh.edu/connect/>). The objective of the course is to provide an opportunity for incoming freshmen that come from groups

with historically low retention in STEM majors (e.g. low-income, multicultural, first-generation college students) to build community, discover college resources, and bolster skills that are needed to succeed in their academic programs (e.g. writing of lab/research reports, basic math and statistics for analyzing scientific data). There were 7 students in the class, but the broader CONNECT program serves approximately 100 students.

- Students learned about best management practices (BMPs) and discussed how these engineering solutions may help mitigate local nutrient pollution and eutrophication in Great Bay, NH. They measured nitrogen and phosphorus concentrations in stormwater collected at the inflow and outflow of two different stormwater management structures operated by the UNH Stormwater Center (<http://www.unh.edu/unhsc/>). The students found that the BMPs surrounding the UNH campus were effective in reducing nutrient concentrations in stormwater, and presented these results to the entire CONNECT program at the end of the week.

Koenig, L., L.E. Snyder, C.W. Hunt, and W.H. McDowell. 2016. The contribution of aquatic metabolism to CO₂ emissions from New Hampshire streams. Annual Lamprey River Science Symposium. University of New Hampshire, Durham, NH. January 8, 2016.

McDowell, W.H. 2015. EPA TIME/LTM New England 2015. EPA Clean Air Act Cooperators meeting, Montpelier, VT. May 26 2015.

Shattuck, M.D. 2015. Led field trip for undergraduate and graduate students to sites in the Lamprey River Hydrologic Observatory. September 22, 2015.

Shattuck, M.D. 2015. Water Quality Research in the Lamprey River Hydrologic Observatory. Presentation to University of New Hampshire undergraduate class: Studio Soils. October 28, 2015.

Shattuck, M.D. 2015. Urbanization and suburbanization in New Hampshire watersheds. Presentation to University of New Hampshire class: Watershed Water Quality Management. October 6, 2015.

Shattuck, M.D. 2015. Understanding Water Quality Impacts of Farm Practices in Groundwater and Stream Water. Research field day at the University of New Hampshire Organic Dairy Research Farm. Lee, NH. November 4, 2015.

Shattuck, M.D. 2015. Watershed management in practice: Great Bay. Presentation to University of New Hampshire class: Watershed Water Quality Management. December 1, 2015.

Shattuck, M.D., Potter, J., Snyder, L. and McDowell, W.H. 2016. Hydrologic controls on nitrate and specific conductivity in NH streams: New insights using sensor data. Annual Lamprey River Science Symposium. University of New Hampshire, Durham, NH. January 8, 2016.

Wymore, A., Rodriguez-Cardona, B. and McDowell, W.H. 2016. Direct response of dissolved organic nitrogen to nitrate (NO₃⁻) availability in headwater streams. Annual Lamprey River Science Symposium. University of New Hampshire, Durham, NH. January 8, 2016.

Press Releases

Daley, M.L. 2015. Understanding Nitrogen Sources in the Great Bay Watershed. Great Bay Matters. Spring/Summer 2015. <http://greatbay.org/documents/gbmspring2015.pdf>

McDowell, W.H. 2015. On the Suncook River, a slow, rolling disaster response. Concord Monitor. August 2, 2015.

- Interviewed by Nick Reid, a reporter from the Concord Monitor, on the Suncook River avulsion in Epsom, NH which resulted from the Mother's Day 100 year flood in 2006. Interviewed on July 20, 2015.
<http://www.concordmonitor.com/home/17941607-95/on-the-suncook-river-a-slow-rolling-disaster-response>

Meetings attended

Daley, M.L. 2015. Met with NH Fish and Game, NRCS and Trout Unlimited to discuss water quality monitoring of adding wood to streams for stream restoration. Durham, NH. April 23, 2015.

Daley, M.L. 2015. Attended PREP monitoring meeting to discuss future eelgrass monitoring and PREP monitoring in general. Portsmouth, NH. May 7, 2015.

Daley, M.L. 2015. Attended Great Bay, Water and Science Meeting, Great Bay Discovery Center, Greenland, NH. May 5, 2015.

McDowell, W.H. 2016. Met with Kelsey Keegan, Legislative Assistant, Office of Senator Kelly Ayotte (R-NH), to discuss water resources issues in New Hampshire. Washington, D.C. February 9, 2016.

McDowell, W.H. 2016. Met with Travis Krogman, Legislative Assistant, Office of Representative Ann Kuster (D-NH-2), to discuss water resources issues in New Hampshire. Washington, D.C. February 9, 2016.

McDowell, W.H. 2016. Met with Michelle Jelnicky, Legislative Director, Office of Representative Frank Guinta (R-NH-1), to discuss water resources issues in New Hampshire. Washington, D.C. February 10, 2016.

McDowell, W.H. 2016. Met with Marissa Serafino, Legislative Correspondent, Office of Senator Jeanne Shaheen (D-NH), to discuss water resources issues in New Hampshire. Washington, D.C. February 10, 2016.

Shattuck, M.D. 2015. Attended a meeting to discuss the findings of the review of the two-year implementation of the Souhegan and Lamprey Instream Flow Pilot Program. Lee, NH. July 29, 2015.

Shattuck, M.D. 2015. Met with NRCS and Trout Unlimited to discuss water quality monitoring of adding wood to streams for stream restoration. Durham, NH. August 25, 2015.

Shattuck, M.D. 2015. Met with NH Fish and Game, NRCS and Trout Unlimited to discuss water quality monitoring of adding wood to streams for stream restoration. Durham, NH. October 10, 2015.

Shattuck, M.D. 2015. Met with NRCS and Trout Unlimited to discuss water quality monitoring of adding wood to streams for stream restoration. Durham, NH. March 22, 2016.

Shattuck, M.D. 2016. Attended The Nature Conservancy Coastal Plan Update for Water Resource Protection meeting – Identifying Spatial Priorities. Greenland, NH. March 31, 2016.