

To: Durham Planning Board / From: Joshua Meyrowitz, 7 Chesley Dr / Aug 5, 2022

**Prof. Wilfred Wollheim's professional expertise & input to the Planning Board on Church Hill parking plan**

*Since the Planning Board has thus far given shockingly little attention to the expert watershed-impact input on the Church Hill parking proposal generously provided to you by UNH's Prof. Wil Wollheim, and has seemingly discredited him and a few other top experts in their fields because they also happen to live in Durham, I submit here some easily found details about Dr. Wollheim's professional expertise from his [UNH profile](#), his submitted [Wilfred Wollheim 7-7-22](#) letter, the [WSAG](#) site, and [Google Scholar](#), including links to 273 of his publications.*

**Wilfred M. Wollheim**  
**ASSOCIATE PROFESSOR**  
**CO-DIRECTOR, WATER SYSTEMS ANALYSIS GROUP (WSAG)**  
**[Natural Resources and the Environment](#)**  
**College of Life Science and Agriculture**

**Education**

Ph.D., Earth Sciences, University of New Hampshire

M.S., Zoology/Physiology, University of Wyoming

B.S., Natural Resources, Cornell University

**Courses Taught**

504: Freshwater Resources

707/807: Environmental Modeling

NR 504: Freshwater Resources

NR 707/807: Environmental Modeling

NR 751/851: Aquatic Ecosystems

NR 795W: Investigations

NR 905: Grant Writing



“In understanding the environment as an integrated system, WSAG explores the physical, chemical and biological processes that shape hydrological systems, with emphasis on the unique role of humans as agents of change. Our research and educational programs cross the boundaries of traditional scientific disciplines to foster interdisciplinary understanding of environmental change. Through field monitoring, whole ecosystem experiments, novel in situ sensor deployments, and dynamic hydrological and ecosystem modeling, we attempt to understand hydrological and biogeochemical dynamics at scales ranging from individual ecosystems, to whole river systems, to the global systems of inland waters. Built on strong collaborations that are national and international in scope, our group also serves as a teaching platform for the next generation of ecosystem and earth system scientists.”

“The success of the Water Systems Analysis Group reflects a rapidly emerging scientific field which pursues integrative studies of hydrology, biogeochemistry, and human-water interactions that is necessary to analyze the full dimension of anthropogenic change at local, regional, and global scales.”

*In his letter to the Planning Board, excerpted in text boxes below, Professor Wollheim identifies his professional status as “**an aquatic ecosystem ecologist in the Department of Natural Resources and the Environment at UNH**” who has “**conducted extensive hydrological and water quality measurements in College Brook\* over the past 10 years, including working with the Town of Durham on its non-point nitrogen assessment in the early 2010’s.**”*

I am writing regarding the plan for a proposed new parking lot on Church Hill. This parking lot would replace the forest that is presently there. I urge you to strongly consider **the negative environmental impacts of such a development**. Church Hill currently drains into College Brook, prior to it flowing into the Oyster River and Great Bay.

College Brook is already one of the most impaired streams in NH, due to UNH campus and agricultural land upstream, as well as downtown Durham parking lots, stores, and residences. The impairment of College Brook results from impervious areas as well as manured or fertilized fields and lawns. The only upland forest land remaining in the College Brook watershed are College Woods, and the forest on Church Hill. Everything else is either cleared or built up.

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\*I have emphasized some text, replaced Prof. Wollheim’s “Br” with “Brook” for clarity, and added more line spaces for enhanced readability.

Forests are especially good at maintaining a good flow regime because water soaks into soils, and much of it is evaporated by the trees, while also maintaining good water quality in streams and rivers. As a result of forest loss through most of the College Brook watershed, the hydrologic regime of College Brook is greatly altered (peak flows too high), while the water chemistry has very high levels of chloride, sediment, and nutrients.

**Conversion of one of the last forest tracts to a parking lot will further degrade flows and introduce more pollutants.**

There is less evapotranspiration without the trees, which means more rainwater will get to the stream. **Installation of storm water detention ponds would reduce the peak flow, but the net result would still be more water getting to the stream due to less evaporation through the trees.**

**A parking lot will also result in more road salt additions, tire particles, automobile pollution, and other atmospheric deposition getting into the stream, further degrading it.\* While a buffer may remain between this new development and College Brook, it will likely not reduce the high flows from a parking lot, would do nothing for chloride, and likely very little for nitrogen. The amount of cleared land to buffer size would likely be too big.**

Efforts to restore College Brook are beginning. UNH has begun to **add storm water infrastructure** as part of building renovations (e.g. Hamilton Hall detention ponds) to reduce storm flow, **though these structures do nothing to alter chloride and little to reduce nitrogen concentrations.**

\* Note that these negative environmental impacts described by Prof. Wollheim, such as tire particles and automobile pollution, are prohibited under CUP Criterion #2 (as uniquely negative impacts on abutting properties and the neighborhood from the proposed parking lot, as distinct from other existing and possible uses). And these negative impacts are even more definitively prohibited under CUP Criterion #5: **“shall not degrade such identified resources on abutting properties. This shall include, but not be limited to, identified wetlands, floodplains....”** (without any required comparison in CUP Criterion #5 to other permitted or existing uses). *See the pictures on the last two pages of this document.*

I have begun conversations with the NH Agriculture Experiment Station about restoring a riparian forest buffer along the UNH fields (Fairchild Dairy). Towards that end, my lab has begun deploying sensors\* in College Brook at the outflow of the fields to understand current flow and water quality, to serve as a baseline to assess whether future riparian restoration results in improvements. Similarly, a riparian forest should be restored along the Mill Plaza parking lot to reduce pollutant inputs to the adjacent stream (there is essentially no riparian zone there right now).

These mitigation measures help mitigate the impacts of current human land uses, and are likely to improve water quality, but do not bring it up to the quality of water draining a forest.

**To have one of the last remaining forested sections in the College Brook watershed be cleared would be a major setback in improving water quality and flow conditions in College Brook.**

**Further, research from my lab demonstrates how protecting forest land in the downstream parts of a watershed (where Church Hill is located) carries disproportionate benefits in maintaining water quality, which has implications for nutrient fluxes to Great Bay.**

There are many other benefits of a forest in urban areas, including maintenance of cooler air and water temperatures **(a parking lot would add to the heat island effect and storm runoff during summers would be heated)**. I urge you to value these considerations in your discussions as you make a decision on the Church Hill forest....

\* See pictures on last page of this document

## A simple “Google Scholar” search reveals links to 273 Research Publications with Prof. Wollheim among the authors, 1994 to 2022

Article title, authors (full list of co-authors at link), publication, # of Google citations, publication year

<a href="#">Control of nitrogen export from watersheds by headwater streams</a> BJ Peterson, WM Wollheim, PJ Mulholland, JR Webster, JL Meyer, ... Science 292 (5514), 86-90	<a href="#">1674</a>	2001
<a href="#">Coastal eutrophication as a driver of salt marsh loss</a> LA Deegan, DS Johnson, RS Warren, BJ Peterson, JW Fleeger, ... Nature 490 (7420), 388-392	<a href="#">903</a>	2012
<a href="#">Nitrous oxide emission from denitrification in stream and river networks</a> JJ Beaulieu, JL Tank, SK Hamilton, WM Wollheim, RO Hall, ... Proceedings of the National Academy of Sciences 108 (1), 214-219	<a href="#">560</a>	2011
<a href="#">The regional and global significance of nitrogen removal in lakes and reservoirs</a> JA Harrison, RJ Maranger, RB Alexander, AE Giblin, PA Jacinthe, ... Biogeochemistry 93 (1), 143-157	<a href="#">389</a>	2009
<a href="#">NITROGEN CYCLING IN A FOREST STREAM DETERMINED BY A <sup>15</sup>N TRACER ADDITION</a> PJ Mulholland, JL Tank, DM Sanzone, WM Wollheim, BJ Peterson, ... Ecological Monographs 70 (3), 471-493	<a href="#">333</a>	2000
<a href="#">Factors affecting ammonium uptake in streams—an inter-biome perspective</a> JR Webster, PJ Mulholland, JL Tank, HM Valett, WK Dodds, BJ Peterson, ... Freshwater Biology 48 (8), 1329-1352	<a href="#">313</a>	2003
<a href="#">N uptake as a function of concentration in streams</a> WK Dodds, AJ López, WB Bowden, S Gregory, NB Grimm, SK Hamilton, ... Journal of the North American Benthological Society 21 (2), 206-220	<a href="#">313</a>	2002
<a href="#">Dynamic modeling of nitrogen losses in river networks unravels the coupled effects of hydrological and biogeochemical processes</a> RB Alexander, JK Böhlke, EW Boyer, MB David, JW Harvey, ... Biogeochemistry 93 (1), 91-116	<a href="#">256</a>	2009
<a href="#">Taking the pulse of snowmelt: in situ sensors reveal seasonal, event and diurnal patterns of nitrate and dissolved organic matter variability in an upland forest stream</a>	<a href="#">252</a>	2012

- BA Pellerin, JF Saraceno, JB Shanley, SD Sebestyen, GR Aiken, ...  
Biogeochemistry 108 (1), 183-198
- [Relationship between river size and nutrient removal](#) [251](#) 2006  
WM Wollheim, CJ Vörösmarty, BJ Peterson, SP Seitzinger, CS Hopkinson  
Geophysical Research Letters 33 (6)
- [Can uptake length in streams be determined by nutrient addition experiments? Results from an interbiome comparison study](#) [237](#) 2002  
PJ Mulholland, JL Tank, JR Webster, WB Bowden, WK Dodds, ...  
Journal of the North American Benthological Society 21 (4), 544-560
- [Influence of stream size on ammonium and suspended particulate nitrogen processing](#) [207](#) 2001  
WM Wollheim, BJ Peterson, LA Deegan, JE Hobbie, B Hooker, ...  
Limnology and Oceanography 46 (1), 1-13
- [Temperature and peat type control CO<sub>2</sub> and CH<sub>4</sub> production in Alaskan permafrost peats](#) [176](#) 2014  
CC Treat, WM Wollheim, RK Varner, AS Grandy, J Talbot, S Frolking  
Global Change Biology 20 (8), 2674-2686
- [Global N removal by freshwater aquatic systems using a spatially distributed, within-basin approach](#) [176](#) 2008  
WM Wollheim, CJ Vörösmarty, AF Bouwman, P Green, J Harrison, ...  
Global Biogeochemical Cycles 22 (2)
- [Quantification of the nitrogen cycle in a prairie stream](#) [176](#) 2000  
WK Dodds, MA Evans-White, NM Gerlanc, L Gray, DA Gudder, MJ Kemp, ...  
Ecosystems 3 (6), 574-589
- [N retention in urbanizing headwater catchments](#) [172](#) 2005  
WM Wollheim, BA Pellerin, CJ Vörösmarty, CS Hopkinson  
Ecosystems 8 (8), 871-884
- [Analysis of nitrogen cycling in a forest stream during autumn using a <sup>15</sup>N-tracer addition](#) [170](#) 2000  
JL Tank, JL Meyer, DM Sanzone, PJ Mulholland, JR Webster, ...  
Limnology and Oceanography 45 (5), 1013-1029
- [The application of electrical conductivity as a tracer for hydrograph separation in urban catchments](#) [146](#) 2008  
BA Pellerin, WM Wollheim, X Feng, CJ Vörösmarty  
Hydrological Processes: An International Journal 22 (12), 1810-1818

<a href="#">Nitrogen uptake and transformation in a midwestern US stream: a stable isotope enrichment study</a>	<a href="#">132</a>	2001
SK Hamilton, JL Tank, DF Raikow, WM Wollheim, BJ Peterson, ... Biogeochemistry 54 (3), 297-340		
<a href="#">Millennium ecosystem assessment scenario drivers (1970–2050): climate and hydrological alterations</a>	<a href="#">129</a>	2010
BM Fekete, D Wisser, C Kroeze, E Mayorga, L Bouwman, WM Wollheim, ... Global Biogeochemical Cycles 24 (4)		
<a href="#">Tracking evolution of urban biogeochemical cycles: past, present, and future</a>	<a href="#">128</a>	2014
SS Kaushal, WH McDowell, WM Wollheim Biogeochemistry 121 (1), 1-21		
<a href="#">Thinking outside the channel: modeling nitrogen cycling in networked river ecosystems</a>	<a href="#">114</a>	2011
AM Helton, GC Poole, JL Meyer, WM Wollheim, BJ Peterson, ... Frontiers in Ecology and the Environment 9 (4), 229-238		
<a href="#">The impact of flooding on aquatic ecosystem services</a>	<a href="#">113</a>	2018
CJ Talbot, EM Bennett, K Cassell, DM Hanes, EC Minor, H Paerl, ... Biogeochemistry 141 (3), 439-461		
<a href="#">Role of wetlands and developed land use on dissolved organic nitrogen concentrations and DON/TDN in northeastern US rivers and streams</a>	<a href="#">113</a>	2004
BA Pellerin, WM Wollheim, CS Hopkinson, WH McDowell, MR Williams, ... Limnology and Oceanography 49 (4), 910-918		
<a href="#">A stable isotope tracer study of nitrogen uptake and transformation in an old-growth forest stream</a>	<a href="#">111</a>	2004
LR Ashkenas, SL Johnson, SV Gregory, JL Tank, WM Wollheim Ecology 85 (6), 1725-1739		
<a href="#">Dynamics of N removal over annual time periods in a suburban river network</a>	<a href="#">96</a>	2008
WM Wollheim, BJ Peterson, SM Thomas, CH Hopkinson, CJ Vörösmarty Journal of Geophysical Research: Biogeosciences 113 (G3)		
<a href="#">Food resources of stream macroinvertebrates determined by natural-abundance stable C and N isotopes and a <sup>15</sup>N tracer addition</a>	<a href="#">95</a>	2000
PJ Mulholland, JL Tank, DM Sanzone, WM Wollheim, BJ Peterson, ... Journal of the North American Benthological Society 19 (1), 145-157		
<a href="#">Separation of river network–scale nitrogen removal among the main channel and two transient storage compartments</a>	<a href="#">89</a>	2011

- RJ Stewart, WM Wollheim, MN Gooseff, MA Briggs, JM Jacobs, ...  
Water Resources Research 47 (10)
- [Characterizing nitrogen dynamics, retention and transport in a tropical rainforest stream using an in situ<sup>15</sup>N addition](#) [86](#) 2002  
JL Merriam, WH McDowell, JL Tank, WM Wollheim, CL Crenshaw, ...  
Freshwater Biology 47 (1), 143-160
- [Urban evolution: The role of water](#) [81](#) 2015  
SS Kaushal, WH McDowell, WM Wollheim, TAN Johnson, PM Mayer, ...  
Water 7 (8), 4063-4087
- [Dissolved organic carbon uptake in streams: A review and assessment of reach-scale measurements](#) [80](#) 2016  
MM Mineau, WM Wollheim, I Buffam, SEG Findlay, RO Hall Jr, ...  
Journal of Geophysical Research: Biogeosciences 121 (8), 2019-2029
- [Continental-scale decrease in net primary productivity in streams due to climate warming](#) [78](#) 2018  
C Song, WK Dodds, J Rüegg, A Argerich, CL Baker, WB Bowden, ...  
Nature Geoscience 11 (6), 415-420
- [Lateral marsh edge erosion as a source of sediments for vertical marsh accretion](#) [76](#) 2018  
CS Hopkinson, JT Morris, S Fagherazzi, WM Wollheim, PA Raymond  
Journal of Geophysical Research: Biogeosciences 123 (8), 2444-2465
- [Roles of bryophytes in stream ecosystems](#) [75](#) 1999  
WB Bowden, D Arscott, D Pappathanasi, J Finlay, JM Glime, J LaCroix, ...  
Journal of the North American Benthological Society 18 (2), 151-184
- [River network saturation concept: factors influencing the balance of biogeochemical supply and demand of river networks](#) [74](#) 2018  
WM Wollheim, S Bernal, DA Burns, JA Czuba, CT Driscoll, AT Hansen, ...  
Biogeochemistry 141 (3), 503-521
- [Legacy effects in material flux: structural catchment changes predate long-term studies](#) [73](#) 2012  
DJ Bain, MB Green, JL Campbell, JF Chamblee, S Chaoka, JM Fraterrigo, ...  
Bioscience 62 (6), 575-584
- [Characterizing storm-event nitrate fluxes in a fifth order suburbanizing watershed using in situ sensors](#) [68](#) 2014  
RO Carey, WM Wollheim, GK Mulukutla, MM Mineau  
Environmental science & technology 48 (14), 7756-7765



- [Horizontal cooling towers: riverine ecosystem services and the fate of thermoelectric heat in the contemporary Northeast US](#) [65](#) 2013  
 RJ Stewart, WM Wollheim, A Miara, CJ Vörösmarty, B Fekete, ...  
 Environmental Research Letters 8 (2), 025010
- [Removal of terrestrial DOC in aquatic ecosystems of a temperate river network](#) [61](#) 2015  
 WM Wollheim, RJ Stewart, GR Aiken, KD Butler, NB Morse, J Salisbury  
 Geophysical Research Letters 42 (16), 6671-6679
- [Salinity effects on macroinvertebrate assemblages and waterbird food webs in shallow lakes of the Wyoming High Plains](#) [61](#) 1995  
 WM Wollheim, JR Lowvorn  
 Hydrobiologia 310 (3), 207-233
- [Surface and hyporheic transient storage dynamics throughout a coastal stream network](#) [58](#) 2010  
 MA Briggs, MN Gooseff, BJ Peterson, K Morkeski, WM Wollheim, ...  
 Water Resources Research 46 (6)
- [Extreme rainfall, vulnerability and risk: a continental-scale assessment for South America](#) [56](#) 2013  
 CJ Vörösmarty, L Bravo de Guenni, WM Wollheim, B Pellerin, D Bjerklie, ...  
 Philosophical transactions of the royal society a: mathematical, physical ...
- [A longer vernal window: the role of winter coldness and snowpack in driving spring transitions and lags](#) [55](#) 2017  
 AR Contosta, A Adolph, D Burchsted, E Burakowski, M Green, D Guerra, ...  
 Global Change Biology 23 (4), 1610-1625
- [Aquatic nitrate retention at river network scales across flow conditions determined using nested in situ sensors](#) [53](#) 2017  
 WM Wollheim, GK Mulukutla, C Cook, RO Carey  
 Water Resources Research 53 (11), 9740-9756
- [A coupled field and modeling approach for the analysis of nitrogen cycling in streams](#) [53](#) 1999  
 WM Wollheim, BJ Peterson, LA Deegan, M Bahr, JE Hobbie, D Jones, ...  
 Journal of the North American Benthological Society 18 (2), 199-221
- [Climate variability masks the impacts of land use change on nutrient export in a suburbanizing watershed](#) [51](#) 2014  
 NB Morse, WM Wollheim  
 Biogeochemistry 121 (1), 45-59
- [Effects of macrophyte growth forms on invertebrate communities in saline lakes of the Wyoming High Plains](#) [50](#) 1996

WM Wollheim, JR Lovvorn  
Hydrobiologia 323 (2), 83-96

[Controls on dissolved organic carbon quantity and chemical character in temperate rivers of North America](#) 46 2013

KW Hanley, WM Wollheim, J Salisbury, T Huntington, G Aiken  
Global Biogeochemical Cycles 27 (2), 492-504

[Longer thaw seasons increase nitrogen availability for leaching during fall in tundra soils](#) 42 2016

CC Treat, WM Wollheim, RK Varner, WB Bowden  
Environmental Research Letters 11 (6), 064013

[Nitrate uptake dynamics of surface transient storage in stream channels and fluvial wetlands](#) 38 2014

WM Wollheim, TK Harms, BJ Peterson, K Morkeski, CS Hopkinson, ...  
Biogeochemistry 120 (1), 239-257

[Influences of agricultural land use composition and distribution on nitrogen export from a subtropical watershed in China](#) 36 2018

W Li, L Zhai, Q Lei, WM Wollheim, J Liu, H Liu, W Hu, T Ren, H Wang, ...  
Science of the total environment 642, 21-32

[An index to characterize the spatial distribution of land use within watersheds and implications for river network nutrient removal and export](#) 36 2015

MM Mineau, WM Wollheim, RJ Stewart  
Geophysical Research Letters 42 (16), 6688-6695

[Riverine ecosystem services and the thermoelectric sector: strategic issues facing the Northeastern United States](#) 36 2013

A Miara, CJ Vörösmarty, RJ Stewart, WM Wollheim, B Rosenzweig  
Environmental Research Letters 8 (2), 025017

[Residence time distributions in surface transient storage zones in streams: Estimation via signal deconvolution](#) 35 2011

MN Gooseff, DA Benson, MA Briggs, M Weaver, W Wollheim, B Peterson, ...  
Water Resources Research 47 (5)

[Ammonium and nitrate uptake lengths in a small forested stream determined by <sup>15</sup>N tracer and short-term nutrient enrichment experiments](#) 29 2000

PJ Mulholland, JL Tank, DM Sanzone, JR Webster, WM Wollheim, ...  
Internationale Vereinigung für theoretische und angewandte Limnologie ...

- [A coupled terrestrial and aquatic biogeophysical model of the Upper Merrimack River watershed, New Hampshire, to inform ecosystem services evaluation and management under ...](#) [27](#) 2017  
NR Samal, WM Wollheim, S Zuidema, RJ Stewart, Z Zhou, MM Mineau, ...  
Ecology and Society 22 (4)
- [Spatial distribution of land type in regression models of pollutant loading](#) [27](#) 2005  
EJ Fedorko, RG Pontius Jr, SP Aldrich, L Claussens, CS Hopkinson, ...  
Journal of spatial hydrology
- [Ecosystem metabolism and nutrient uptake in an urban, piped headwater stream](#) [24](#) 2014  
AJ Hope, WH McDowell, WM Wollheim  
Biogeochemistry 121 (1), 167-187
- [History of nutrient inputs to the northeastern United States, 1930–2000](#) [22](#) 2013  
RL Hale, JH Hoover, WM Wollheim, CJ Vörösmarty  
Global Biogeochemical Cycles 27 (2), 578-591
- [The biogeochemical influences of NO<sub>3</sub><sup>-</sup>, dissolved O<sub>2</sub>, and dissolved organic C on stream NO<sub>3</sub><sup>-</sup> uptake](#) [21](#) 2009  
JA Thouin, WM Wollheim, CJ Vörösmarty, JM Jacobs, WH McDowell  
Journal of the North American Benthological Society 28 (4), 894-907
- [The role of snowmelt and spring rainfall in inorganic nutrient fluxes from a large temperate watershed, the Androscoggin River basin \(Maine and New Hampshire\)](#) [20](#) 2006  
AJ Oczkowski, BA Pellerin, CW Hunt, WM Wollheim, CJ Vörösmarty, ...  
Biogeochemistry 80 (3), 191-203
- [Supply, demand, and in-stream retention of dissolved organic carbon and nitrate during storms in Mediterranean forested headwater streams](#) [19](#) 2019  
S Bernal, A Lupon, WM Wollheim, F Sabater, S Poblador, E Martí  
Frontiers in Environmental Science, 60
- [Stream processes alter the amount and form of nitrogen exported from small watersheds](#) [18](#) 2001  
BJ Peterson, W Wollheim, PJ Mulholland, JR Webster, JL Meyer, JL Tank, ...  
Science 292, 86-90
- [High plains wetlands of southeast Wyoming: salinity, vegetation, and invertebrate communities](#) [18](#) 1999  
JR Lovvorn, WM Wollheim, EA Hart  
Wiley
- [Nitrification increases nitrogen export from a tropical river network](#) [17](#) 2017

LE Koenig, C Song, WM Wollheim, J Rüegg, WH McDowell  
Freshwater Science 36 (4), 698-712

[A scale-explicit framework for conceptualizing the environmental impacts of agricultural land use changes](#) [17](#) 2014

IL Hale, WM Wollheim, RG Smith, H Asbjornsen, AF Brito, K Broders, ...  
Sustainability 6 (12), 8432-8451

[From headwaters to rivers to river networks: Scaling in stream ecology](#) [16](#) 2016

WM Wollheim  
Stream ecosystems in a changing environment, 349-388

[Baseflow physical characteristics differ at multiple spatial scales in stream networks across diverse biomes](#) [16](#) 2016

J Rüegg, WK Dodds, MD Daniels, KR Sheehan, CL Baker, WB Bowden, ...  
Landscape ecology 31 (1), 119-136

[Assessment of select climate change impacts on US national security](#) [16](#) 2008

MA Levy, B Anderson, M Brickman, C Cromer, B Falk, B Fekete, P Green, ...

[The Lotic Intersite Nitrogen Experiments: an example of successful ecological research collaboration](#) [15](#) 2014

LINX collaborators  
Freshwater Science 33 (3), 700-710

[Hotbeds of biogeochemical diversity: Insights from urban long-term ecological research sites](#) [14](#) 2012

DJ Bain, RL Hale, WM Wollheim  
Elements 8 (6), 435-438

[Deliberative multiattribute valuation of ecosystem services across a range of regional land-use, socioeconomic, and climate scenarios for the upper Merrimack River watershed ...](#) [13](#) 2019

ME Borsuk, G Mavrommati, NR Samal, S Zuidema, W Wollheim, ...  
Ecology and Society 24 (2)

[Stream tracer breakthrough curve decomposition into mass fractions: A simple framework to analyze and compare conservative solute transport processes](#) [13](#) 2017

AN Wlostowski, MN Gooseff, WB Bowden, WM Wollheim  
Limnology and Oceanography: Methods 15 (2), 140-153

[Effects of suburbanization on foodweb stoichiometry of detritus-based streams](#) [13](#) 2012

NB Morse, WM Wollheim, JP Benstead, WH McDowell  
Freshwater Science 31 (4), 1202-1213

<a href="#">Controls of chloride loading and impairment at the river network scale in New England</a>	<a href="#">12</a>	2018
S Zuidema, WM Wollheim, MM Mineau, MB Green, RJ Stewart Journal of environmental quality 47 (4), 839-847		
<a href="#">Effective denitrification scales predictably with water residence time across diverse systems</a>	<a href="#">12</a>	2009
M Green, W Wollheim, N Basu, G Gettel, PS Rao, N Morse, R Stewart Nature Precedings, 1-1		
<a href="#">Causes and consequences of ecosystem service regionalization in a coastal suburban watershed</a>	<a href="#">10</a>	2015
WM Wollheim, MB Green, BA Pellerin, NB Morse, CS Hopkinson Estuaries and Coasts 38 (1), 19-34		
<a href="#">The overlooked role of diffuse household livestock production in nitrogen pollution at the watershed scale</a>	<a href="#">8</a>	2020
W Li, Q Lei, H Yen, WM Wollheim, L Zhai, W Hu, L Zhang, W Qiu, J Luo, ... Journal of Cleaner Production 272, 122758		
<a href="#">Mulholland PJ</a>	<a href="#">7</a>	2011
JJ Beaulieu, JL Tank, SK Hamilton, WM Wollheim, RO Hall Jr Peterson BJ, Ashkenas LR, Cooper LW, Dahm CN, Dodds WK, Grimm NB, Johnson SL ...		
<a href="#">CJ Vörösmarty, and ML Daley. 2004. Role of wetlands and developed land use on dissolved organic nitrogen concentrations and DON/DTN in northeastern US rivers and streams</a>	<a href="#">7</a>	
BA Pellerin, WH Wollheim, CS Hopkinson, WH McDowell, MR Williams Limnol. Oceanogr 49, 910-918		
<a href="#">Mulholland, JR Webster, JL Meyer, JL Tank, E</a>	<a href="#">6</a>	2001
BJ Peterson, WM Wolheim, P JH Marti, WB Bowden, HM Valett, AE Hershey, WH McDowell, WK Dodds, SK Hamilton ...		
<a href="#">Next generation framework for aquatic modeling of the Earth System</a>	<a href="#">4</a>	2009
BM Fekete, WM Wollheim, D Wisser, CJ Vörösmarty Geoscientific Model Development Discussions 2 (1), 279-307		
<a href="#">A spatially distributed framework for aquatic modeling of the Earth system (FrAMES)</a>	<a href="#">4</a>	2008
WM Wollheim, CJ Vörösmarty, AF Bouwman, P Green, JA Harrison, ... Global Biogeochem Cycles 22		
<a href="#">Utility of stable isotopes (13C and 15N) to demonstrate comparability between natural and experimental streams for environmental risk assessment</a>	<a href="#">4</a>	2006
DD Morrall, SC Christman, BJ Peterson, WM Wolheim, SE Belanger		

Ecotoxicology and Environmental safety 65 (1), 22-35

- [WBM: A scalable gridded global hydrologic model with water tracking functionality](#) 3 2022  
DS Grogan, S Zuidema, A Prusevich, WM Wollheim, S Glidden, ...  
Geoscientific Model Development Discussions, 1-54
- [The earth's natural water cycles](#) 3 2009  
CJ Vörösmarty, D Conley, P Döll, J Harrison, P Letitre, E Mayorga, ...  
The United Nations world water development report 3, 166-180
- [Spatial and temporal heterogeneity of methane ebullition in lowland headwater streams and the impact on sampling design](#) 2 2021  
AL Robison, WM Wollheim, B Turek, C Bova, C Snay, RK Varner  
Limnology and Oceanography 66 (12), 4063-4076
- [Simulating temporal variations of nitrogen losses in river networks with a dynamic transport model unravels the coupled effects of hydrological and biogeochemical processes](#) 2 2009  
PJ Mulholland, R Alexander, J Bohlke, E Boyer, J Harvey, S Seitzinger, ...  
Biogeochemistry 93 (1-2)
- [Ammonium and nitrate uptake lengths in a small forested stream determined by <sup>15</sup>N tracer and short-term nutrient enrichment experiments](#) 2 1998  
PJ Mulholland, JL Tank, DM Sanzone, JR Webster, W Wollheim, ...  
Oak Ridge National Lab.(ORNL), Oak Ridge, TN (United States)
- [Macroinvertebrate relations with salinity and macrophyte species in shallow lakes of the Wyoming High Plains](#) 2 1994  
WM Wollheim  
University of Wyoming
- [Superlinear scaling of riverine biogeochemical function with watershed size](#) 1 2022  
WM Wollheim, TK Harms, AL Robison, LE Koenig, AM Helton, C Song, ...  
Nature communications 13 (1), 1-9
- [Removal of Fecal Indicator Bacteria by River Networks](#) 1 2022  
T Huang, WM Wollheim, SH Jones  
Water 14 (4), 617
- [Spatial Patterns of Greenhouse Gases Across an Urbanization Gradient in a Suburban River Network](#) 1 2017  
A Robison, E Balch, WM Wollheim

AGU Fall Meeting Abstracts 2017, H23I-1792

- [Year 2012, 15 minute measurements of stage in a small headwater stream draining a highly suburban catchment \(72% residential\), Saw Mill Brook, Burlington, MA.](#) [1](#) 2016  
W Wollheim  
Environmental Data Initiative
- [Natural dams and biogeochemistry at the river network scale: implications for water quality](#) [1](#) 2016  
D Burchsted, C Brehme, MB Green, JM Jacobs, W Wollheim  
NH WRRC, University of New Hampshire
- [Transient Storage Parameterization of Wetland-dominated Stream Reaches](#) [1](#) 2014  
SM Wilderotter, A Lightbody, LH Kalnejais, WM Wollheim  
AGU Fall Meeting Abstracts 2014, H13H-1206
- [Seasonal asynchrony in terrestrial nutrient production and demand drives nutrient delivery to Arctic streams](#) [1](#) 2012  
WB Bowden, MS Khosh, G Waldvogel, MN Gooseff, WM Wollheim, ...  
AGU Fall Meeting Abstracts 2012, GC12A-06
- [High frequency measurements using in situ sensors in a coupled watershed-estuary reveal factors driving DOC variability](#) [1](#) 2012  
GK Mulukutla, RO Carey, WM Wollheim, J Salisbury  
AGU Fall Meeting Abstracts 2012, B13I-04
- [Examining effects of changing seasonality on arctic stream nutrients using a model of in-stream and hyporheic zone biogeochemical cycling](#) [1](#) 2011  
KA Whittinghill, WM Wollheim, WB Bowden, MN Gooseff, MR Herstand, ...  
AGU Fall Meeting Abstracts 2011, GC51F-1066
- [Thinking outside the channel: Research challenges for forecasting stream network denitrification](#) [1](#) 2008  
AM Helton, GC Poole, JL Meyer, BJ Peterson, WM Wollheim, ...  
The Nabs 56th Annual Meeting. Salt Lake City, Utah
- [The controls of watershed nutrient export](#) [1](#) 2005  
WM Wollheim  
University of New Hampshire
- [Application of isotopic and geochemical hydrograph separation to a suburban basin in the north shore of Massachusetts](#) [1](#) 2002  
BA Pellerin, WM Wollheim, CJ Vorosmarty, WH McDowell

AGU Spring Meeting Abstracts 2002, H42F-02

[Long-term ecological research and the COVID-19 anthropause: A window to understanding social-ecological disturbance](#) 2022

EE Gaiser, JS Kominoski, DM McKnight, CA Bahlai, C Cheng, S Record, ...  
Ecosphere 13 (4), e4019

[Dominance of Diffusive Methane Emissions From Lowland Headwater Streams Promotes Oxidation and Isotopic Enrichment](#) 2022

AL Robison, WM Wollheim, CR Perryman, AR Cotter, JE Mackay, ...  
Frontiers In Environmental Science 9 (ARTICLE), 791305

[Small Reservoirs as Nitrogen Transformers: Accounting For Seasonal Variability in Inorganic and Organic Nitrogen Processing](#) 2021

CT Whitney, WM Wollheim, A Gold, JM Buonpane  
AGU Fall Meeting 2021

[Scalability of the Farmable Wetlands Program—existing program is only one piece of the puzzle in meeting nitrate reduction targets](#) 2021

S Zuidema, WM Wollheim, CJ Kucharik, RB Lammers  
AGU Fall Meeting 2021

[Long-term change in river silicon from the poles to the tropics](#) 2021

KJ Jankowski, K Johnson, P Julian, L Sethna, P Thomas, BW Abbott, ...  
AGU Fall Meeting 2021

[High-Frequency Concurrent Measurements in Watershed and Impaired Estuary Reveal Coupled DOC and Decoupled Nitrate Dynamics](#) 2021

GK Mulukutla, WM Wollheim, JE Salisbury, RO Carey, TK Gregory, ...  
Estuaries and Coasts, 1-17

[The Seasonality of In-Stream Nutrient Concentrations and Uptake in Arctic Headwater Streams in the Northern Foothills of Alaska's Brooks Range](#) 2021

TP Covino, AN Wlostowski, MN Gooseff, WM Wollheim, WB Bowden  
Journal of Geophysical Research: Biogeosciences 126 (4), e2020JG005949

[Ambient N<sub>2</sub>: Ar in surface waters: How useful for understanding dynamics of reactive N?](#) 2020

WM Wollheim, E Balch, S Bower, D Bolster, A Robison, CTT Whitney  
AGU Fall Meeting Abstracts 2020, B115-0017



<a href="#"><u>The Impact of Water Withdrawals on Summer Low Flows in the Ipswich River Watershed, MA, USA</u></a>	2020
J Bobyock, WM Wollheim AGU Fall Meeting Abstracts 2020, H032-0001	
<a href="#"><u>Storms Disproportionately Contribute to Carbon Dioxide Efflux from Streams and Rivers on Annual Timescales</u></a>	2020
A Robison, WM Wollheim, L Koenig, J Potter, LE Snyder, WH McDowell AGU Fall Meeting Abstracts 2020, H077-07	
<a href="#"><u>Nitrogen processing across scales in reservoirs and implications for dam removal</u></a>	2020
E Balch, WM Wollheim, A Wymore AGU Fall Meeting Abstracts 2020, H032-0002	
<a href="#"><u>Assessing The Expansion of Beaver in Northeastern Coastal Watersheds Using High-Resolution Remotely-Sensed Data and the Implications for Biogeochemical Fluxes</u></a>	2020
CTT Whitney, WM Wollheim, MW Palace, C Herrick AGU Fall Meeting Abstracts 2020, B062-0003	
<a href="#"><u>Characterization of Wetland Scaling and Influence in the Ipswich and Parker River Watersheds of Northeastern Massachusetts</u></a>	2020
J Strzempko, WM Wollheim AGU Fall Meeting Abstracts 2020, H011-0025	
<a href="#"><u>RE: Scientists and Disinformation on Social Media</u></a>	2020
WM Wollheim	
<a href="#"><u>Terrestrial Carbon Dioxide Dominates Headwater Stream Emissions: Lessons Learned from One Year of SIPCO2 Sensor Deployment</u></a>	2019
A Robison, WM Wollheim AGU Fall Meeting Abstracts 2019, B51M-2415	
<a href="#"><u>Taking nitrogen by storm: Insights from sensors and spatial sampling</u></a>	2019
E Balch, WM Wollheim, A Wymore, A Lightbody AGU Fall Meeting Abstracts 2019, B51M-2419	
<a href="#"><u>High-Frequency Data Reveal Patterns of Dissolved Organic Matter Production and Nitrate Removal Within a Low-Head Coastal Reservoir</u></a>	2019
CT Whitney, WM Wollheim AGU Fall Meeting Abstracts 2019, B51M-2417	

<p><a href="#">Requirements for Successful Model Coupling in Interdisciplinary Research.</a> R Lammers, D Grogan, S Zuidema, A Prusevich, S Froking, W Wollheim Geophysical Research Abstracts 21</p>	2019
<p><a href="#">Winter greenhouse gas emissions from fluvial wetland dominated streams in Ipswich River, Massachusetts, USA.</a> P Clarizia, D Nguyen, D Bastviken, W Wollheim, RK Varner Geophysical Research Abstracts 21</p>	2019
<p><a href="#">PIE LTER year 2018, 15 minute measurements of dissolved oxygen, water temperature in a small headwater stream draining a mainly forested catchment (55% forest+ 19 ...</a> W Wollheim Environmental Data Initiative</p>	2019
<p><a href="#">Annual estimates of the water budget for the Ipswich River watershed, 1931 to 2018</a> W Wollheim, PIE LTER Environmental Data Initiative</p>	2019
<p><a href="#">PIE LTER nutrient samples collected by Sigma Autosampler between 2001 and 2017 in three headwater sites of contrasting land use, and at the Parker and Ipswich River Dams as ...</a> W Wollheim, PIE LTER Environmental Data Initiative</p>	2019
<p><a href="#">PIE LTER time series of nutrient grab samples from Ipswich River and Parker River watershed catchments, Massachusetts, with frequency ranging from weekly to monthly between 2001 ...</a> W Wollheim, PIE LTER Environmental Data Initiative</p>	2019
<p><a href="#">PIE LTER Year 2017, 15 minute measurements of conductivity, water temperature at the Ipswich River head of tide, Sylvania Dam in Ipswich, MA.</a> W Wollheim, M Green Environmental Data Initiative</p>	2019
<p><a href="#">PIE LTER year 2017, 15 minute measurements of specific conductance, water temperature in a small headwater stream draining a highly suburban catchment (72% residential), Saw ...</a> W Wollheim, M Green Environmental Data Initiative</p>	2019
<p><a href="#">PIE LTER Year 2017, 15 minute measurements of dissolved oxygen, water temperature at the Ipswich River head of tide, Sylvania Dam in Ipswich, MA.</a></p>	2019

W Wollheim  
Environmental Data Initiative

[PIE LTER dissolved nutrient and particulate concentrations of freshwater inputs to the Plum Island estuarine system, Massachusetts, taken approximately monthly.](#) 2019  
W Wollheim, C Hopkinson, PIE LTER  
Environmental Data Initiative

[The Role of Small Reservoirs in Reducing Reactive N Export Via Denitrification](#) 2019  
M Phillips, W Wollheim

[Enhancing Measurements of  \$p\text{CO}\_2\$  in Freshwaters Using High-Frequency in Situ Sensors: Options and Best Practices](#) 2018  
WM Wollheim, A Robison, K Cawley, L Koenig, DE Butman, PA Raymond, ...  
AGU Fall Meeting 2018

[Metabolic Scaling of River Networks](#) 2018  
WM Wollheim, WB Bowden, T Harms, AM Helton, L Koenig, A Robison  
AGU Fall Meeting Abstracts 2018, H21C-01

[Transport and Retention of Diffuse Livestock-Derived N at the Watershed Scale across Flow Conditions](#) 2018  
W Li, Q Lei, H Yen, WM Wollheim, L Zhai, H Liu  
AGU Fall Meeting Abstracts 2018, B21I-2435

[Examining the influence of land use and flow variability on carbon emissions from headwater streams](#) 2018  
A Robison, B Turek, WM Wollheim  
AGU Fall Meeting Abstracts 2018, H21K-1813

[River network saturation hypothesis: Factors influencing biogeochemical demand of entire river networks relative to supply](#) 2018  
W Wollheim, S Bernal, DA Burns, J Czuba, CT Driscoll, A Hansen, ...  
2018 ESA Annual Meeting (August 5--10)

[PIE LTER year 2015, 15 minute measurements of dissolved oxygen, water temperature in a small headwater stream draining a mainly forested catchment \(55% forest+ 19 ...](#) 2018  
W Wollheim  
Environmental Data Initiative

[PIE LTER Year 2015, 15 minute measurements of dissolved oxygen, water temperature at the Ipswich River head of tide, Sylvania Dam in Ipswich, MA.](#) 2018

W Wollheim Environmental Data Initiative	
<a href="#">PIE LTER year 2012, 5 minute and 15 minute measurements of conductivity, water temperature in a small headwater stream draining a mainly wetland catchment (49% wetlands/swamp+ ...</a>	2018
W Wollheim, M Green Environmental Data Initiative	
<a href="#">PIE LTER Year 2014, 15 minute measurements of conductivity, water temperature at the Ipswich River head of tide, Sylvania Dam in Ipswich, MA.</a>	2018
W Wollheim, M Green Environmental Data Initiative	
<a href="#">PIE LTER year 2014, 15 minute measurements of specific conductance, water temperature in a small headwater stream draining a highly suburban catchment (72% residential), Saw ...</a>	2018
W Wollheim, M Green Environmental Data Initiative	
<a href="#">The carbon commute: Effects of urbanization on dissolved organic carbon quality on a suburban New England river network</a>	2017
E Balch, A Robison, WM Wollheim AGU Fall Meeting Abstracts 2017, H23I-1791	
<a href="#">Survival of tidal marshes? A sediment mass balance approach that tells two stories</a>	2017
CS Hopkinson, J Morris, S Fagherazzi, W Wollheim, PA Raymond 24th Biennial CERF Conference	
<a href="#">Mass balances of dissolved gases at river network scales across biomes.</a>	2016
WM Wollheim, RJ Stewart, K Sheehan AGU Fall Meeting Abstracts 2016, B24C-03	
<a href="#">Annual nutrient loading and yield to Plum Island Estuary, as measured at the Ipswich and Parker Dams</a>	2016
W Wollheim, C Hopkinson Environmental Data Initiative	
<a href="#">Annual estimates of the water budget for the Ipswich River watershed, 1931 to present</a>	2016
W Wollheim Environmental Data Initiative	
<a href="#">Year 2015, 15 minute measurements of stage, water temperature in a small headwater stream draining a</a>	2016

- [mainly wetland catchment \(49% wetlands/swamp+ 36% forest\), Bear Meadow ...](#)  
W Wollheim  
Environmental Data Initiative
- [Dissolved nutrient and particulate concentrations of freshwater inputs to the Plum Island estuarine system, taken approximately monthly.](#) 2016  
W Wollheim, C Hopkinson  
Environmental Data Initiative
- [Annual estimates of nitrogen loading to the Ipswich River Watershed, 1931-2012.](#) 2016  
W Wollheim  
Environmental Data Initiative
- [Nutrient samples collected by Sigma Autosampler between 2001 and 2015 in three headwater sites of contrasting land use, and at the Parker and Ipswich River Dams as they enter ...](#) 2016  
W Wollheim  
Environmental Data Initiative
- [Contribution of fluvial wetlands to nitrogen retention in urbanizing coastal watersheds in New England across multiple scales](#) 2016  
A Lightbody, L Kalnejais, W Wollheim  
NH WRRC, University of New Hampshire
- [Sensitivity of New England Stream Temperatures to Air Temperature and Precipitation Under Projected Climate](#) 2015  
NR Samal, WM Wollheim, RJ Stewart, S Zuidema, AA Prousevitch, ...  
2015 AGU Fall Meeting
- [Removal of terrestrial dissolved organic carbon in aquatic ecosystems of a temperate river network.](#) 2015  
WM Wollheim, RJ Stewart, G Aiken, KD Butler, N Morse, J Salisbury  
AGU Fall Meeting Abstracts 2015, B13J-08
- [Understanding potential futures of riverine chloride impairment in New England USA due to climate change, groundwater storage, and human activities.](#) 2015  
S Zuidema, A Thorn, WM Wollheim, CP Wake, M Mineau  
AGU Fall Meeting Abstracts 2015, H33I-1722
- [Temperature sensitivity of stream gross primary production and respiration from the tropics to the arctic](#) 2015  
C Song, A Argerich, C Baker, WB Bowden, WK Dodds, M Douglas, ...  
AGU Fall Meeting Abstracts 2015, B51F-0488

- [Biome Context and Lotic Ecosystem Rates](#) 2015  
 WK Dodds, J Rüegg, K Sheehan, C Song, F Ballantyne, C Baker, ...  
 AGU Fall Meeting Abstracts 2015, B21D-0503
- [Fluvial Wetland Nitrogen Removal in Shallow Sloped, Coastal New England Watersheds](#) 2015  
 CT Whitney, WM Wollheim, G Mulukutla, A Lightbody  
 AGU Fall Meeting Abstracts 2015, B11F-0493
- [Fecal Coliform Removal by River Networks](#) 2015  
 T Huang, WM Wollheim, RJ Stewart  
 AGU Fall Meeting Abstracts 2015, H32E-04
- [What factors control the percentage of nitrogen that gets exported downstream from man-made reservoirs?](#) 2015  
 JM Buonpane, WM Wollheim, CT Whitney  
 AGU Fall Meeting Abstracts 2015, H13L-1761
- [Sensitivity of New England Stream Temperatures to Air Temperature and Precipitation Under Projected Climate](#) 2015  
 T Huang, NR Samal, WM Wollheim, RJ Stewart, S Zuidema, ...  
 AGU Fall Meeting Abstracts 2015, GC51E-1137
- [Coupled terrestrial and aquatic regional responses to land use change and climate variability in a temperate New England watershed](#) 2015  
 WM Wollheim, NR Samal, Z Zhou, S Zuidema, RJ Stewart, M Mineau  
 AGU Fall Meeting Abstracts 2015, GC34B-08
- [CONTRIBUTION OF SURFACE TRANSIENT STORAGE TO NITROGEN RETENTION WITHIN WETLAND-DOMINATED STREAM REACHES IN NEW ENGLAND](#) 2015  
 A LIGHTBODY, S WILDEROTTER, WM WOLLHEIM, L KALNEJAIS
- [CITIES ON THE RIVER-SCAPE: MODELING FRESHWATER SALINIZATION FROM URBAN CENTERS AND URBAN WATERSHEDS ALONG THE MERRIMACK RIVER](#) 2015  
 S ZUIDEMA, WM WOLLHEIM, MB GREEN, M MINEAU, R STEWART
- [The Buffering Balance: Modeling Arctic river total-, inorganic-, and organic-alkalinity fluxes](#) 2014  
 CW Hunt, J Salisbury, WM Wollheim, M Mineau, RJ Stewart  
 AGU Fall Meeting Abstracts 2014, B34B-05
- [Natural and Anthropogenic Water Treatment: How Riverine Ecosystem Services of Nitrogen Removal Interact with Wastewater Treatment Infrastructure in the Northeast US](#) 2014

RJ Stewart, WM Wollheim, KA Whittinghill, M Mineau, B Rosenzweig  
AGU Fall Meeting Abstracts 2014, B41J-0191

[Understanding dynamic pattern and process across spatial scales in river systems using simultaneous deployments of in situ sensors](#) 2014

WM Wollheim, G Mulukutla, C Cook, RO Carey  
AGU Fall Meeting Abstracts 2014, H14E-08

[Regional Analysis of River Conductivity Maps Salinity Driven Aquatic Habitat Degradation Potential Throughout New England](#) 2014

S Zuidema, WM Wollheim, M Green, M Mineau, RJ Stewart, E Volitis  
AGU Fall Meeting Abstracts 2014, H11C-0896

[Tracking evolution of urban biogeochemical cycles: salinization of fresh water](#) 2014

S Kaushal, WH McDowell, WM Wollheim, S Duan, JK Gorman, S Haq, ...  
AGU Fall Meeting Abstracts 2014, H11C-0894

[A megaregion-scale approach for assessing the impacts of climate change and strategic management decisions in the Northeast United States](#) 2014

B Rosenzweig, CJ Vorosmarty, RJ Stewart, A Miara, X Lu, DW Kicklighter, ...  
AGU Fall Meeting Abstracts 2014, GC51C-0426

[Heterogeneity in a Suburban River Network: Understanding the Impact of Fluvial Wetlands on Dissolved Oxygen and Metabolism in Headwater Streams](#) 2014

JS Cain, WM Wollheim, K Sheehan, A Lightbody  
AGU Fall Meeting Abstracts 2014, H11B-0879

[Year 2001, 15 minute measurements of stage, water temperature, conductivity, dissolved oxygen, and pH on the Ipswich R. mainstem at North Reading, just upstream of Rt. 28 \(~ 48 ...](#) 2014

W Wollheim, C Vorosmarty  
Environmental Data Initiative

[Year 2006, 10, 15 or 30 minute measurements of stage, water temperature, conductivity in a small headwater stream draining a mainly wetland catchment \(49% wetlands ...](#) 2014

W Wollheim, C Vorosmarty  
Environmental Data Initiative

[Amanda J. Hope, William H. McDowell](#) 2014

WM Wollheim  
Biogeochemistry 121, 167-187

- [Stream Tracer Integrity: Comparative Analyses of Rhodamine-WT and Sodium Chloride through Transient Storage Modeling](#) 2013  
EM Smull, AN Wlostowski, MN Gooseff, WB Bowden, WM Wollheim  
AGU Fall Meeting Abstracts 2013, H33F-1456
- [Modeling Nitrogen Processing in Northeast US River Networks](#) 2013  
KA Whittinghill, R Stewart, M Mineau, WM Wollheim, RB Lammers  
AGU Fall Meeting Abstracts 2013, B33F-0550
- [NE-RESM: An Integrated Water Resource Assessment and Solutions Platform for the US Northeast](#) 2013  
CJ Vorosmarty, A Miara, B Rosenzweig, F Duchin, N Dileki, R Stewart, ...  
AGU Fall Meeting Abstracts 2013, U51A-06
- [Future scenarios of urbanization and its effects on water quantity and quality in three New England watersheds](#) 2013  
L Hutyra, Y Yang, J Kim, C Cheng, P O'Brien, S Rouhani, EM Douglas, ...  
AGU Fall Meeting Abstracts 2013, B31E-0456
- [Stream Nitrate Concentrations Diverge at Baseflow and Converge During Storms in Watersheds with Contrasting Urbanization](#) 2013  
RO Carey, WM Wollheim, GK Mulukutla, CS Cook  
AGU Fall Meeting Abstracts 2013, B13F-0578
- [Incorporating human activities into an earth system model of the Northeastern United States: socio-hydrology at the regional scale](#) 2013  
B Rosenzweig, CJ Vorosmarty, A Miara, R Stewart, WM Wollheim, X Lu, ...  
AGU Fall Meeting Abstracts 2013, H34F-04
- [Contribution of Surface Transient Storage to Nitrogen Retention within Wetland-Dominated Stream Reaches](#) 2013  
A Lightbody, K Lawrence, WM Wollheim  
AGU Fall Meeting Abstracts 2013, H41D-1257
- [A general framework for incorporating heterogeneity of aquatic ecosystems into aquatic network models to understand biogeochemical fluxes](#) 2013  
WM Wollheim, R Stewart, KR Sheehan  
AGU Fall Meeting Abstracts 2013, B21G-06
- [Factors controlling aquatic dissolved inorganic nitrogen removal and export in suburban watersheds](#) 2013  
M Mineau, WM Wollheim, R Stewart, M Daley, WH McDowell  
AGU Fall Meeting Abstracts 2013, H33M-05



- [One-dimensional Solute Transport Models: Parameter Uncertainty Implications for Quantifying Biogeochemical Cycling in Stream Networks](#) 2013  
E Smull, A Wlostowski, M Gooseff, WB BOWDEN, WM WOLLHEIM  
2013 GSA Annual Meeting in Denver
- [Spatial and temporal controls on streamflow generation in a high arctic catchment: How does water accumulate along the valley floor?](#) 2013  
A Wlostowski, E Smull, M Gooseff, W Bowden, W Wollheim, K Whittinghill  
EGU General Assembly Conference Abstracts, EGU2013-3599
- [SAMPLING THE LAMPREY RIVER WATERSHED ACROSS SPACE AND TIME--NEW DATA COLLECTION EFFORTS TOWARD UNDERSTANDING NITROGEN SOURCES](#) 2013  
TE SMITH, WH MCDOWELL, WM WOLLHEIM, M DALEY, G MULUKUTLA, ...
- [Nutrient samples collected by Sigma Autosampler between 2001 and 2011 in three headwater sites of contrasting land use, and at the Parker and Ipswich River Dams as they enter ...](#) 2013  
W Wollheim  
Environmental Data Initiative
- [Time series of nutrient grab samples from Ipswich River and Parker River watershed catchments with frequency ranging from weekly to monthly between 2001 and 2011.](#) 2013  
W Wollheim  
Environmental Data Initiative
- [Annual estimates of the water budget for the Ipswich River watershed, 1931-2008.](#) 2013  
W Wollheim  
Environmental Data Initiative
- [Flow Direction from Land Surface-Parker and Ipswich Watersheds-ASCII Raster File](#) 2013  
W Wollheim  
Environmental Data Initiative
- [Stream Order for drainage to streams in the Ipswich or Parker River Network-ASCII Raster File](#) 2013  
W Wollheim  
Environmental Data Initiative
- [Estimated River Length for Rivers in the Ipswich and Parker River Watersheds-ASCII Raster File](#) 2013  
W Wollheim  
Environmental Data Initiative

- [Estimated Distance from the Ocean for River Grid Cells-Parker and Ipswich Watersheds-ASCII Raster File](#) 2013  
W Wollheim  
Environmental Data Initiative
- [Contributing drainage areas-Parker and Ipswich Watersheds-ASCII Raster File](#) 2013  
W Wollheim  
Environmental Data Initiative
- [Year 2010, 15 minute measurements of stage, water temperature in a small headwater stream draining draining a mainly forested catchment \(55% forest+ 19% wetland\), Cart Cr ...](#) 2013  
W Wollheim  
Environmental Data Initiative
- [Controls on soil carbon loss with permafrost thaw in Alaskan peatland ecosystems](#) 2012  
CC Treat, M Bhagat, J Talbot, RK Varner, S Grandy, SA Ewing, ...  
AGU Fall Meeting Abstracts 2012, B21D-0414
- [Deciphering relationships between in-stream travel times, nutrient concentrations, and uptake through analysis of hysteretic and non-hysteretic kinetic behavior](#) 2012  
TP Covino, WB Bowden, MN Gooseff, WM Wollheim, BL McGlynn, ...  
AGU Fall Meeting Abstracts 2012, H13C-1359
- [Hydrogeomorphic contrast between inlet and outlet streams of a high arctic lake influence stream-groundwater exchange](#) 2012  
AN Wlostowski, MN Gooseff, WB Bowden, WM Wollheim, KA Whittinghill  
AGU Fall Meeting Abstracts 2012, H12B-07
- [Spatial and Temporal Variability in Sources and Fate of Dissolved Carbon and Nutrients in an Arctic River Network](#) 2012  
KA Whittinghill, WM Wollheim, WB Bowden, MN Gooseff, AN Wlostowski  
AGU Fall Meeting Abstracts 2012, H51B-1341
- [Aquatic Ecosystem Services in the 21st Century Northeast Corridor: Assessment Using a Regional Earth System Model](#) 2012  
B Rosenzweig, A Miara, RJ Stewart, WM Wollheim, CJ Vorosmarty  
AGU Fall Meeting Abstracts 2012, B23D-0491
- [Impacts and socio-ecological feedbacks associated with regionalization of water supply in a suburban New England watershed](#) 2012  
WM Wollheim, RJ Stewart, C Polsky, R Pontius, C Hopkinson

AGU Fall Meeting Abstracts 2012, H23F-1446

[Headwater Nutrient Concentration Patterns in Response to Storm Events Across Land Use Types using In Situ Sensors](#) 2012

A Price, WM Wollheim, GK Mulukutla, RO Carey, WH McDowell  
AGU Fall Meeting Abstracts 2012, H13C-1354

[Comparison of rhodamine-WT and sodium chloride tracer transport in a 4th order arctic river](#) 2012

EM Smull, AN Wlostowski, MN Gooseff, WB Bowden, WM Wollheim  
AGU Fall Meeting Abstracts 2012, H13D-1370

[Carbon, Nitrogen, and Phosphorus Stoichiometry During Storms in a Suburbanizing Watershed](#) 2012

RO Carey, WM Wollheim, GK Mulukutla  
AGU Fall Meeting Abstracts 2012, H13C-1352

[Linking the continental landmass to biogeochemical variability in the coastal ocean: the role of hydrological models and new satellite ocean color and salinity sensors.](#) 2012

J Salisbury, DC Vandemark, S Fournier, R Nicolas, B Chapron, ...  
AGU Fall Meeting Abstracts 2012, H21L-06

[Bridging the Divide: understanding controls on nitrogen export by scaling from headwater catchments to eastern North America](#) 2012

JM Duncan, LE Band, IF Creed, C Duffy, MB Green, PM Groffman, ...  
AGU Fall Meeting Abstracts 2012, H11J-03

[Linking headwaters to the coast: Modeling DOC export at the large watershed scale](#) 2012

CW Hunt, WM Wollheim, J Salisbury, RJ Stewart, KW Hanley, G Aiken  
AGU Fall Meeting Abstracts 2012, B41D-0322

[Connecting Streams to Watersheds Through Stream-Groundwater Exchange as Determined from the Channel](#) 2012

MN Gooseff, MN Taptich, AN Wlostowski, K Gerecht, RA Payn, AS Ward, ...  
AGU Fall Meeting Abstracts 2012, PA53A-2077

[A Model of Water Resources & Thermoelectric Plant Productivity Considering Changing Climates & Environmental Policy](#) 2012

A Miara, CJ Vorosmarty, RJ Stewart, WM Wollheim, B Rosenzweig  
AGU Fall Meeting Abstracts 2012, B53F-0754

[Capacity of river networks to buffer thermal impacts of power plants in the northeastern US](#) 2012

- RJ Stewart, WM Wollheim, A Miara, B Rosenzweig, CJ Vorosmarty  
AGU Fall Meeting Abstracts 2012, EP31A-0806
- [A Regional Earth System Model of the Northeast Corridor: Analyzing 21st Century Climate and Environment](#) 2012  
CJ Vorosmarty, F Duchin, JM Melillo, WM Wollheim, J Gonzalez, ...  
AGU Fall Meeting Abstracts 2012, GC12B-03
- [Understanding controls on dissolved organic carbon flux and lability in United States watersheds](#) 2011  
KW Hanley, WM Wollheim, J Salisbury, G Aiken  
AGU Fall Meeting Abstracts 2011, H54A-01
- [Monitoring Urban Water Quality Variability Using Continuous In-Situ Sensors](#) 2011  
RO Carey, WM Wollheim, GK Mulukutla  
AGU Fall Meeting Abstracts 2011, H51P-03
- [Influences of seasonality, geomorphology, and hydrology on primary production and respiration in Arctic stream ecosystems](#) 2011  
MR Herstand, WB Bowden, MN Gooseff, KA Whittinghill, AN Wlostowski, ...  
AGU Fall Meeting Abstracts 2011, GC51F-1074
- [What are the controls on surface and hyporheic transient storage in Alaskan tundra streams?](#) 2011  
AN Wlostowski, MN Gooseff, WB Bowden, WM Wollheim, MR Herstand, ...  
AGU Fall Meeting Abstracts 2011, H34A-06
- [Changing Seasonality in the Arctic and its Influences on Biogeochemical Processing in Tundra River Networks](#) 2011  
WB Bowden, MN Gooseff, WM Wollheim, MR Herstand, CC Treat, ...  
AGU Fall Meeting Abstracts 2011, GC32A-01
- [Accounting for heterogeneity of nutrient dynamics in riverscapes through spatially distributed models](#) 2011  
WM Wollheim, RJ Stewart  
AGU Fall Meeting Abstracts 2011, H33K-02
- [Examining Controls on Dissolved Organic Carbon Quantity and Quality in Large North American Rivers](#) 2010  
KW Hanley, WM Wollheim, J Salisbury, G Aiken  
AGU Fall Meeting Abstracts 2010, B23E-0429
- [Dynamics of nitrogen saturation in river networks.](#) 2010  
WM Wollheim, RJ Stewart, MN Gooseff, M Green  
AGU Fall Meeting Abstracts 2010, H44C-04

- [Channel water balances in Arctic tundra streams](#) 2010  
AN Wlostowski, MN Gooseff, WB Bowden, WM Wollheim, M Herstand, ...  
AGU Fall Meeting Abstracts 2010, H31D-1032
- [Context Conundrums: Observations and Conceptual Models are Primary Controls on Interpretations of Temporal and Spatial Scales of Stream-Groundwater Interactions](#) 2010  
MN Gooseff, KE Bencala, WB Bowden, BL McGlynn, RA Payn, K Singha, ...  
AGU Fall Meeting Abstracts 2010, H33J-01
- [Modification of suburban carbon and nitrogen fluxes by a coupled channel/floodplain system assessed using in situ sensors](#) 2010  
WM Wollheim, BA Pellerin, J Saraceno, C Hopkinson, A Hope, N Morse  
AGU Fall Meeting Abstracts 2010, B42C-03
- [Controls on the Flux, Age, and Composition of Terrestrial Organic Carbon Exported by Rivers to the Ocean](#) 2010  
V Galy, B Peucker-Ehrenbrink, T Eglington, R Holmes, A Soule, S Goetz, ...  
EGU General Assembly Conference Abstracts, 11979
- [Exploring the History of Time in an Integrated System: the Ramifications for Water](#) 2009  
MB Green, LE Adams, TL Allen, JS Arrigo, DJ Bain, EN Bray, JM Duncan, ...  
AGU Fall Meeting Abstracts 2009, H43A-1004
- [The Effect of Beaver Activity on the Ammonium Uptake and Water Residence Time Characteristics of a Third-Order Stream Reach](#) 2009  
M Briggs, MN Gooseff, WM Wollheim, BJ Peterson, K Morkeski  
AGU Fall Meeting Abstracts 2009, H53D-0957
- [Patterns in dissolved organic carbon quality in a New England coastal watershed: it's relationship to urban and wetland sources and flow dynamics](#) 2009  
GM Gettel, WM Wollheim, C Hopkinson, T Harms  
AGU Fall Meeting Abstracts 2009, B43A-0353
- [Evolving demand for ecosystem services and their impact in a coastal New England watershed](#) 2009  
WM Wollheim, MB Green, BA Pellerin, JM Duncan, GM Gettel, ...  
AGU Fall Meeting Abstracts 2009, H51J-03
- [Water Scarcity in the Northeast Corridor During the Nineteenth Century and its Correlation to Infrastructure Development](#) 2009  
A Munoz Hernandez, JS Arrigo, LE Adams, DJ Bain, EN Bray, MB Green, ...  
AGU Fall Meeting Abstracts 2009, H51J-07

- [Comparing Stream Discharge, Dissolved Organic Carbon, and Selected MODIS Indices in Freshwater Basins](#) 2009  
WT Shaver, WM Wollheim  
AGU Fall Meeting Abstracts 2009, H21A-0827
- [Controls on the Flux, Age, and Composition of Terrestrial Organic Carbon Exported by Rivers to the Ocean](#) 2009  
B Peucker-Ehrenbrink, TI Eglinton, RM Holmes, V Galy, S Soule, SJ Goetz, ...  
AGU Fall Meeting Abstracts 2009, PP23A-1369
- [Nutrient spiraling from hillslopes to rivers and oceans](#) 2009  
BJ Peterson, E Rastetter, WM Wollheim, M Holmes, J McClelland, ...
- [Increased spiraling lengths in urban headwater streams-potential buffering mechanisms by river networks](#) 2009  
WM Wollheim, BJ Peterson, GM Gettel, CS Hopkinson, TK Harms
- [Impacts of suburbanization on food web stoichiometry in detritus-based streams of New England](#) 2009  
NB Morse, WM Wollheim, JP Benstead, WH McDowell
- [Nutrient dynamics in surface transient storage zones within a coastal Massachusetts river network](#) 2009  
K Morkeski, BJ Peterson, MA Briggs, MN Gooseff, CS Hopkinson, ...
- [Separating In-Channel and Hyporheic Transient Storage Processes in River Networks-A Path Toward Improved Quantification of Stream-Groundwater Interactions](#) 2009  
MN Gooseff, MA Briggs, PC Kerr, MR Weaver, W Wollheim, BJ Peterson, ...  
AGU Spring Meeting Abstracts 2009, H71D-02
- [Separating in-channel and hyporheic transient storage processes in river networks-A path toward improved understanding of fluvial biogeochemistry](#) 2009  
MN Gooseff, MA Briggs, M Weaver, W Wollheim, BJ Peterson, K Morkeski, ...  
EGU General Assembly Conference Abstracts, 2014
- [The role of floodplain connections in controlling dissolved organic carbon quality and export in coastal urban sub-basins](#) 2009  
GM Gettel, WM Wollheim, TK Harms, C Hopkinson  
EGU General Assembly Conference Abstracts, 11583
- [Separating in-channel and hyporheic transient storage processes in river networks &# 8211; A path toward improved understanding of fluvial biogeochemistry](#) 2009  
MN Gooseff, MA Briggs, M Weaver, W Wollheim, BJ Peterson, K Morkeski, ...

- [Separation of River Network Scale Nitrogen Removal Between Surface and Hyporheic Transient Storage Compartments](#) 2008  
RJ Stewart, WM Wollheim, MA Briggs, MN Gooseff, K Morkeski, ...  
AGU Fall Meeting Abstracts 2008, H11B-0750
- [Characterization of Surface Transient Storage Zone Exchange and Flow Dynamics in a 3rd-Order Stream, Massachusetts](#) 2008  
MR Weaver, MN Gooseff, MA Briggs, K Morkeski, BJ Peterson, ...  
AGU Fall Meeting Abstracts 2008, H11B-0738
- [Determining Surface Transient Storage Zone Residence Time Distributions from Whole Stream Solute Injections](#) 2008  
MN Gooseff, MA Briggs, DA Benson, K Morkeski, BJ Peterson, ...  
AGU Fall Meeting Abstracts 2008, H11B-0737
- [Next Generation Framework for Aquatic Modeling of the Earth System \(NextFrAMES\)](#) 2008  
BM Fekete, WM Wollheim, T Lakhankar, CJ Vorosmarty  
AGU Fall Meeting Abstracts 2008, H41G-0967
- [Assessing the influence of various aquatic ecosystem types on biogeochemical fluxes at river network scales](#) 2008  
W Wollheim, R Stewart, M Briggs, G Gettel, M Green, M Gooseff, T Harms, ...  
AGU Fall Meeting Abstracts 2008, H14B-03
- [Modeling the Effects of Hydrological and Biogeochemical Processes on Denitrification and Stream Nitrogen Losses in River Networks](#) 2008  
RB Alexander, JK Bohlke, EW Boyer, MB David, JW Harvey, ...  
AGU Fall Meeting Abstracts 2008, H13I-06
- [Partitioning Surface and Hyporheic Transient Storage in Streams of Increasing Size](#) 2008  
MA Briggs, MN Gooseff, K Morkeski, B Peterson, W Wollheim, ...  
AGU Fall Meeting Abstracts 2008, H11B-0741
- [COS 34-2: The regional and global significance of nitrogen removal in lakes and reservoirs](#) 2008  
JA Harrison, R Maranger, RA Alexander, AE Giblin, PA Jacinthe, ...  
The 93rd ESA Annual Meeting
- [Assessment of Select Climate Change Impacts On US National Security](#) 2008  
CV Thorkelson, W Wollheim, X Xing, G Yetman, MA Levy

- [Nutrient removal in point source dominated river systems—interactions of dilution, saturation and hydraulic loads](#) 2008  
WM Wollheim, C Vorosmarty
- [Discriminating hyporheic and in-channel dead zone transient storage in streams](#) 2008  
M Briggs, NG Michael, K Morkeski, WM Wollheim, B Peterson, ...
- [Understanding nitrogen removal processes within river networks over annual time scales: implications of saturation.](#) 2007  
WM Wollheim, CJ Vorosmarty, B Fekete, P Milly, KL Findell, BJ Peterson  
AGU Fall Meeting Abstracts 2007, B31A-0065
- [A Comparison of In-Channel Dead Zone and Hyporheic Zone Transient Storage Parameter Estimates Between a 1st and 5th Order Stream](#) 2007  
M Briggs, M Gooseff, K Morkeski, W Wollheim, C Hopkinson, B Peterson, ...  
AGU Fall Meeting Abstracts 2007, H13D-1536
- [TES: An Unexpected Opportunity to Revolutionize Large Scale Hydrological Studies](#) 2007  
BM Fekete, DC Noone, WM Wollheim, CJ Vorosmarty  
AGU Fall Meeting Abstracts 2007, H311-03
- [River network N removal over annual time scales—incorporating time varying hydrological conditions](#) 2007  
WM Wollheim, CJ Vorosmarty, BJ Peterson, C Hopkinson
- [Year 2005, 15 or 30 minute measurements of stage in a small headwater stream draining a highly suburban catchment \(72% residential\), Saw Mill Brook, Burlington, MA.](#) 2007  
C Wollheim  
Plum Island Ecosystems LTER
- [Year 2004, 15 minute measurements of stage, water temperature, conductivity, dissolved oxygen, and pH in a small headwater stream draining a mainly forested catchment ...](#) 2007  
W Wollheim  
Plum Island Ecosystems LTER
- [Use of Scenarios to Decipher Key Determinants of Change in the Water Cycle](#) 2006  
CJ Vorosmarty, R Lammers, A Shiklomanov, X Xiao, M Rawlins, ...  
AGU Fall Meeting Abstracts 2006, H52B-01
- [The UNH Earth Systems Observatory: A Regional Application in Support of GEOSS Global-Scale Objectives](#) 2006  
CJ Vorosmarty, B Braswell, B Fekete, S Glidden, H Hartmann, A Magill, ...



AGU Fall Meeting Abstracts 2006, IN13B-1166

[Utility of stable isotopes\( <sup>13</sup>C and <sup>15</sup>N\) to demonstrate comparability between natural and experimental streams for environmental risk assessment](#) 2006

DD Morrall, SC Christman, BJ Peterson, WM Wolheim, SE Belanger  
Ecotoxicology and Environmental Safety 65 (1), 22-35

[Hydrology and Land Surface Studies-L06410-Relationship between river size and nutrient removal \(DOI 10.1029/2006GL025845\)](#) 2006

WM Wollheim, CJ Vorosmarty, BJ Peterson, SP Seitzinger, CS Hopkinson  
Geophysical Research Letters 33 (6)

[Watershed Characteristics Influencing Stream Nutrient Concentrations Across a Rural-to-Urban Land Use Gradient](#) 2005

BA Pellerin, WM Wollheim, CJ Vorosmarty, WH McDowell, CS Hopkinson  
AGU Spring Meeting Abstracts 2005, H13A-02

[Nitrogen Removal by the River Network of the 400 km<sup>2</sup> Ipswich R. Watershed, MA, USA](#) 2004

WM Wollheim, BA Pellerin, CJ Vorosmarty, CS Hopkinson  
AGU Spring Meeting Abstracts 2004, B41A-19

[Quantifying New Water Contributions to Stormflow in an Urban Watershed Using Electrical Conductivity and Isotopic Tracers](#) 2004

BA Pellerin, WM Wollheim, X Feng, CJ Vorosmarty, AM Faiia  
AGU Spring Meeting Abstracts 2004, H13B-02

[Time series of nutrient grab samples from catchments with frequency ranging from weekly to monthly between 2001 and 2009.](#) 2004

W Wollheim  
Plum Island Ecosystems LTER

[Quantifying the Principal Components of Stormflow in a Forested and Developed Headwater Catchment with End-Member Mixing Analysis and Continuous Water Quality Measurements](#) 2001

BA Pellerin, BA Pellerin, WM Wollheim, WM Wollheim, CJ Vorosmarty, ...  
AGU Fall Meeting Abstracts 2001, B51B-0203

[Analysis of nitrogen cycling in a forest stream during autumn using a <sup>15</sup>N-tracer addition Jennifer L. Tank Department of Natural Resources and Environmental Sciences ...](#) 2000

JL Meyer, DM Sanzone, PJ Mulholland, JR Webster, BJ Peterson, ...  
Limnol. Oceanogr 45 (5), 1013-1029

[Examining controls on dissolved organic carbon quantity and qual Examining controls on dissolved organic carbon quantity and quality in US rivers ity in US rivers](#)

KW Hanley, WM Wollheim, J Salisbury, G Aiken

[Examining controls on dissolved organic carbon quantity and quality in large US rivers](#)

KW Hanley, WM Wollheim, J Salisbury, G Aiken

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RJ Stewart, WM Wollheim, A Miara, CJ Vorosmarty, BM Fekete

[Publications to date received by NH Sea Grant](#)

WM Wollheim, TK Harms, BJ Peterson, K Morkeski, CS Hopkinson, ...

[Supporting Information for Controls of Chloride Loading and Impairment at the River Network Scale in New England Zuidema, Shan1, 2, Wilfred M. Wollheim2, 3, Madeleine M ...](#)

S Zuidema, WM Wollheim, MM Mineau, MB Green

[hydrobiologia volume 323 \(1996\), author index](#)

RW Bachmann, LA Bartsch, A Brancelj, DJ Call, DE Canfield Jr, A Coutk, ...

[Volume 310 \(1995\), author index](#)

ZA Ansari, S Bennett, P Bir, G Bornette, J Castel, S Casu, A Chatterji, ...

[Climate change, snowpacks, and biogeochemical cycling in northern temperate forest ecosystems](#)

JL Campbell, SD Sebestyen, ER Boose, EG Booth, RJ Stewart, ...

[overview of the global hydrologic cycle](#)

CJ Vörösmarty, D Conley, P Döll, J Harrison, P Letitre, E Mayorga, ...  
water supply 9 (95), 1.8

[Spatial distribution of land type in regression models of pollutant loading](#)

C Hopkinson Jr, WM Wollheim

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**See also Prof. Wil Wollheim, Co-Director UNH WSAG, at Conservation Commission, [Nov 23 2020](#), 8:49p**



The Chesley Marsh below the rock wall boundary with Toomerfs



The Chesley Marsh draining into College Brook



The College Brook Footbridge overlooking typical brook flooding



Access to the College Brook Footbridge blocked by flood waters

## UNH Water Systems Analysis Group (WSAG)

studying the flooding and health of College Brook since 2013

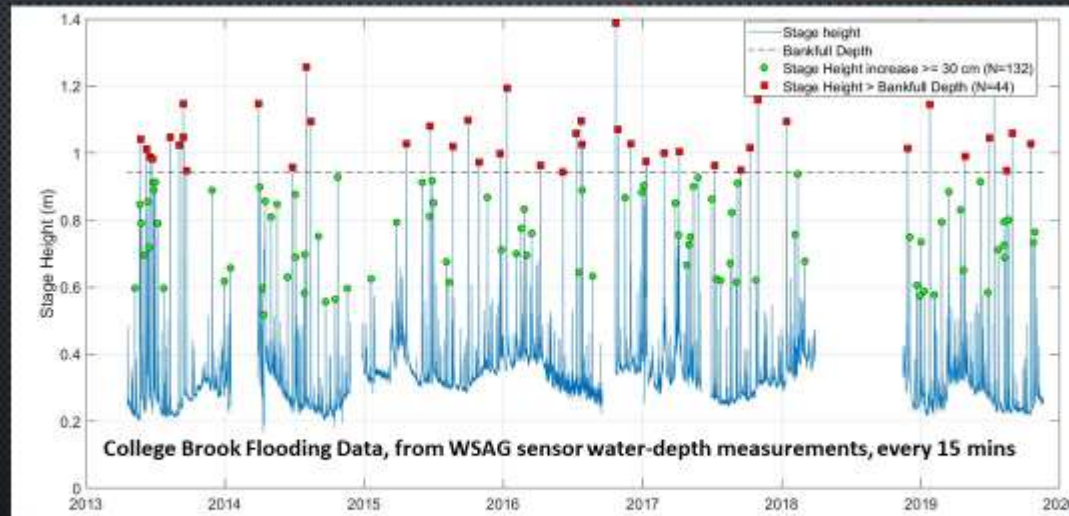


Please draw on WSAG expertise & data before advising Planning Board on CDA WCOD & SPOD applications.



*"In understanding the environment as an integrated system, WSAG explores the physical, chemical and biological processes that shape hydrological systems, with emphasis on the unique role of humans as agents of change."*

## UNH Water Systems Analysis Group (WSAG)



WSAG sensor data estimates: April 2013 to Nov 2019, 132 storm events with stage-height rise of 12" or more (1.7/mo avg), 44 exceeding "bankfull depth" (.6/mo avg). Please contact WSAG for precise details.

[LINK: YouTube Channel: College Brook Flooding](#) {ww h 080522}