

ROXANNE MARINO

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Education

BS, University of Hartford, Chemistry (summa cum laude), 1980

Ph.D., Cornell University, Biogeochemistry, 2001

Professional experience

- 2003-present Senior Research Associate, Department of Ecology & Evolutionary Biology, Cornell University.
- 2005-present Visiting Investigator, The Ecosystems Center, Marine Biological Laboratory, Woods Hole.
- 2001- 2004 Staff Scientist I, The Ecosystems Center, Marine Biological Laboratory, Woods Hole.
- 2001 Consultant, Environmental Defense, NY, NY.
- 1988-2001 Research Support Specialist III & Laboratory Manager, Section of Ecology & Systematics, Division of Biological Sciences, Cornell University.
- 1985-1988 Research Support Specialist II, Section of Ecology & Systematics, Division of Biological Sciences, Cornell University.
- 1983-1985 Research Assistant II & III, The Ecosystems Center, Marine Biological Laboratory, Woods Hole.
- 1981-1982 Research Assistant I, The Ecosystems Center, Marine Biological Laboratory, Woods Hole.
- 1980-1981 Participant on research cruise (R/V Endeavor), University of Rhode Island; Summer intern, Chemistry Dept., Woods Hole Oceanographic Institution.

Research Interests

Biogeochemistry and aquatic ecosystem ecology; controls on biological nitrogen fixation; interactions of major nutrient cycles and trace elements in aquatic and terrestrial ecosystems; influence of land use and management practices on riverine and estuarine ecosystem processes and eutrophication; sediment and aquatic phosphorus biogeochemistry; atmospheric deposition of gaseous nitrogen from near-source emissions; application of research results to science education, public outreach, and policy to address ecological problems.

Professional Activities

- 2010- 2013 Town Supervisor (Ulysses, Tompkins County NY)
- 2010 - 2012 Co-principal investigator, Agriculture, Energy, and Environment Program at Cornell; continuing studies of nutrient inputs and fluxes from the Upper Susquehanna River basin in NY.
- 2005- 2009 Co-principal Investigator, Agricultural Ecosystems Program at Cornell; studying nutrient pollution in the Upper Susquehanna River basin in NY, and its influence on Chesapeake Bay.

- 2004 - 2006 Participant, North American Nitrogen Center Initiative (part of International Nitrogen Initiative, ICSU)
- 2004 - 2007 Town Councilperson (Ulysses, Tompkins County NY); member of County Advisory Board on Water Resources (2004-2006)
- 2002 Co-organizer, Workshop to Identify National Research Priorities for Nutrient Pollution in Coastal Waters, 30 May 2002, Woods Hole.
- 1999-2002 Participant, International SCOPE Nitrogen Project.

Professional Societies

American Society of Limnology and Oceanography
Coastal and Estuarine Research Federation

Reviewer

National Science Foundation
Biogeochemistry
Estuaries and Coasts
Estuarine and Coastal Shelf Science
Limnology and Oceanography
Marine Ecology Progress Series

Publications:

- 2013 Berg, P., M. H. Long, M. Huettel, J. E. Rheuban, K. J. McGlathery, R. W. Howarth, K. H. Foreman, A. E. Giblin, and R. Marino. Eddy correlation measurements of oxygen fluxes in permeable sediments exposed to varying current flow and light. *Limnology & Oceanography* 58:1329-1343.
- Bettez, N.D., R. Marino, R.W. Howarth, and E.A. Davidson. Roads as nitrogen deposition hot spots. *Biogeochemistry*: 114:149-163.
- Hayn, M., R. W. Howarth, R. Marino, N. Ganju, P. Berg, K. H. Foreman, A. E. Giblin, and K. J. McGlathery. Exchange of nitrogen and phosphorus between a shallow seagrass-dominated lagoon and coastal waters. *In press: Estuaries and Coasts*
- Howarth, R. W., M. Hayn, R. Marino, K. Foreman, P. Berg, A. E. Giblin, K. J. McGlathery, and J. D. Walker. Metabolism of a nitrogen-enriched coastal marine lagoon during the summertime. *In press: Biogeochemistry*
- 2013 Bettez, N.D., R. Marino, E.A. Davidson. Forest response to chronic low level N deposition from vehicle emissions near a roadway. *In review: Water, Air, and Soil Pollution*.
- Reynolds, L.K., R. Marino, M.F. Muth, N. McLenaghan, M. Hayn, A.C. Tyler, K.J. McGlathery, and R.W. Howarth. Evidence of grazer control on nitrogen fixation by eelgrass epiphytes in a temperate coastal bay. *In review: Marine Ecology Progress Series*
- 2012 Ganju, N. K., M. Hayn, S Chen, R. W. Howarth, P. J. Dickhudt, A. L. Aretxabaleta, and R. Marino. Tidal and groundwater fluxes to a shallow, microtidal estuary:

- Constraining inputs through field observations and hydrodynamic modeling. *Estuaries and Coasts* 35:1285-1298.
- Howarth, R. W., D. Swaney, G. Billen, J. Garnier, B. Hong, C. Humborg, P. Johnes, C. Morth, and R. Marino. Nitrogen fluxes from large watershed to coastal ecosystems controlled by net anthropogenic nitrogen inputs and climate. *Frontiers in Ecology & Environment* 10:37-43.
- 2011 Howarth, R. W., F. Chan, D. Conley, J. Garnier, S. C. Doney, R. Marino, and G. Billen. Coupled biogeochemical cycles: Eutrophication and hypoxia in coastal marine ecosystems. *Frontiers in Ecology & Environment*, 9(1):18-26.
- McLenaghan, N. A., A. C. Tyler, U. H. Mahl, R. W. Howarth, and R. Marino. Benthic macroinvertebrate functional diversity regulates nutrient and algal dynamics in a shallow estuary. *Marine Ecology Progress Series* 426:171-184.
- 2009 Marino, R. and R. W. Howarth. Nitrogen fixation. Pages 65-72 in G. E. Likens (ed.), *Encyclopedia of Inland Waters*. Elsevier.
- Davidson, E. A., K. E. Savage, N. D. Bettez, R. Marino, and R. W. Howarth. Nitrogen in runoff from residential roads in a coastal area. *Water Air Soil Pollution*, DOI 10.1007/s11270-009-0218-2.
- 2008 Swaney, D. P., D. Scavia, R. W. Howarth, and R. M. Marino. Estuarine classification and response to nitrogen loading: Insights from simple ecological models. *Estuarine Coastal and Shelf Science* 77:253-263.
- 2006 Chan, F., R. L. Marino, R. W. Howarth, and M. L. Pace. Ecological constraints on planktonic nitrogen fixation in saline estuaries. II. Grazing controls on cyanobacterial population dynamics. *Marine Ecology Progress Series* 309:41-53.
- Howarth, R. W. and R. Marino. Nitrogen as the limiting nutrient for eutrophication in coastal marine ecosystems: Evolving views over three decades. *Limnology and Oceanography* 51:364-376.
- Howarth, R. W., D. P. Swaney, E. W. Boyer, R. Marino, N. Jaworski, and C. Goodale. The influence of climate on average nitrogen export from large watersheds in the Northeastern United States. *Biogeochemistry* 79:163-186.
- Howarth, R. W., R. Marino, D. P. Swaney, and E. W. Boyer. Wastewater and watershed influences on primary productivity and oxygen dynamics in the lower Hudson River estuary. Pages 121-139 in J. S. Levinton and J. R. Waldman (eds.), *The Hudson River Estuary*. Cambridge University Press.
- Marino, R., F. Chan, R. W. Howarth, M. L. Pace, and G. E. Likens. Ecological constraints on planktonic nitrogen fixation in saline estuaries: I. Nutrient and trophic controls. *Marine Ecology Progress Series* 309:25-39.
- 2004 Chan, F., M. L. Pace, R. W. Howarth, and R. Marino. Bloom formation in heterocystic nitrogen-fixing cyanobacteria: The dependence on colony size and zooplankton grazing. *Limnology and Oceanography* 49:2171-2178.

- 2003 Howarth, R., R. Marino, and D. Scavia. Priority topics for nutrient pollution in coastal waters: An integrated national research program for the United States. National Ocean Service, NOAA 1-24.
- Marino, R., R. W. Howarth, F. Chan, J. J. Cole, and G. E. Likens. Sulfate inhibition of molybdenum-dependent nitrogen fixation by planktonic cyanobacteria under seawater conditions: A non-reversible effect. *Hydrobiologia* 500:277-293.
- 2002 Barron, S., C. F. Weber, R. Marino, E. A. Davidson, G. Tomasky, and R. W. Howarth. Effects of varying salinity on phytoplankton growth in a low-salinity coastal pond under two nutrient conditions. *Biological Bulletin* 203:260-261.
- Marino, R., F. Chan, R. Howarth, M. Pace, and G. Likens. Ecological and biogeochemical interactions constrain planktonic nitrogen fixation in estuaries. *Ecosystems* 5:719-725.
- Vitousek, P. M., K. Cassman, C. Cleveland, T. Crews, C. B. Field, N. B. Grimm, R. W. Howarth, R. Marino, L. Martinelli, E. B. Rastetter, and J. I. Sprent. Towards an ecological understanding of biological nitrogen fixation. *Biogeochemistry* 57&58:1-45.
- Weber, C. F., S. Barron, R. Marino, R. W. Howarth, G. Tomasky, and E. A. Davidson. Nutrient limitation of phytoplankton growth in Vineyard Sound and Oyster Pond, Falmouth, Massachusetts. *Biological Bulletin* 203:261-263.
- 2001 Marino, R. An experimental study of the role of phosphorus, molybdenum, and grazing as interacting controls on planktonic nitrogen fixation in estuaries. Ph.D. thesis, Cornell University, Ithaca, NY, 199 pp.
- McGlathery, K. J., P. Berg, and R. Marino. Using porewater profiles to assess nutrient availability in seagrass-vegetated carbonate sediments. *Biogeochemistry* 56:239-263.
- 2000 Howarth, R. W., D. P. Swaney, T. J. Butler, and R. Marino. Climatic control on eutrophication of the Hudson River Estuary. *Ecosystems* 3:210-215.
- 1999 Howarth, R. W., F. Chan, and R. Marino. Do top-down and bottom-up controls interact to exclude nitrogen-fixing cyanobacteria from the plankton of estuaries: Explorations with a simulation model. *Biogeochemistry* 46:203-231.
- Howarth, R. W. and R. Marino. Oil spills: Containment and clean-up. Pages 456-458 in D. E. Alexander & R. W. Fairbridge (eds.), *Encyclopedia of Environmental Science*. Kluwer, Dordrecht.
- 1998 Howarth, R. W. and R. Marino. A mechanistic approach to understanding why so many estuaries and brackish waters are nitrogen limited. Pages 117-136 in *Effects of Nitrogen in the Aquatic Environment*, KVA Report 1998: 1, Kungl. Vetenskapsakademien (Royal Swedish Academy of Sciences), Stockholm.
- Jensen, H. S., K. J. McGlathery, R. Marino, and R. W. Howarth. Forms and availability of sediment phosphorus in carbonate sand of Bermuda seagrass beds. *Limnology and Oceanography* 43:799-810.
- 1995 Howarth, R. W., D. Swaney, R. Marino, T. Butler, and C. R. Chu. Turbulence does not prevent nitrogen fixation by plankton in estuaries and coastal seas (reply to the comment of Paerl et al.). *Limnology and Oceanography* 40:639-643.

- Howarth, R. W., H. Jensen, R. Marino, and H. Postma. Transport to and processing of phosphorus in near-shore and oceanic waters. Pages 323-345 in H. Tiessen (ed.), Phosphorus in the Global Environment, SCOPE #54. Wiley & Sons, Chichester.
- 1994 McGlathery, K. J., R. Marino, and R. W. Howarth. Variable rates of phosphate uptake by shallow marine sediments: Mechanisms and ecological significance. *Biogeochemistry* 25:127-146.
- 1993 Marino, R. and R. W. Howarth. Atmospheric oxygen exchange in the Hudson River: Dome measurements and comparison with other natural waters. *Estuaries* 16:433-445.
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- 1992 McGlathery, K. J., R. W. Howarth, and R. Marino. Nutrient limitation of the macroalga, *Penicillus capitatus*, associated with subtropical seagrass meadows in Bermuda. *Estuaries* 15:18-25.
- Howarth, R. W., R. Marino, R. Garritt, and D. Sherman. Ecosystem respiration in a large, tidally influenced river: The Hudson River. *Biogeochemistry* 16:83-102.
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- Howarth, R. W. and R. Marino. Oil and water-- a bad mix. Pages 40-53 in Science Year. World Book Encyclopedia, Chicago.
- 1990 Marino, R., R. W. Howarth, J. Shames, and E. E. Prepas. Molybdenum and sulfate as controls on the abundance of nitrogen-fixing cyanobacteria in saline lakes in Alberta. *Limnology and Oceanography* 35:245-259.
- Howarth, R. W. and R. Marino. Nitrogen-fixing cyanobacteria in the plankton of lakes and estuaries: A reply to the comment by Smith. *Limnology and Oceanography* 35:1859-1863.
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- Howarth, R. W., R. Marino, J. Lane, and J. J. Cole. Nitrogen fixation in freshwater, estuarine, and marine ecosystems. 1. Rates and importance. *Limnology and Oceanography* 33:669-687.
- 1986 Cole, J. J., R. W. Howarth, S. S. Nolan, and R. Marino. Sulfate inhibition of molybdate assimilation by planktonic algae and bacteria: Some implications for the aquatic nitrogen cycle. *Biogeochemistry* 2:179-196.
- 1984 Howarth, R. W. and R. Marino. Sulfate reduction in salt marshes, with some comparisons to sulfate reduction in microbial mats. Pages 245-263 in Y. Cohen, R. W. Castenholz, and H. O. Halvorson (eds.), *Microbial Mats: Stromatolites*. Alan R. Liss Publishers.