

## Wendy J. Pabich

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### EDUCATION

#### **Massachusetts Institute of Technology**, Cambridge, MA

Ph.D., Environmental Engineering (biogeochemistry and hydrology), Parsons Water Resource Laboratory, 2001

M.S., Urban Studies & Planning, 1995

#### **Duke University**, Durham, NC

M.S., Geology (coastal), 1995

#### **Dartmouth College**, Hanover, NH

B.A., Geography (*cum laude*), 1988

### CONSULTING AND APPLIED EXPERIENCE

#### **Water Futures, Hailey, ID and Salem, MA (2005-present)**

##### ***President***

- Providing strategic technical and policy consulting services related to land and water conservation, sustainable water use, wastewater planning, water rights, and waste-to-energy issues.
- Developed and lead scientific strategy, built and managed research team, worked closely with legal counsel, fundraised, and built coalition in four-year effort to conduct robust due diligence and challenge \$500 million worth of water rights in Idaho's Snake River Basin Adjudication for coalition of ranchers and conservation groups looking to protect agricultural and in-stream water rights.
- Client list includes county government, land trusts, ranching associations, canal companies, environmental non-profits, technology companies, private equity firms and private investors.
- Business development and administration, building/managing contract teams, high-level analysis, study design, project management and public presentations.

#### **Blaine County Land, Water and Wildlife Levy Advisory Board (2009-present)**

##### ***Inaugural Board Member***

- From inception, envisioning, designing and managing program to properly invest \$3.2 million in levy proceeds to conserve land, water, wildlife and working farms via a standardized and transparent process for consideration of eligible expenditures.
- Evaluating proposed conservation projects relative to levy goals, conservation merits, financial leverage, suitability of conservation partners, and strength of conservation instruments, and making funding recommendations to Board of Commissioners.
- Acting as technical lead and providing counsel on water issues.

#### **Tetra Tech EM, Cambridge, MA (2003-2005)**

##### ***Scientist and Project Manager***

- Managed ecosystem restoration projects in New England, including NOAA salt marsh restoration and dam removal efforts, and state beach bacterial studies; developed nutrient management practice.
- Study design, fieldwork, analysis and project engineering.

- Client interface, budgeting, staff and subcontractor oversight, and overall project direction.

**Independent Consultant, Marblehead, MA (1993-2005)**

- Reviewed states' experiences with effluent trading in watersheds and synthesized requirements for successful program development.
- Analyzed state nitrogen loading policy, modeling and permitting.
- Provided technical review and testimony related to nitrogen load modeling and riverine response, environmental impact assessment, and permit conditions, including groundwater monitoring plans, for a proposed 1,800-home subdivision and wastewater treatment facility.
- Developed methodology to assess natural resource damages (NRD) to groundwater.
- Designed educational materials related to drinking water protection, groundwater/surface water interactions, and contaminate fate and transport.

**Environmental Defense, Boston, MA (2001-2003)**

**Post-Doctoral Scientist, Oceans Program (Advisor: Robert W. Howarth, Ph.D.).**

- Developed strategies to address anthropogenic nutrient loading to coastal system, evaluated nitrogen export from agricultural best management practices (BMPs), provided scientific input to national policy process including EPA's proposed Nutrient Criteria program, and evaluated nitrogen reduction opportunities under the U.S. Farm Bill.
- Acted as technical lead for a large, multi-institutional project to develop a pilot nutrient trading program for the Conestoga watershed in Pennsylvania.
- Assessed anthropogenic perturbations to the nitrogen cycle in the US.

**Temple, Barker & Sloane (now Oliver Wyman), Lexington, MA (1989-1991; -93, part-time)**

**Research Associate/Consultant, Public Policy and Management Group**

- Analyzed environmental regulatory issues including biological monitoring, risk communication, wastewater treatment facility financing, recycling markets, packaging, groundwater contamination, and SRF, RCRA and Superfund.
- Formal training in financial analysis, accounting, writing, analytical techniques, and public speaking.

## RESEARCH EXPERIENCE

**Massachusetts Institute of Technology, Cambridge and Woods Hole, MA (1995-2001)**

**Research Assistant, Parsons Water Resources Laboratory (Harold F. Hemond)**

*Denitrification of anthropogenic nitrogen in groundwater: Measurement and Modeling using stable isotopic and mass balance approaches.*

Committee: Harold F. Hemond (chair), Ivan Valiela (Marine Biological Laboratory), Sally Chisholm

- Designed and implemented field-based research project to evaluate rate of denitrification of anthropogenically-derived nitrogen in groundwater from fertilizer, atmospheric deposition, and septic waste, and to assess the role of nitrate and dissolved organic carbon (DOC) as controls on reaction rate using stoichiometry and stable isotopes.
- Investigated the relationship between vadose thickness and DOC to predictively model groundwater DOC concentrations. Developed kinetics model to predict groundwater denitrification rates.
- Designed, constructed, installed and sampled several fields of multi-level groundwater sampling wells, optimized methods for measurement of low level nitrate and ammonium,

and developed methods for analysis of N<sub>2</sub>/Ar by gas chromatography in aqueous samples.

**Massachusetts Institute of Technology, Cambridge, MA (1994)**

***Research Assistant, Energy Laboratory (Jefferson Tester)***

*Hydrothermally-Generated Electricity in the United States: An Industry Analysis.*

- Analyzed extraction technology, market opportunities, and regulatory framework of domestic hydrothermal industry for U.S. Department of Energy, Geothermal Division.

**MIT-Harvard Program on Negotiation, Cambridge, MA (Fall 1993)**

***Research Assistant (Lawrence Susskind)***

- Developed and published role-playing case study to illustrate negotiation strategies in environmental regulation and compliance.

**Duke University, Department of Geology, Durham, NC (1991-1993)**

***Research Assistant (Orrin Pilkey)***

*A Sedimentological Study of a Replenished Beach: Revere Beach, Massachusetts.*

- Designed and implemented field-based research project to evaluate sediment transport mechanics of a beach replenishment project.
- Collected nearshore and beach samples and analyzed sedimentology to estimate transport pathways.
- Evaluated beach profiles to estimate erosion and deposition rates.
- Correlated transport pathways with theoretical model of transport on a log-spiral beach.

## TEACHING EXPERIENCE

**Massachusetts Institute of Technology, Civil and Environmental Engineering (2008-2009)**

***Lecturer and Project Supervisor, Evaluation of Dam Projects in Patagonia***

- Responsible for curriculum, logistics, budget and teaching for year-long project course, including month-long expedition to Chilean Patagonia.
- Supervised five Masters of Engineering theses assessing impacts of five proposed hydro-electric dams on Rios Baker and Pasqua and 1,400 miles of transmission lines.
- Assessed carbon implications of proposal; modeled options for operational optimization of reservoirs at existing hydro-power facilities closer to Santiago; evaluated risks associated with Glacial Lake Outburst Floods (GLOFs) and flooding in the Rio Baker watershed; and analyzed potential water quality changes.
- Trekked up remote Rio Colonia valley to the Northern Patagonian Ice Field and ran the Rio Baker from ice to sea.

**Massachusetts Institute of Technology, Civil and Environmental Engineering (2002-2003)**

***Lecturer and Project Supervisor, Big and Little Wood River Watershed Nitrogen Loading Assessment, Blaine County, Idaho***

- Responsible for curriculum, logistics, budget and teaching for year-long project course; including month expedition to Idaho.
- Supervised three Masters of Engineering theses.
- Assessed nitrogen loading to two watersheds, developed land use-based mass balance GIS model of nitrogen loads and transport, evaluated appropriate management strategies, including nutrient trading and agricultural best management practices (BMPs), and conducted public outreach and education

**Massachusetts Institute of Technology**, Civil and Environmental Engineering (1996)  
**Teaching Assistant, Aquatic Chemistry Laboratory**

**Massachusetts Institute of Technology**, Urban Studies and Planning (Fall 1994)  
**Teaching Assistant, Environmental Policy and Regulation**

**Duke University Marine Laboratory, Beaufort, NC (Summers 1992 and 1993)**  
**Teaching Assistant, Biological Oceanography**  
**Teaching Assistant, Marine Biology**

**Sierra Institute**

**Co-Instructor, Himalayan Field Studies Program, Ladakh, India (Fall 2005)**

- Co-instructed semester-long undergraduate field courses in natural history, sustainable development, wilderness skills and environmental education.
- Extended backpacking through remote Himalayan terrain.

**The Wild Gift, Sun Valley, Idaho (2003-present)**

**Advisor**

- Advising on curriculum, mentoring students, participating in governance for organization helping to foster leaders focused on sustainable communities and preservation of wilds.
- Participated on three-week educational backpacking and river rafting adventure in the Wrangell St. Elias National Park in Alaska (summer 2003), and in the Boulder/White Clouds (summers 2006 and 2009).
- Mentored student working on sustainable design in urban housing projects.

## **ART AND FILMMAKING EXPERIENCE**

**Collaborative Art, Water Footprinting, *The Ripple Effect*, Peabody Essex Museum, Salem, MA (April 2012)**

- Lead a collaborative art project with museum visitors to create an impressive wave sculpture representing the water footprint of one pair of blue jeans (over 2,000 gallons) as a means to reveal the hidden demands on water.

**Producer, *The Devil Selling Crosses* (2009-present)**

- Developing dramatic film based on real-life story of a charismatic, young American with a frontier dream who builds a sustainable tourism business and is caught in a war over dam-building in Patagonia—the last bastion of gaucho culture.
- Co-wrote film treatment and business plan; building production team and coalition of supporters (including NGOs, scientists, activists and celebrities); budgeting; organizing logistics; and fundraising.

**Artist and Scientist-in-Residence, *Wade in the Water*, Colorado Art Ranch, Salida, CO (May 2010).**

- Selected to participate in a one-month residency program to explore issues related to water, land use and the intersection between art and science.
- Joined in an Artposium to celebrate the mysteries of water through music, dance, art-making and writing.

**Science Advisor, *Patagonia Rising* (2009)**

- Developed initial film concept and provided scientific input to documentary film tracing the hydrologic cycle of the Baker River from ice to ocean, providing voice to the frontier

people caught in the crossfire of Chile's energy demands, and juxtaposing the pro-dam business sector with renewable energy experts, bringing awareness and solutions to this global conflict over water and power.

**Exhibiting Painter (www.wendypabich.com), Hailey, ID (ongoing)**

- Exhibiting member of Green Antelope Gallery (www.greenantelope.net), with ongoing exhibitions and individual showing (October 2009), Ketchum Arts Festival, Hailey Artists' Market.

**Geography Intern, National Geographic Society, Washington, D.C. (Fall 1988)**

- Chosen for nationally-competitive geography intern program.
- Created artwork and maps published in Traveler Magazine.

**VOLUNTEER POSITIONS**

**Board of Directors, High Country News, Paonia, CO (2012-present)**

- Newly-appointed board member charged with broad responsibility for promoting the mission, programs and public image of High Country News, an award-winning print and online magazine dedicated to coverage of natural resource, public lands, ranching, wildlife and communities of the West. Board holds legal, financial and governance responsibilities.

**Wood River Valley Watershed Project, Hailey, Idaho (2005-2006)**

- Co-initiator, organizer and fundraiser for \$750,000 study of water quantity and quality in the Wood River Valley, initiated in response to development pressures; currently being undertaken by the US Geological Survey, Boise.
- Study is evaluating impact of changing land uses on surface and groundwaters, assessing water resource limitations, and providing a scientific basis for policy and planning decisions.

**Massachusetts Executive Office of Environmental Affairs, Lakeville, MA. (1999-2000)  
*Task Force Member, Eel River Watershed Nutrient Technical Advisory Committee***

**Town of Marblehead Conservation Commission, Marblehead, MA (1995-2000)  
*Board Member and Vice Chair***

- Charged with enforcing Massachusetts Wetlands Protection laws and evaluating and deciding on wetland permit applications.

**Environmental Policy Intern, Office of Senator John Kerry, Boston, MA (Spring 1993)**

**CERTIFICATIONS**

Wilderness First Responder (80 hr), Wilderness Medicine Institute  
Level 1 Avalanche Training, American Avalanche Association  
Open Water Diver, PADI

**PUBLICATIONS**

Pabich, Wendy J. (expected Fall 2012) *TAKING ON WATER: How One Water Expert Challenged Her Inner Hypocrite, Reduced Her Water Footprint (without Sacrificing a Toasty Shower), and Found Nirvana*, Sasquatch Books, Seattle, WA.

Pabich, Wendy J. (2008) *Idaho: An Explorer's Guide*. Countryman Press. Woodstock, VT., 384 p.

Bowan JL, Kroeger KD, Tomasky G, Pabich WJ, Cole ML, Carmichael RH and I Valiela. (2007) A review of land-sea coupling by groundwater discharge to New England estuaries: Mechanisms and effects. *Applied Geochemistry* 22:175-191

Colman JA, Masterson, Pabich WJ & Walter DA (2004) Effects of aquifer travel time on nitrogen transport to a coastal embayment. *Ground Water* 42(7):1069-1078.

Howarth RW, Boyer EW & Pabich WJ. (2002) Nitrogen Use in the United States from 1961 – (2000) and Potential Future Trends. *Ambio* 31:88-96.

Pabich WJ, Valiela I & Hemond HF (2001). Relationship between DOC concentration and vadose zone thickness and depth below water table in groundwater of Cape Cod, U.S.A. *Biogeochemistry*. 55: 247-268.

Valiela I, Bowen JD, Cole ML, Kroeger KD, Lawrence D, Pabich WJ, Tomasky G & Mazzilli S. (2001). Following up on a Margalevian concept: Interactions and exchanges among adjacent parcels of coastal landscapes. In: J.M. Gill, J.L. Pretus and T.T. Packard (eds.), *A Marine Science Odyssey into the 21<sup>st</sup> Century*. Scientia Marina 65 (Suppl. 2): 217-231.

Westgate EJ, Kroeger KD, Pabich WJ & Valiela I. (2000). Fate of anthropogenic nitrogen in a nearshore Cape Cod aquifer. *Biological Bulletin* 199:221-223.

Pabich WJ and Susskind L. (1999). *Chemco, Inc.: Negotiating Compliance Before the Fact*. In *Negotiating Environmental Agreements: How to Avoid Escalating Confrontation, Needless Costs, and Unnecessary Litigation* by L. Susskind and P.F. Levy

Pabich WJ, Hemond HF & Valiela I (accepted). Denitrification rates in groundwater, Cape Cod, USA: Control by nitrate and DOC concentrations. *Biogeochemistry*.

## PRESENTATIONS

*Taking on Water*, Peabody Essex Museum, Salem, MA, April 15, 2012

*Patagonia: Ice to Ocean*. Chaffee Citizens for Sustainability. Salida, CO, May 19, 2010.

*Water Futures*. Central Colorado Humanists. Salida, CO, May 9, 2010.

*Water: Waste Not, Want Not*. Living Future 2009. Portland, OR, May 8, 2009.

*The Future of Water*. St. Luke's Hospital Brown Bag Series, Ketchum, ID, February 26, 2009.

*Ladakh, Land of Many Passes: The Landscape and Economy of the Western Himalayas*. Environmental Resource Center Armchair Adventure Series. Ketchum, ID, January 25, 2006.

Howarth RW, Boyer EW & Pabich WJ. *The Nation's Nitrogen Story*. N2001 The Second International Nitrogen Conference. Potomac, MD. October 16, 2001.

Pabich WJ, Hemond HF & Valiela I. *Denitrification rates in groundwater, Waquoit Bay watershed, Cape Cod, MA: Control by nitrate and DOC concentrations* (poster presentation). Gordon Conference. Forested Catchments: Hydrological, Geochemical, and Biological Processes, Andover, NH, July 24, 2001.

Pabich WJ & Howarth RW. *Human influences on the delivery of nitrogen to coastal systems*. American Society of Agronomy & Soil Science Society of America, Northeast Branch, Annual Meeting, W. Greenwich, RI, June 25, 2001.

Pabich WJ, Hemond HF & Valiela I. *Denitrification rates in groundwater, Waquoit Bay watershed, Cape Cod, MA: Control by nitrate and DOC concentrations*. ASLO 2001 Aquatic Sciences Meeting, Albuquerque, NM, February 14, 2001.

Pabich WJ. *Vadose zone thickness and depth below the water table as controls on DOC concentration in groundwater, Cape Cod*. Woods Hole Oceanographic Institution, Challenges in Coastal Groundwater Research, Spring 2000 Groundwater Seminar Series, April 25, 2000.

Pabich WJ. DOC and nitrogen in Cape Cod groundwater. U.S. Geological Survey Cape Cod Toxic Substances Hydrology Research Site Meeting. Westborough, MA, February 3, 2000.

Pabich WJ, Valiela I & Hemond HF. *Vadose zone thickness as a control on dissolved organic carbon (DOC) delivery to groundwater, Waquoit Bay watershed, Cape Cod*. ASLO 99 Conference, Santa Fe, NM, 1999.

Pabich WJ. *Kinetic modeling of denitrification in groundwater on Cape Cod*. MIT Parsons Laboratory, Aquatic Sciences Seminar Series, October 21, 1998.

Pabich WJ. *Measuring rates of denitrification in a sandy coastal aquifer*. MIT Parsons Laboratory, Aquatic Sciences Seminar Series, December 4, 1996.

## PANEL DISCUSSIONS

*Our River: A Panel Discussion on the Big Wood River*, Sun Valley Center for the Arts, Ketchum, ID. October 14, 2010

*Peak Water*. Future in Review, Palos Verdes, CA. May 11-14, 2010.

*The Promise of Biofuels*. Renewable Energy Conference. Snake River Alliance. May 10, 2007. Ketchum, Idaho.

*Water and Sustainability*. Sun Valley Sustainability Conference. September 27-29, 2006.

Perspective with Gene Dallago. KSVT TV Channel 13, *The Valley's Water Crisis with Drs. Wendy Pabich and Lee Brown*. March 2-9, 2006.

*Interactions between the science and policy of nitrogen deposition*. Gordon Conference. Forested Catchments: Hydrological, Geochemical, and Biological Processes. Andover, NH. July 24, 2001.

*The Scientific/Policy Underpinnings of the Ecoregional Nutrient Criteria*. EPA National Nutrient Criteria Stakeholders Meeting. Crystal City, VA. June 27, 2001.