

PAUL T. GREMILLION

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Education

Ph.D., Civil Engineering, University of Central Florida, 1994

Dissertation: Separation of Streamflow Components in the Econlockhatchee River System Using Environmental Stable Isotope Tracers

Major: Water Resources Engineering

Minors: Environmental Science
Geotechnical Engineering

M.S.C.E, Civil Engineering, Louisiana State University, 1986

Thesis: Water Quality Response to Eutrophication Control in Two Urban Hypereutrophic Lakes

B.S.C.E, Civil Engineering, Louisiana State University, 1983

Registration

Professional Civil Engineer: Louisiana #29253

Professional Hydrologist

Professional Positions

Northern Arizona University, Civil & Environmental Engineering Department, Flagstaff, Arizona. Deputy Coordinator (NAU) Arizona Water Institute (2007), Associate Professor (2007), Assistant Professor (2003-2007).

Louisiana Department of Natural Resources, Coastal Engineering Division, Field Engineering Section, New Orleans, Louisiana. Design Engineer and Engineer Supervisor (2000-2003).

Union College, Civil Engineering Department, Schenectady, New York. Assistant Professor (1996-2000).

University of Oklahoma, School of Civil Engineering and Environmental Sciences, Norman, Oklahoma. Assistant Professor (1994-1996).

University of Central Florida, Civil & Environmental Engineering Department, Orlando, Florida. Graduate Research Assistant (1991-1994)

Northwest Florida Water Management District, Bureau of Environmental Resource Planning, Division of Resource Management Havana, Florida. Environmental Engineer (1990-1991)

Ecology & Environment, Inc., Tallahassee, Florida. Senior Civil Engineer (1989-1990)

International Science & Technology, Inc., Reston, Virginia (now Dynamac, Inc., Rockville, Maryland). Environmental Engineer (1986-1989)

Northern Arizona University

Environmental Change in Arizona Reservoirs

My current research program focuses on how mercury and other metals are delivered to lakes and reservoirs, and how reservoirs differ from lakes in their capacity to create sediment records of water quality, primary productivity, and hydrology. My initial projects were concerned with establishing chronologies for sediment cores from about a dozen northern Arizona reservoirs and analyzing those sediments for anthropogenic metals. My students and I are now refining our techniques to reconstruct past storm and wildfire events by analyzing our archive of sediment cores for a variety of physical and chemical parameters. We are working toward the goal of tracking the sequestration and release of mercury stored in terrestrial ecosystems. To better understand the depositional setting for reservoir sediments, we will be using seismic sub-bottom profiler and side-scan sonar equipment to map sediment thickness and stratigraphy in three reservoirs during the 2006 summer. This approach, combined with inventories of fallout radioisotopes, should reveal patterns of sediment redistribution in reservoirs. Among other things, these techniques will assist us in determining future coring sites.

Union College

Ballston Lake

Research in applied limnology and paleolimnology has been tightly linked with undergraduate education through projects on Ballston Lake. Typical of lakes with watersheds that have undergone human development, Ballston Lake supports moderate to high primary productivity. The southern end of Ballston Lake remains permanently chemically stratified, or meromictic. Anoxic and highly reducing conditions have allowed sediments to accumulate in a well-preserved, laminated sediment package 16-meters thick. My current research program includes geochemical analysis of the Ballston Lake cores and hydrodynamic modeling of the lake to determine energies necessary de-stratify the meromictic basin.

Schoharie County Groundwater Study

Groundwater resources protection in the Town of Wright, Schoharie County, New York. The principal aquifer for the town is a selectively transmissive karst unit, replete with sinkholes, springs, and a network of dry and flooded caves. The objective of this study is to identify potential point-sources of recharge to the aquifer and determine flowpaths of major insurgences and springs. Techniques for analysis include hydrologic mass balances and tracer studies using dyes and introduced rare-earth metals.

University of Oklahoma

Principal investigator for a study of over 20 Oklahoma reservoirs to relate primary productivity to organic carbon-13 in the water column and sediments. A cross-sectional study of water column parameters was related with recent surface-sediment isotopic characteristics to calibrate a primary productivity model. The model was then applied to sediment cores from Lake Henryetta, Oklahoma to reconstruct the primary-productivity history of the lake.

Other Professional and Research Experience

Water Quality Management

Limnologist for the Queechy Lake Club, Canaan, New York. Responsible for annual assessment of lake water quality. Prepared a state-of-the-lake report as part of Queechy Lake's participation in the New York State Federation of Lake Associations watershed management program.

Project manager for a water quality and biology assessment project on Deer Point Lake, Bay County, Florida. Study objectives were to monitor water chemistry and benthic macroinvertebrate diversity in the lake and tributary streams to assess the current trophic state of the system and the sensitivity of the resource to urban development and silviculture.

Project engineer for lake-liming operations on 18 acidic lakes in the Adirondack Mountains of New York; the Berkshire region of Massachusetts; and Cape Cod, Massachusetts. Responsible for selecting carbonate materials and material handling and delivery technology, developing a carbonate dose for each lake system, and estimating treatment effectiveness in terms of level of treatment and re-acidification time. Required coordinating helicopter subcontractors, carbonate suppliers, and bulk trucking subcontractors; locating suitable staging areas; and obtaining site access permission. Supervised all on-site activities.

Directed a water quality monitoring program to assess the effectiveness of restoration on six hypereutrophic lakes to support the University Lakes Restoration Project, an EPA Clean Lakes Project, in Baton Rouge, Louisiana. Responsibilities included coordinating field-sampling teams, supervising an inorganic chemistry laboratory, and data analysis. Prepared the project final report.

Coastal Restoration

Project manager for the Caernarvon and Davis Pond freshwater diversion projects. Mississippi River water is diverted into the Breton Sound and Barataria Bay estuaries to mimic some of the ecological functions that were served by periodic overbank flooding of the river prior to the construction of levees along the river. These functions included sediment, freshwater, and nutrient delivery to marshes that would otherwise not have these sources to stimulate primary productivity. These projects affect a combined area of over 1.3 million acres of marsh and inland waters. Nearly a third of all marine organisms commercially harvested in the lower 48 United States spend some part of their life cycle

in one of these estuaries. Duties included chairing the Caernarvon Technical Advisory Committee, implementing the water control plans for Caernarvon and Davis Pond, and managing contracts with the US Army Corps of Engineers, local governments, and support contractors. The combined construction budgets for these projects exceeded \$175 million and annual budgets for operations and maintenance, exceeded \$500,000. Additional duties included hosting tours of the projects to interested parties including congressional, White House, and international media visitors.

Supervisor of the Thibodaux Field Office in the Field Engineering Section of the Louisiana Department of Natural Resources. Supervised two professional engineers. Activities included construction, operation, maintenance, repair, and replacement of coastal restoration projects. Restoration strategies included renourishing and replanting barrier islands, modifying the hydrology of impaired coastal marshes, and controlling erosion at interfaces of marsh and open water.

Hydrology

Designed and implemented a study to quantify relative contributions of direct surface runoff and shallow groundwater in a shallow central-Florida aquifer using environmental stable isotope tracers. Derived and applied mass-balance models at the watershed and sub-catchment levels to trace sources of river flow using isotopic end member (surface runoff and groundwater) water masses.

Project manager for the Lake Jackson facility improvement project, Tallahassee, Florida. Developed design drawings and bid documents for renovation of a stormwater treatment facility to remove particulate solids from stormwater prior to treatment in a constructed wetland.

Project engineer for a two-year study to quantify hydraulic and water quality effects (thermal, nutrient, and sediment loading) of extended-detention ponds on small, urban watersheds in Montgomery County, Maryland. Responsibilities included developing and implementing field and data-handling protocols and data analysis.

Environmental Science and Engineering

Fellow of the 1996 Young Investigator Program on Urban Water Quality Management, National Research Council. Objectives were to develop a liaison with Russian scientists and engineers and assess the state of drinking water quality in Nizhnevartovsk, Russia, a city of approximately 250,000 located in the petroleum-development region of western Siberia.

Project manager for the design and construction of remediation systems for leaking underground petroleum storage tank facilities. Responsibilities included remediation process and construction design; compliance with environmental regulations and budgets; and liaison with client representatives, permit granting authorities, and subcontractors.

Project manager for Phase I and Phase II environmental and geotechnical audits. Objective was to determine whether subsurface environmental contamination was

present, or had migrated, on site. Activities included researching local and state government environmental data and legal records, installing and sampling soil borings and monitoring wells, conducting geotechnical analyses to determine the suitability of the site to shallow-foundation development, and preparing summary reports.

Project manager for the design and implementation of a fuel-spill cleanup on Florida's Turnpike. Contamination consisted of approximately 2,000 gallons of jet fuel released from an overturned tank truck. Remediation consisted of excavating and incinerating approximately 2,300 tons of contaminated soil. Site constraints included excavation within structural portions of the roadway and maintaining safe traffic flow during work operations.

Project engineer for several projects involving control of aquatic plants. One project involved maintaining navigational access to marinas in the Potomac River estuary. Another project involved assessing the feasibility of harvesting hydrilla as a nutrient control strategy in Lake Okeechobee, Florida.

Publications

Peer-Reviewed Journal Articles

Gremillion, P.T., J.V. Cizdziel, and N.R. Cody, 2005. Caudal fin mercury as a non-lethal predictor of fish-muscle mercury. *Environmental Chemistry*, 2:96-99.

Rodbell, D.T. and P.T. Gremillion, 2005. A winter field-based course on limnology and paleolimnology. *Journal of Geoscience Education*, 53(5):494-500.

Gremillion, P. and M. Wanielist, 2000. Effects of evaporative enrichment on the stable isotope hydrology of a central Florida river. *Hydrological Processes*, 14(8): 1465-1484.

Gremillion, P., A. Gonyeau, and M. Wanielist, 2000. Application of alternative hydrograph separation models to detect changes in flow paths in a watershed undergoing urban development. *Hydrological Processes*, 14(8):1485-1501.

Mericas, C.E. and P.T. Gremillion, 1990. Aquatic weed removal as a nutrient export mechanism in Lake Okeechobee, Florida. In: Berger, John, J., ed., *Environmental Restoration: Science and Strategies for Restoring the Earth*, Island Press, Washington, DC.

Burden, D.G., P.T. Gremillion, and R.F. Malone, 1987. Instability in a small hyper-eutrophic lake. *Environmental Monitoring and Assessment*, 9:13-24.

Selected Peer-Reviewed Proceedings and Abstracts

Gremillion, P.T. and D.T. Rodbell, 2003. Comparing the limnology and paleo-limnology of upstate New York lakes. *Geological Society of America Abstracts with Programs* 35(6):276.

Garver, J.I., P.T. Gremillion, D.T. Rodbell, G.E. Brown, M.E. Hagerman, 1999. Enhancing cross-disciplinary learning through limnological studies in the Environmental Studies program at Union College: *EOS Transactions*, 80:121.

Gremillion, P.T., D.T. Rodbell, 1998. Overturn history of an iron-rich meromictic lake as an indicator of extreme meteorological events. *Geological Society of America Abstracts with Programs*, 30(7):66.

Brocksen, R.W., G.F. Filbin, M.B. Bonoff, P.T. Gremillion, R. Danehy, and J.F. Fraser, 1987. The effect of limestone application on water quality in fifteen acidified New York and Massachusetts lakes. In: *Proceedings of the 80th Annual Meeting of the Air Pollution Control Association, 1*. June 21-26, 1987, New York, NY.

Gremillion, P.T. and R.F. Malone, 1986. Waterfowl waste as a source of nutrient enrichment in two shallow hypereutrophic lakes. *Lake and Reservoir Management*, 2:319-322.

Gremillion, P.T., D.G. Burden, and R.F. Malone, 1985. Transient sediment resuspension associated with hydraulic dredging of the University Lakes. *Lake and Reservoir Management*, 1:113-118.

Mericas, C.E., P.T. Gremillion, and R.F. Malone, 1985. Physical factors associated with the occurrence of summer fishkills in hypereutrophic southern lakes. *Lake and Reservoir Management*, 1:63-67.

Selected Technical Reports

Gremillion, P.T. and J.L. Toney, 2005. Metals deposition in northern Arizona reservoirs. Final report submitted to the Arizona Department of Environmental Quality, Phoenix, Arizona, March 2005.

Gremillion, P.T. and T. Nguyen 1996. Reconstructing the Primary Productivity of Lake Henryetta, Oklahoma Using Carbon-13 Isotopic Ratios. Final Report to the Oklahoma Water Resources Board, Oklahoma City, OK. June 1996.

Florida Department of Environmental Regulation, 1992. Biological and water quality investigation of the Deer Point Lake drainage basin, Bay County, Florida. Florida Department of Environmental Regulation Biology Group in cooperation with the Northwest Florida Water Management District, July 1992.

Malone, R.F., R.M. Knaus, P.T. Gremillion, and D.G. Burden, 1988. The final report of the University Lakes restoration project. Prepared by the Louisiana State University Civil Engineering Department, Baton Rouge, Louisiana for the United States Environmental Protection Agency Region VI, 289 pp.