Massachusetts Water Resources Research Center

Overview

The **Massachusetts Water Resources Research Center** supports research, education, and outreach on water resources issues of state, regional, and national importance as part of the national system of institutes authorized under the Water Resources Research Act of 1964. Established in 1965, the Center has been a unit of The Environmental Institute since 1984. The Center supports faculty research and training of graduate students and is a national leader in the use of volunteers for high quality water quality monitoring of surface waters. The Center's primary objectives are to conduct research responsive to state and regional needs; support the education and training of students; and disseminate information on water resources research and methods.

The Center encourages an interdisciplinary approach to address water resources problems and has involved the University and many other Massachusetts colleges and universities in Center research over the years. The Center operates a statewide competitive grants program open to all academic institutions in Massachusetts. Current research priorities include watershed and ecosystem management, non-point source pollution, drinking water supply, and water quality.

Funded Research in 2007

Continuing Projects
The MA WRRC continued to support the research project: *Monitoring Estrogenic Hormones – Undesired Fish Contraceptives, and Investigating their Sources, Transportation, and Fate in Buzzards Bay, MA by* Dr. Yuegang Zuo of UMass Dartmouth, and also supported one graduate student, Ashish Sahu of the UMass Amherst Civil and Environmental Engineering Dept. to study *Perchlorate Reduction in Groundwater Using Elemental Sulfur.*

New Projects
The Center awarded the first of a two-year grant to Dr. Baoshan Xing of the UMass Plant, Soil, & Insect Sciences Dept. to study *Environmental Behaviors of Engineered Nanoparticles in Water.* The student project award went to Lauren Moffat in Animal Biotechnology and Biomedical Sciences, UMass Amherst for *Development of a Standardized Protocol for Fish Bioassays Detecting Estrogenic Exposure.*

Funded Research in 2008

Dr. Xing's nanoparticle project was funded for a second and final year. Four graduate student projects were also awarded:
- *Quantifying Sediment Transport in Red Brook, Wareham, MA: Impacts of Dam Removal* by Steven Kichefski, Dr. Ellen Douglas, and Dr. Allen Gontz, Dept. of Environmental, Earth & Ocean Sciences, UMass Boston;
- *Estimation of Climatic and Anthropogenic Influences on Freshwater Availability* by Yushiou Tsai and Dr. Richard Vogel, Dept. of Civil & Environmental Engineering, Tufts University;
- *Toxicity of Carbon Nanotubes to the Activated Sludge Process: Protective Ability of Extracellular Polymeric Substances* by Lauren Luongo and Dr. Xiaoqi (Jackie) Zhang, Dept. of Civil and Environmental Engineering, UMass Lowell;
- *Characterization of Wastewater Effluent from Western Massachusetts Publicly Owned Treatment Works Using Metaproteomic Analysis* by Pamela Westgate and Dr. Chul Park, Dept. of Civil & Environmental Engineering, UMass Amherst.

WRRC Programs and Projects

The **Acid Rain Monitoring project** volunteers continue to survey pH and alkalinity for 150 sites. Of these, twenty-six long-term sites are analyzed further for major anions, cations, and color. This WRRC

program updates information on acid deposition impacts on Massachusetts surface waters, and analyzes long-term trends in lakes and streams. A related project is the ARM database project, which has made the full ARM database of water chemistry (more than 40,000 records covering more than 20 years) available to search and download by all web users.

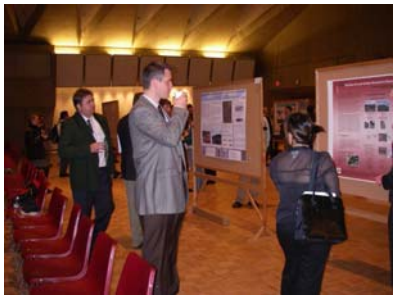
A new WRRC program is the **Three-state Connecticut River Watershed Initiative**. This project addresses major bacterial pollution from combined sewer overflows and urban stormwater, extensive streambank erosion, threats to public water supplies, and nutrient loading from agricultural runoff, in a coordinated watershed-wide approach, in four overall themes: Improving Main Stem Water Quality and Public Use, Innovative Financing for Stormwater Recharge and CSOs, Smart Growth and Low Impact Development, and Innovative Public Outreach and Participation.

The Center continues to work with UMass Extension on the **Stream Continuity Project** to examine the barrier effect created by road crossings on streams. The team is conducting pilot surveys of crossings in several watersheds, involving volunteers in developing an inventory of existing crossings. The project will result in a priority scheme for culvert replacement on a watershed basis.

The Center is also working on the **Massachusetts Stormwater Evaluation Project**, a stormwater clearinghouse project that enables users to search the web for stormwater Best Management Practices and to find innovative technologies available to treat stormwater (www.mastep.net).

Conferences

The fifth annual MA WRRC Conference, *Integrating Water Resources Management,* was held on April 8, 2008. The sixth annual conference, *Water Dependencies in New England: Systems, Stresses, and Responses*, will be held April 7, 2009. Concurrent tracks will examine Pharmaceuticals and Personal Care Products, among other topics.



EAL Laboratory

WRRC runs an inorganic chemistry laboratory on campus, the Environmental Analysis Lab, which provides chemical analysis of water, soils, tissue, and other environmental media for University researchers, public agencies, and other publicly-supported clients. The EAL conducts a wide variety of analyses to support environmental research, management, and monitoring activities, and has a particular strength in water-related analyses requiring substantial numbers of samples. The EAL provides high quality analytical services for inorganic substances in water including nutrients, inorganic anions, and metals and has especially distinguished itself in the analysis of trace levels of phosphorus. The EAL has a new partnership with the Chemistry Department which will expand the suite of services that can be offered as well as encourage new methods development .

Interdisciplinary Working Groups

The WRRC Director leads the interdisciplinary Water Working Group, and staff also participate in other environmental working groups to facilitate interdisciplinary research and educational initiatives related to water.

Potential projects under development include water sensing of the environment, consequences of global change for water quality, and integrated programs to improve water quality.

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