WATER RESOURCES RESEARCH CENTER

Mission

In the University of Massachusetts' College of Natural Sciences, WRRC is a center whose mission is to support 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.

Vision

- To serve as the liaison between federal, state and local representatives and water/environment expertise at UMass Amherst,

- To address the water resources needs of the Commonwealth and New England through research, creative partnerships, and information transfer, and

- To actively engage federal and state agencies in inter-disciplinary University water resources research, education, and outreach efforts.

Research

Through funding from the U.S. Geological Survey Water Resources Institutes Program (WRIP), the Center supports faculty and graduate student research on water resources including water quality, long-term environmental monitoring, hydrologic modeling, watershed planning, management, protection, policy and the impacts of climate change.

2023 Research Awards

The Water Center selected three major projects to fund under the USGS WRIP:

- **"Conjunctive Water Use for Managing Drought in the Middle Connecticut River"** led by Timothy Randhir at UMASS Amherst, aims to implement land management practices to enhance soil moisture and recharge rates. It will also identify strategic areas for conservation practices to assist local communities in water storage during rainy seasons. ($15,000K)

- **"Hydrothermal Conversion of Microplastic Pollutants and Harmful Algal Blooms into Biocrude Oil"** led by Dr. Wan-Ting (Grace) Chen Assistant Professor, UMASS Lowell, aims to recycle microplastics and harmful algal blooms (HABs) into biocrude oil using hydrothermal conversion. Researchers will assess if combining microplastics and HABs improves biocrude oil production efficiency for potential use as a petroleum-derived fuel substitute. ($50,000K)

- **"Tailorable, Dynamically Crosslinked Polymer Adsorbents for Targeted Capture and Release of Per- and Polyfluoroalkyl Substances (PFAS)"** led by James Reuther Assistant Professor, UMASS Lowell, focuses on developing tailorable and dynamically crosslinked polymer adsorbents for the targeted capture and release of Per- and Polyfluoroalkyl Substances (PFAS). The project introduces sustainable water purification materials with user-friendly regeneration protocols, offering alternatives to single-use disposable devices. These materials can be applied in various settings, from domestic to industrial, and have the flexibility to remove emerging pollutants, making them suitable for next-generation water treatment systems. ($50,000K)

2022 Research Awards

- **"Decreasing toxicity of DBPs in drinking water through light driven reaction,"** led by Dr. Mariana Lopes at UMass Lopes, tested the reduction of toxicity of disinfection byproducts (DBPs) in drinking water through practical ultraviolet light distribution in pipes at points of use. ($50,000)

- **"Evaluating hydroclimatic controls on riverine flooding in New England using reanalysis data and model simulations,"** led by Dr. Samuel Muñoz at Northeastern University, studied ways to enhance understanding of how climate variability and change influence floods in rivers in New England. ($50,000)

Current Projects

Acid Rain Monitoring Project

The Center coordinates annual volunteer sampling of 150 surface water sites across Massachusetts for analytes indicative of the long-term effects of acid deposition. The Center makes the full ARM database (more than 40,000 records from nearly 4,000 lakes and streams sampled since 1983) available on the Internet.

Acid Rain Monitoring Project volunteer analyzing water samples for pH and alkalinity at home

Blackstone River Water Quality Study

Since 2012, this study has included data collection, analysis and modeling of surface water flow and quality. Currently, sampling is conducted April through November to determine nutrient and chlorophyll levels, dissolved oxygen, and river response to reduced pollutant loads.

Measuring water quality in the Blackstone River

Assistance Program for Lead in Drinking Water of School and Childcare Facilities

WRRC is working with the Civil & Environmental Engineering Department at UMass Amherst on a collaborative project with MassDEP to provide free lead testing and technical assistance to public and private schools, and to group child care centers as well as family child care facilities. This is the third phase of the project and is aimed at facilities serving children aged 6 and younger.

Statewide Sampling for PFAS Contaminants in Drinking Water

WRRC staff joined the UMass team contracted by MassDEP to test drinking water in Public Water Supply sources and privately owned wells across the Commonwealth. Associate Director Hatte was the project manager on the UMass Amherst campus and Mr. Richards trained students to create GIS maps for locating good private well candidates for testing in towns where at least 60% of drinking water is provided by privately owned wells. This project ended June 30, 2022.

Environmental Analysis Laboratory

The EAL provides inorganic chemical analysis of water for University researchers, watershed organizations, and other publicly supported clients to support environmental research, management, and monitoring activities, with a particular strength in the analysis of low-level phosphorus and chlorophyll *a*.

Outreach

WRRC participates in projects such as the North Atlantic Aquatic Connectivity Collaborative (road-stream crossings assessment) and RiverSmart Communities (supporting New England communities to manage their river landscape to prevent flood and erosion damage while protecting river ecosystems).

Contact WRRC

Timothy Randhir, PhD
Director
randhir@umass.edu
413-545-3969

Olga Tsvetkova, PhD
Interim Senior Research and Administration Manager
otsvetkova@umass.edu

Emad Mady, PhD
EAL Coordinator
emady@umass.edu

209 Ag Engineering Bldg
250 Natural Resources Rd
Amherst, MA 01003-9295
413-545-5531
wrrc@umass.edu
http://wrrc.umass.edu/

The WRRC is affiliated with the Center for Agriculture, Food, and the Environment in the College of Natural Sciences at the University of Massachusetts Amherst.