Vermont Water Resources and Lake Studies Center

Congressional Authorization:
Water Resources Research Act of 1964 (Public Law 88-379)

FY 2022 Funding:
Federal: $133,770
Non-federal: $133,770
Total:
$267,540

FY 2023 Funding:
Federal: $146,840
Non-federal: $146,840
Total:
$293,680

Host:
University of Vermont Rubenstein School of Environment and Natural Resources

Director:
Dr. Anne Jefferson

Contact:
vwrlsc@uvm.edu
uvm.edu/rsenr/vtwatercenter
and econewsvt.org

The Vermont Water Resources and Lake Studies Center (Vermont Water Center) is one of 54 state water resources research institutes established by the Water Resources Research Act of 1964 and located at land-grant universities. Through cooperation with the U.S. Geological Survey's National Institutes for Water Resources, the Vermont Water Center leverages expertise in research and communications to address Vermont's water resource challenges.

The Vermont Water Center runs an annual competition to fund research projects that inform and impact important Vermont water resource issues. The Center shares research results with stakeholders and uses findings to educate Vermonters about state water resources. Projects are led by Vermont college and university-based researchers.

USGS-NIWR annual base funding to Vermont supports:

- A website and quarterly newsletter about recent ecological findings in Vermont available at www.econewsvt.org.
- 4-5 research projects per year that include training for about 5 graduate and 5 undergraduate students from a range of disciplines.
- 3-5 peer-reviewed publications, 2-4 theses, and 12+ outreach products per year.
- Scientific knowledge that informs water resources management in Vermont. Examples from recent research:
  - First published report of bloom-forming cyanobacteria in Vermont's high-elevation acid-impaired lakes contributes to development and implementation of biotic indices for rapid assessment of water quality impairment.
  - Research on the adaptation of freshwater whitefish to environmental variability helps understand the range of possible responses to climate change and assists managers to conserve fisheries.

USGS science for a changing world

NIWR THE NATIONAL INSTITUTES FOR WATER RESOURCES

Ongoing Research Projects

LAKE CHAMPLAIN INTERANNUAL WINTER MICROBIAL DYNAMICS

Assistant Professor Erin Eggleston, Middlebury College

This project, first funded by the Vermont Water Center last year, was the first to characterize winter microbial communities at three sites on Lake Champlain by collecting water and nutrient samples at four discrete times. This ongoing study, now funded by both the Vermont Water Center and Lake Champlain Sea Grant, will analyze biological and chemical data in water samples to identify specific variables that help predict spring and summer bloom dynamics.

CONSEQUENCES OF WARMING WINTERS ON NUTRIENT EXPORT TO LAKE CHAMPLAIN

Associate Professor Carol Adair, University of Vermont

Runoff from snowmelt, rain, and rain-on-snow events in the Lake Champlain basin are increasing throughout the winters which can lead to watershed nutrient loss. This project will use year-round data from two Vermont watersheds to quantify winter nutrient loading to Lake Champlain and determine how warming winters impact watershed nutrient export, sources, and flowpaths.

INFLUENCE OF ARTIFICIAL AERATION ON NITROGEN FIXATION AND NUTRIENT LIMITATION OF PHYTOPLANKTON IN LAKE CARMI, VT

Assistant Professor Mindy Morales and Graduate Student Maria Alfaro, University of Vermont

Substantial efforts to control phosphorus in Vermont lakes are underway due to their role in cyanobacteria bloom formation. As phosphorus inputs are limited, the role of nitrogen in lake systems will become more important. This project will run small experiments with different limiting nutrients in order to increase our understanding of nitrogen cycling in eutrophic Lake Carmi and inform future management efforts aimed at mitigating cyanobacteria blooms.

ASSESSING MECHANISMS OF PHOSPHOROUS REMOVAL AT A CHAMPLAIN BASIN WASTEWATER TREATMENT PLANT

Assistant Professor Matthew Scarborough and Graduate Student Amelia McClure, University of Vermont

Wastewater treatment facilities (WWTFs) remove nutrients and other pollutants from wastewater before discharging the water into waterbodies. This project will study phosphorous (P)-removal at the Burlington, Vermont WWTF. Samples of wastewater before, during, and after physical, chemical, and biological treatments will be collected weekly for one year. Insights will inform future optimization strategies at WWTFs in Burlington and throughout Vermont and the US.

IDENTIFYING THE ENVIRONMENTAL DRIVERS OF TOXIC VS. NON-TOXIC CYANOBACTERIA STRAIN ABUNDANCE IN TWO EUTROPHIC BAYS OF LAKE CHAMPLAIN

Assistant Professor Mindy Morales and Graduate Student Katelynn Warner, University of Vermont

Cyanobacteria blooms in Vermont lakes are a health danger for people and animals, but not all cyanobacteria blooms are dangerous. The role of cyanotoxins in cyanobacteria blooms remains elusive. Through data analysis and sampling in the northeastern arm of Lake Champlain, this project will identify which cyanobacteria species can produce cyanotoxins.