Buffalo State

Great Lakes Center

Since 1966

# Annual Report 2024–2025

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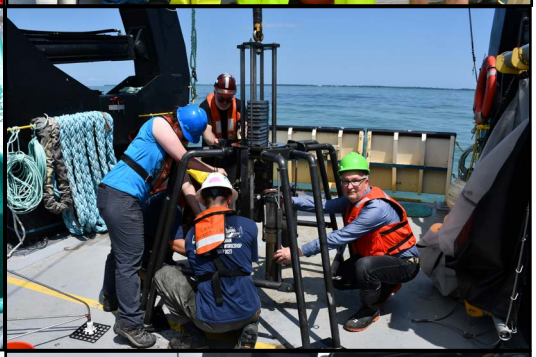
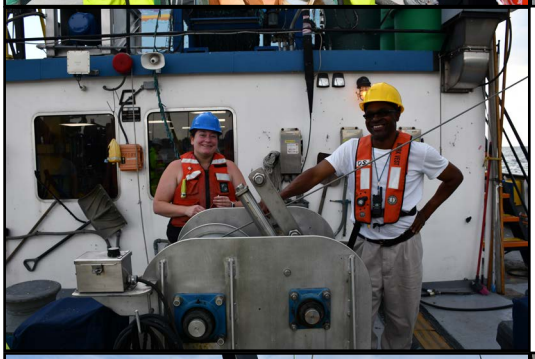
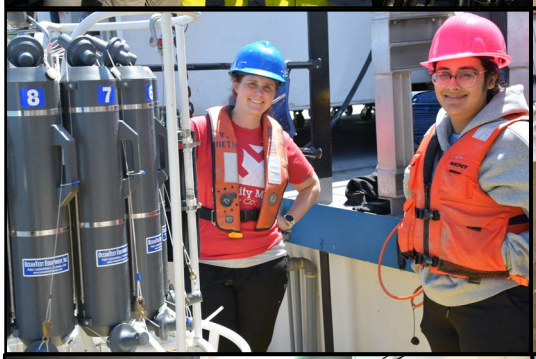
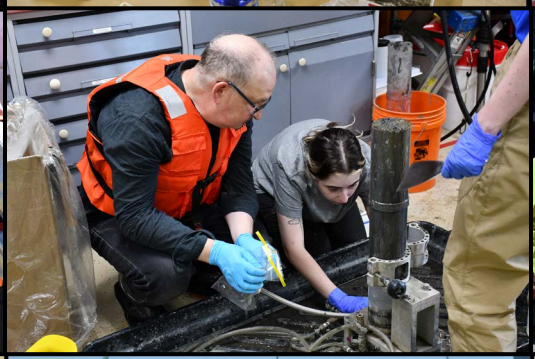



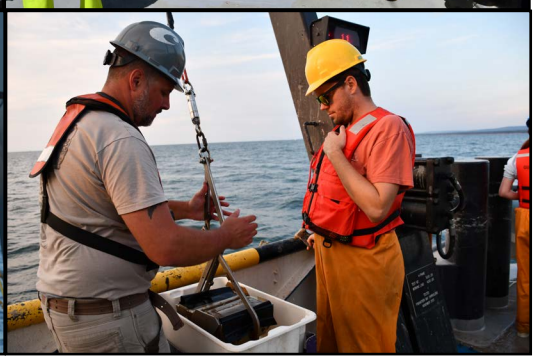
# Lake Erie CSMI

## July 2024







# CONTENTS

# MISSION

The Great Lakes Center (GLC) mission is to improve the quality of the environment by providing the best possible science to decision-makers concerned with the health and sustainability of resources, with a primary focus within the Great Lakes and their watersheds. This is accomplished through high quality research, informed and current graduate and undergraduate education, and dissemination of information to the public through outreach. Although the main focus of the research in the GLC concentrates on the Great Lakes basin, nation-wide and international projects are also considered of high priority as they expose GLC scientists to the cutting edge of modern science, facilitate collaboration, and greatly increase visibility of the Center's activity in the scientific community.

# HIGHLIGHTS

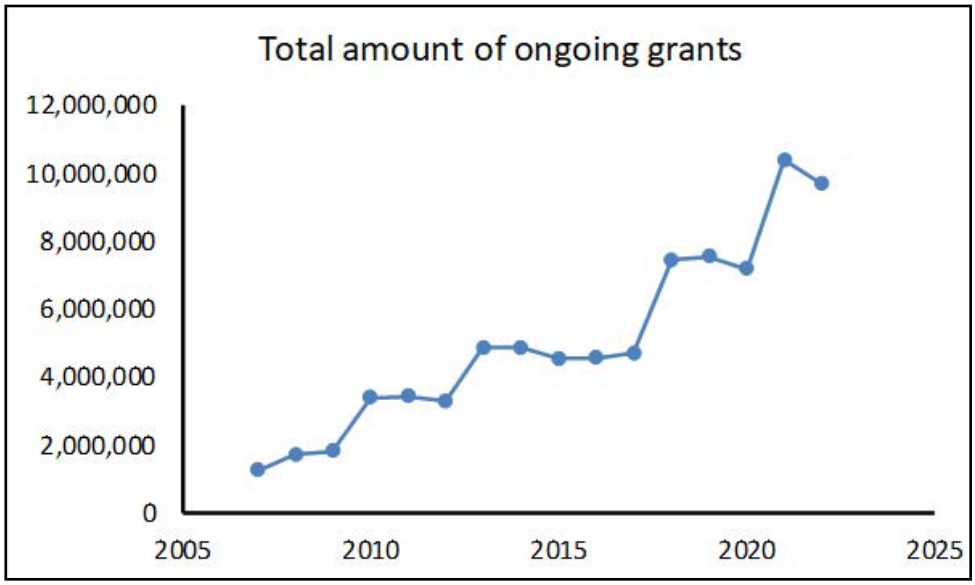
- Over the last year our researchers have published **12 peer-reviewed papers**, and **4 papers** were submitted for publication.
- We presented **35 talks**, including: 27 at national/international/regional conferences and 8 invited talks.
- Eight projects for research and education are currently funded in the GLC totaling **$12,029,746**, including **$7,995,151** for Buffalo State.
- **Six students** were enrolled in Great Lakes Environmental Science M.A. and M.S. programs.
- **Two issues** of GLC newsletters were produced over the last year.

# AWARD

In June 2025, we received the Chandler-Misener Award, which is presented annually to the authors of the peer-reviewed paper published in the Journal of Great Lakes Research in 2024 judged to be "most noticeable." Established in 1974, the award honors D.C. Chandler and A.D. Misener, IAGLR's first presidents. Papers are evaluated on the basis of originality, contribution and presentation. This paper was authored by three Great Lakes Center employees: Adjunct Research Scientist Richard Barbiero, GLC Senior Research Scientist Lyuba Burlakova, and GLC Director Alexander Karatayev.

# FROM THE DIRECTOR

After 18 years as Director of the Great Lakes Center, I will retire on August 31, 2025. I would like to use this opportunity to summarize the Center's major accomplishments during these years. Since 2007, the GLC saw sustained activity and productivity in research, education, and service. Over the last 18 years, the GLC has secured millions of dollars in external research funding (in total 56 grants, $24.3 million, $1.4 million/year), published over 200 peer-reviewed papers, and presented over 550 talks at various scientific meetings. I had the privilege to be a PI/co-PI on 22 of these grants that collectively brought over $10 million to Buffalo State, published 107 papers, and presented 95 talks.




The total amount of ongoing grants (including multiyear) in the Great Lakes Center.

During these years the GLC has become a leader in multiple large collaborative projects, including the leading role in U.S. EPA Great Lakes National Program Office Benthic Monitoring Program, which covers all five of the Great Lakes and is the world's largest freshwater monitoring program. Additionally, over the last 15 years, the GLC has led several projects that involved whole-lake limnological and biological studies in the Great Lakes. The GLC has also been the leader in collaborations with the NY Department of Environmental Conservation, the Army Corps of Engineers, and other universities. GLC personnel make significant contributions to the training and education of graduate and undergraduate students, as well as disseminating the research findings through press releases, the GLC website, the GLC annual activity report, a biannual newsletter, publications, and presentations.

Looking to the future, my biggest hope is that the GLC continues to be a focal center of research to understand and protect the Great Lakes. I sincerely thank the team of employees, colleagues, and RF and Buffalo State administrators who have helped us achieve this status during my time at the GLC. For my part, after retiring as director, I am planning to keep a vibrant research program for years to come.

# I. Staff

## GLC Personnel

| | |
|---|---|
| Director: | Alexander Karatayev |
| Research Scientists: | Nikolai Barulin<br>Lyubov Burlakova<br>Mark Clapsadl (retired in August 2024)<br>Susan Daniel<br>Christopher Pennuto |
| Research Technicians: | Mimi Byrne<br>Lillian Denecke<br>Brian Haas<br>Kit Hastings<br>Benjamin Szczygiel<br>Angela Tulumello<br>Brianne Tulumello |
| Administrative Assistant: | Susan Dickinson |
| WNY PRISM Coordinator: | Andrea Locke |
| Program Managers: | Nicholas Farese, Aquatic Program Manager<br>Brittany Hernon, Terrestrial Program Manager<br>Rachel Taylor, Community Science and Engagement Program Manager |
| Field Crew Leader: | Catherine Eaton |
| Student Research Assistants: | Nick Hahn, Undergraduate Student, SUNY Buffalo State University<br>Sarah Klawinski, Undergraduate Student, SUNY Buffalo State University<br>Emily Klimczak, Graduate Student, SUNY Buffalo State University<br>Kayla Kudlowitz, Undergraduate Student, SUNY Buffalo State University<br>Yevheniia Mikulska, Undergraduate Student, University at Buffalo<br>Lory C. Pierre, Undergraduate Student, SUNY Buffalo State University<br>Allarae Prigan, Graduate Student, SUNY Buffalo State University |

## WNY PRISM Summer Employees

| | |
|---|---|
| Field Crew Leader: | Hannah Rola (2024) |
| Invasive Species Management Assistants: | Brittnee Bukowski, SUNY Niagara (2025)<br>Jessica Catellan, SUNY Environmental Science and Forestry (2024)<br>Rebecca Kolsch, University at Buffalo (2024)<br>Winter Mumbach, University at Buffalo (2025)<br>Hannah Phillips, The University of Pennsylvania, Erie, Pennsylvania (2024)<br>Manmeet Singh, University of Michigan (2025) |

Education and Outreach Assistant:

Nikolai White Bear, University at Buffalo (2024-2025)

Lead Boat Stewards:

Owen Hebeler, SUNY Brockport (2024)
Chloe Van Nelson, University at Buffalo (2025)
Jimi Wiggins, University at Buffalo (2024)
Emily Yousey, SUNY Potsdam (2025)

Boat Steward/Environmental Educators:

- Michael Bayba, University at Buffalo (2024)
- Audra Blue, SUNY Brockport (2024)
- Cayla Burch, SUNY Morrisville (2025)
- Grace Camarata, Allegheny College (2025)
- Daniel Conklin, University at Buffalo (2024)
- Emma Dainty, Houghton University (2025)
- Caitlin Garrell, Niagara University (2025)
- Mailey Geiger, SUNY Geneseo (2024)
- Dylan Glascock, University of Lynchburg (2025)
- Dainaira Goldthwait, University at Buffalo (2024)
- Teresa Gutierrez, SUNY Geneseo (2025)
- Robert Kelly, Niagara University (2024)
- Marisa Michaels, Erie Community College (2025)
- Rehn Pielechowski, SUNY Buffalo State University (2024)
- Mason Shultz, University of Albany (2025)
- Kara Sparling, Niagara University (2024)
- Colby Stoner, Utah State University (2025)
- Chloe Van Nelson, University at Buffalo (2024)
- Charles Weaver III, University at Buffalo (2023-2024)
- Mykayla Williams, SUNY Buffalo State University (2025)

## GLC Affiliates (at SUNY Buffalo State University)

- Kelly Frothingham, Dean, School of Arts and Sciences
- Susan McCartney, Director, Small Business Development Center
- Olga Novikova, Assistant Professor, Biology Department
- Mary Perrelli, GIS Lab Supervisor, Geosciences
- Daniel L. Potts, Professor, Biology Department
- Randal Snyder, Professor, Biology Department
- Tao Tang, Professor, Geosciences
- Stephen Vermette, Professor, Geosciences
- Robert J. Warren II, Professor, Biology Department

## Adjunct Research Scientists

- Richard Barbiero, Chicago, Illinois
- Thomas Hahn, Buffalo, New York
- Vadim Karatayev, Assistant Professor, University of Maryland, College Park, Maryland
- Knut Mehler, Research Scientist, Helmholtz Centre for Polar and Marine Research, Alfred Wegener Institute, Germany

## Collaborators in New York State

- Connie Adams, NYS Department of Environmental Conservation
- Gregory Boyer, SUNY Environmental Science and Forestry, Syracuse
- Mike Goehle, U.S. Fish and Wildlife Service
- Dmitry Gorsky, U.S. Fish and Wildlife Service
- Andrew Hannes, U.S. Army Corps of Engineers
- Kristen Holeck, Cornell Biological Field Station, Cornell University
- Dianna Padilla, Department of Ecology and Evolution, Stony Brook University
- Isabel Porto Hannes, University at Buffalo
- Erin Redding, NYS Department of Environmental Conservation

- Lars Rudstam, College of Agriculture and Life Sciences, Department of Natural Resources, Cornell Biological Field Station, Cornell University
- James Watkins, Cornell Biological Field Station, Cornell University
- Brian Weidel, U.S. Geological Survey, Lake Ontario Biological Station, Oswego

## Collaborators at other U.S. Institutions

- Theodore Angradi, U.S. EPA Mid-Continent Ecological Division, Duluth, Minnesota
- Jakob Boehler, National Center for Water Quality Research, Heidelberg University, Tiffin, Ohio
- David Bunnell, U.S. Geological Survey, Great Lakes Science Center, Ann Arbor, Michigan
- Paris Collingsworth, Illinois-Indiana Sea Grant and Department of Forestry and Natural Resources, Purdue University, West Lafayette, Indiana
- Peter Esselman, U.S. Geological Survey, Great Lakes Science Center, Ann Arbor, Michigan
- Elizabeth Hinchey Malloy, U.S. EPA Great Lakes National Program Office, Chicago, Illinois
- Joel Hoffman, U.S. EPA, National Health and Environmental Effects Research Laboratory, Mid-Continent Ecology Division, Duluth, Minnesota
- Leon Katona, U.S. Geological Survey, Upper Midwest Water Science Center, Lansing, Michigan
- Katya Kovalenko, Natural Resources Research Institute, University of Minnesota Duluth, Duluth, Minnesota
- Richard Kraus, U.S. Geological Survey, Lake Erie Biological Station, Huron, Ohio
- Barry Lesht, Department of Earth and Environmental Sciences, University of Illinois at Chicago; CSRA, Chicago, Illinois
- Julie Lietz, General Dynamics Information Technology, Duluth, Minnesota
- Charles Madenjian, U.S. Geological Survey, Great Lakes Science Center, Ann Arbor, Michigan
- Janet Nestlerode, U.S. EPA, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, Florida
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- Euan Reavie, Natural Resources Research Institute, University of Minnesota Duluth, Duluth, Minnesota
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- Ed Rutherford, Great Lakes Environmental Research Laboratory, NOAA, Ann Arbor, Michigan
- Mike Sayers, Michigan Technological Research Institute, MTU, Ann Arbor, Michigan
- Anne Scofield, U.S. EPA Great Lakes National Program Office, Chicago, Illinois
- Robert Shuchman, Michigan Technological Research Institute, MTU, Ann Arbor, Michigan
- Anett Trebitz, U.S. EPA Office of Research & Development, Mid-Continent Ecology Division, Duluth, Minnesota
- Yvonne Vadeboncoeur, Department of Biological Sciences, Wright State University, Dayton, Ohio
- Jake Vander Zanden, Center for Limnology, University of Wisconsin-Madison, Madison, Wisconsin
- Daelyn Woolnough, Biology Department, Institute for Great Lakes Research, Central Michigan University, Mount Pleasant, Michigan
- David Zanatta, Biology Department, Institute for Great Lakes Research, Central Michigan University, Mount Pleasant, Michigan

## International Collaborators

- Boris Adamovich, Research Laboratory of Aquatic Ecology, Belarusian State University, Minsk, Belarus
- Csilla Balogh, Balaton Limnological Research Institute, Hungary
- Yulia Bespalaja, Federal Center for Integrated Arctic Research, Russian Academy of Sciences, Arkhangelsk, Russia
- Ivan Bolotov, Federal Center for Integrated Arctic Research, Russian Academy of Sciences, Arkhangelsk, Russia
- Demetrio Boltovskoy, University of Buenos Aires, Argentina
- Frank Collas, Radboud University, Nijmegen, The Netherlands
- Nancy Correra, Sede Educativa Universitaria, UNDEF, Buenos Aires, Argentina
- Ronald Dermott, Alumnus, Fisheries and Oceans Canada, Burlington, Canada
- Maria Dittrich, University of Toronto Scarborough, Toronto, Canada
- Elsa Froufe, CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, and University of Porto, Porto, Portugal
- Jürgen Geist, TU München, Munich, Germany

- Ron Griffiths, Aquatic Ecostudies Limited, Canada
- Linda Haltiner, Kanton Luzern, Switzerland
- Jörg Huwyler, Department of Pharmaceutical Sciences, University of Basel, Switzerland
- Bastiaan Ibelings, University of Geneva, Geneva, Switzerland
- Benjamin Kraemer, University of Freiburg, Freiburg, Germany
- Manuel Lopes-Lima, CIBIO/InBIO - Research Center in Biodiversity and Genetic Resources, University of Porto, Portugal
- Frances Lucy, Institute of Technology Sligo, Sligo, Ireland
- Oleg Makarevich, Belarusian State University, Minsk, Belarus
- Tamara Makarevich, Belarusian State University, Minsk, Belarus
- Nicoletta Ricciardi, CNR-Institute of Water Research, Verbania Pallanza, Italy
- Zoltán Serfőző, Balaton Limnological Research Institute, Hungary
- Konstantin Shumskii, Department of Ichthyology and Aquaculture, Belarusian State Agricultural Academy, Belarus
- Ronaldo Sousa, CIIMAR and Minho University, Braga, Portugal
- Piet Spaak, Eawag, Dübendorf, Switzerland
- Maria Urbańska, Poznań University of Life Sciences, Poznań, Poland
- Ilya Vikhrev, Federal Center for Integrated Arctic Research, Northern (Arctic) Federal University, Arkhangelsk, Russia
- Alexandra Weber, Eawag, Dübendorf, Switzerland
- Alexandra Zieritz, University of Nottingham Malaysia Campus, Semenyih, Malaysia

Members of Quagga mussel group in Eawag: Alexandra Weber, Noemi Wellauer, Piet Spaak, Sophie Kessler, Sasha Karatayev, and Lyuba Burlakova.

Lyuba Burlakova meeting with our colleagues from Italy (Nico Riccardi), Poland (Maria Urbanska), and Portugal (Anabela and Manuel Lopez-Lima).

Sasha Karatayev, Frances Lucy (Ireland), Sergey Mastitsky (UK), and Lyuba Burlakova in London, England.

Susie Daniel and Anne Scofield (EPA) aboard the R/V *Lake Guardian*.

# II. Research Activities

## Current Projects

### Monitoring of benthic invertebrates in the Great Lakes

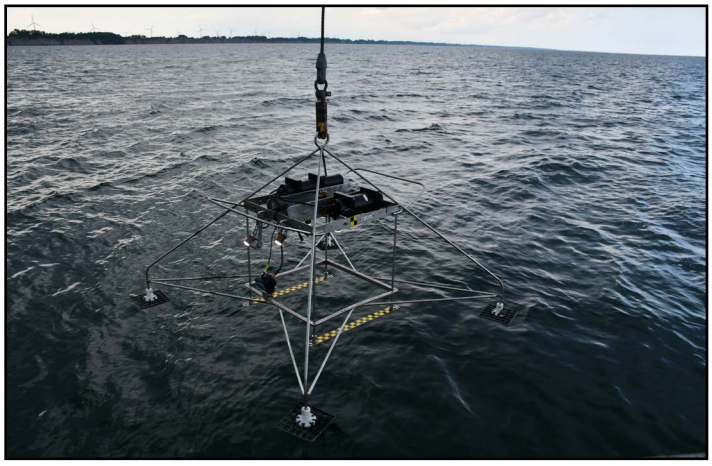
PIs Lyubov Burlakova and Alexander Karatayev. The GLC, in collaboration with Cornell University, was awarded U.S. EPA Great Lakes Long-term Biological Monitoring grants for 2012–2017, 2017–2022 and for 2022–2028. The Great Lakes Monitoring Program by the EPA Great Lakes National Program Office includes both the annual collection of benthos (Buffalo State) and zooplankton samples (Cornell University) from 57 long-term stations and a much more detailed survey conducted on each lake every 5 years within the Coordinated Science and Monitoring Initiative (CSMI). We participated in CSMI surveys in 2014 (Lake Erie), 2015 (Lake Michigan), 2016 (Lake Superior), 2017 (Lake Huron), 2018 (Lake Ontario), 2019 (Lake Erie), 2021 (Lake Michigan), 2022 (Lake Huron and Lake Superior), 2023 (Lake Ontario), and 2024 (Lake Erie). The EPA Monitoring Program is designed to provide managers access to biological data on zooplankton and benthos to support decision-making. Additional research projects include impact of dreissenids on the lower food web and benthic nepheloid layer, and development of remote sensing methods. We identified benthic samples collected onboard the EPA R/V *Lake Guardian* from all the Great Lakes in 2012–2023 and submitted the data to the Great Lakes National Program Office (GLNPO). These data are the basis for individual lake reports as well as reports for the State of the Great Lakes. Thus far, the results of the study have been published in over 35 papers, 15 reports, and were presented at regional and international meetings. (CSMI photo page.)

Sasha Karatayev elutriating a benthic sample during CSMI Erie in July 2024.

Oligochaetes and chironomid larvae from benthic samples.

### New method for rapid assessment of dreissenid mussels populations

PIs Alexander Karatayev and Lyubov Burlakova. The Great Lakes Center, in collaboration with the U.S. Environmental Protection Agency's Great Lakes Biology Monitoring Program and Office of Research and Development-Great Lakes Toxicology and Ecology Division, has developed a new method for rapid assessment of dreissenid mussel populations in lakes. The method uses a Benthic Imaging System (BIS) to estimate population size of these invaders in near-real time (during a typical 2-weeks summer cruise of the EPA research vessel *Lake Guardian*. The new method substantially reduces the time required to map distributions of dreissenid mussels across large spatial scales compared to traditional sediment



The Benthic Imaging System (BIS) is a drop-down frame with down- and side-looking cameras and lights.

collection methods. This increase in spatial resolution and reporting times of monitoring is especially important considering that the quagga mussel is now one of the major drivers of the ecosystem processes in the lower four Great Lakes. This method for *Dreissena* rapid assessment was applied in Lake Erie in 2019, Lake Michigan in 2021, Lake Huron in 2022, Lake Ontario in 2023, Lake Erie 2024, and will be applied in future surveys as a valuable addition to conventional bottom grab monitoring. Results of these studies were already published in two papers and presented at multiple international meetings. This method is now used for quagga mussel monitoring in deep Swiss lakes Constance and Biel (Haltiner et al., 2022).

## Benthoscapes

PIs Lyubov Burlakova and Alexander Karatayev. Images from side-looking BIS cameras used for rapid assessment of dreissenid populations during CSMI surveys are also used to assess spatial distribution of benthos and *Mysis*. Communities of benthic macroinvertebrates are among the most useful indicators for biological assessment of environmental and anthropogenic stressors, but both sample processing and species identification are time-intensive, often requiring several years to identify all samples from a large-scale survey. Mapping benthic landscape or "benthoscape" structure and dynamics using underwater video can provide valuable and cost-effective assessment of bottom habitats on large spatial scales with minimal habitat disturbance. In 2019, during the CSMI benthic survey in Lake Erie, we used this approach to characterize benthic habitats, and then tested whether visual classification could serve as an indicator of hypoxia (Burlakova et al., 2023). We identified four habitat types that differed significantly in near-bottom dissolved oxygen concentration and confirmed that video analysis can provide a quick and reliable method to detect habitats affected by periodic hypoxia. Video identification of benthoscapes may be important for regional monitoring of over 20 hypoxic zones documented in the Great Lakes where the extent and magnitude of hypoxia currently represent a major knowledge gap. We used this method to detect hypoxic habitats in 2022 on Saginaw Bay of Lake Huron, and in 2023 on Hamilton Bay of Lake Ontario. The results of this study have been recently published in *Ecological Indicators*.

## Benthos of the Laurentian Great Lakes: Inventory of lake-wide surveys

PIs Alexander Karatayev and Lyubov Burlakova. Over 110 lake-wide benthic surveys were conducted on the Laurentian Great Lakes since 1929. However, these studies often are not readily available and have never been combined in one dataset to preserve historic data. According to our estimations, primary data for at least 20% of all surveys are incomplete or have already been lost. For over four years, the Great Lakes Center has been conducting inventory of benthic surveys for all Great Lakes to create a database with all the available information on species composition, distribution, density, and biomass of benthic invertebrates. Considering the rarity of long-term benthic studies in lake ecosystems, this data set could be useful to explore effects of different environmental factors and exotic species on community organization, for monitoring of water quality, biodiversity, exotic species introduction, fish food base assessment, and other ecosystem services provided by benthic community. Our first complete dataset on the Lake Ontario benthic community includes taxonomic data to the species level for 11 of the surveys and data to the group level for another two surveys covering the last 54 years and was published as a data paper in *Ecology* (Burlakova et al., 2022). Our second paper summarizing 90 years of benthic research in Lake Erie has been recently published in the *Journal of Great Lakes Research* and the database in *Ecology* as a data paper. The paper describing long-term changes in Lake Superior benthic community is currently in review in the *Journal of Great Lakes Research*. Currently we are analyzing data from benthic research conducted in Lake Huron.

## Interactions of Benthic Invertebrates with the Benthic Nepheloid Layer

PIs Lyubov Burlakova and Alexander Karatayev. Benthic nepheloid layers (BNLs) are areas of high turbidity and suspended solids that form near the benthos during summer stratification. The suspended sediment and other material that build BNLs can come from a variety of sources, including sediment resuspension, entrainment of spring runoff in the hypolimnion, settling of particles from the epilimnion, and from internal waves and density currents. We analyzed GLNPO long-term data to examine relationships between BNL intensity/thickness and benthic invertebrate production, and to compare current BNL intensity and thickness to historical data from studies prior to *Dreissena* invasion. We found that prior to the appearance of *Dreissena*, pronounced benthic nepheloid layers were a consistent and extensive feature of the offshore, stratified waters of all the Laurentian

Great Lakes, except Lake Superior. In recent (2010-2019) years, the BNL has disappeared from all areas except for central Lake Erie, where only a small decrease in bottom turbidity has occurred. All stratified regions which exhibited a pre-*Dreissena* BNL, including central Lake Erie, experienced substantial post-*Dreissena* reductions in near-bottom TP. Initiation of changes in the BNL almost invariably preceded appearance of *Dreissena* in the offshore, suggesting both that dreissenid impacts on the reductions in the BNL were largely remote, and that the source of the BNL was also at least in part remote. These post-invasion reductions in bottom phosphorus during the stratified season could be contributing to the offshore oligotrophication of Great Lakes and to changes in benthic populations, most notably the dramatic decline in deepwater amphipod *Diporeia*. The manuscript based on this study ("The benthic nepheloid layer in the offshore waters of the Great Lakes and its post-dreissenid disappearance" by R. Barbiero, L. Burlakova, J. Watkins, A. Karatayev and B. Lesht) was published in the *Journal of Great Lakes Research* and received the Chandler-Misener Award as "most notable" paper based on originality, contribution, and presentation (IAGLR announces journal, editor awards).

## Eutrophication and multiple invasions decimate the most imperiled freshwater invertebrates

PIs Alexander Karatayev and Lyubov Burlakova. This is a collaborative project with scientists from Cornell University, and Maryland University College Park. We analyzed species composition and density of molluscs in Oneida Lake (New York, USA) for over a century. At the beginning of the 20$^{th}$ century the lake was in a clear water phase and hosted very divers molluscan community. Eutrophication that peaked in 1970s resulted in 25% decline in species richness and 95% decline of the density of native gastropods. Introduction of zebra and quagga mussels was associated with the increase in the water clarity and the expansion of macrophyte and bottom algae resulting in the sharp increase in species richness and the density of native gastropods by 2012 but caused a complete extirpation of unionids by 1995. Introduction of round gobies in 2013 was associated with the significant decline across all gastropod families, but the strongest impact was recorded for the soft-shelled snails. Gobies impact was also depth- and time-dependent. Deep areas were less affected, and most molluscs experienced at least partial recovery. This paper was published in *Biological Invasions* in early 2025.

## "BODENSEE in STRESS - Modelling the consequences of climate change and invasive species for the Lake Constance ecosystem as a basis for integral management:" The impact of serial invasion of dreissenids on lake ecosystems

PIs Alexander Karatayev and Lyubov Burlakova.
This is a large collaborative project involving over 15 scientists from multiple institutions in North America and Europe. Within this project we synthesized decadal time series across seven lake ecosystems to resolve shared changes in seven key ecosystem features following invasion by zebra mussels and subsequent invasion by quagga mussels. These two congeners are among the most widespread invasive species that re-engineer and increasingly co-invade freshwater ecosystems. Seven polymictic shallow lakes with long-term data sets revealed remarkably similar trends, with the strongest ecosystem impacts occurring within 5-10 years of zebra mussel invasion. Surprisingly, plankton communities then exhibited a partial, significant recovery. This recovery was absent, and impacts of initial invasion amplified, in four lakes were quagga mussels outcompeted zebra mussels and more completely depleted phytoplankton. Recently we added data on deep stratified lakes to address the following hypotheses: (1) In stratified lakes quagga mussels form higher lake-wide density than zebra mussels and therefore their ecosystem impact will be stronger. Alternatively, as the bulk of quagga mussel population in stratified lake is located below thermocline and is isolated from the

Collecting quagga mussels from Lake Constance for experiments.

surface waters for most of the growing season, their impact on planktonic communities may be lower than zebra mussels, while profundal benthic community may be more strongly affected by quagga mussels. (2) In contrast to polymictic lakes, in stratified lakes it takes much longer for quagga mussels to reach population maximum and therefore the maximum ecosystem impacts will be delayed. In November 2024 – April 2025, while on sabbatical in the Swiss Federal Institute of Aquatic Science and Technology within "BODENSEE in STRESS" collaborative project, we collected more data from stratified lakes in Germany, Switzerland, and France and are currently analyzing the trends.

## Western New York Partnership for Regional Invasive Species Management (WNY PRISM)

PI Christopher Pennuto. The Western New York Partnership for Regional Invasive Species Management (WNY PRISM) works to address invasive species priorities using a coordinated partnership network for which the program provides leadership, technical assistance, and opportunities for collaboration. The goal of this program is to improve, restore and protect local aquatic and terrestrial resources by improving the effectiveness of invasive species management efforts, engaging the public in management actions, and increasing awareness of invasive species issues throughout the eight-county, western New York region. To achieve established goals, WNY PRISM coordinates several high profile and priority programs. WNY PRISM runs a robust Early Detection and Response Program, several Community Science Programs, a Crew Assistance Program that sees WNY PRISM work with dozens of partners across the region each year, and a Watercraft Inspection Stewardship Program with up to 20 Boat Stewards. This is in addition to expansive education and outreach, data collection and information management efforts. For more information WNY PRISM activities and results, you can see Section VI.

## Combining intensive trapping and largemouth bass introduction to control red swamp crayfish

PI Christopher Pennuto. Recently, a small pond in the region was invaded by red-swamp crayfish (*Procambarus clarkii*). The private pond has no piscivorous fish present. This location has been under active management using intensive trapping for 3 years, with some initial suggestions of reducing the population size of red swamps. To add to this effort, 20, 10-12 inch largemouth bass were introduced into the system in spring 2025. We will continue to monitor crayfish population response to this introduction.

## Native crayfish culturing

PI Christopher Pennuto. Competitive niche replacement occurs when one species having a large degree of niche overlap with similar species outcompetes rivals in an area. This outcome may be more prevalent following a species invasion. Locally, red swamp crayfish have invaded two locations in western NY and are becoming the dominant species in the two habitats. Research suggests that native crayfish populations might be able to remain dominant in their local habitats if their population size is large enough. We are creating a laboratory culture of native White River crayfish (*Procambarus acutus acutus*) for potential release to locations where they have been on the decline since the arrival of red swamp crayfish as a management tool to assist native population decline.

## Invasive fish effect on stream drift rates

PI Christopher Pennuto. Stream drift is a phenomenon linking upstream reaches to downstream reaches through the flow of energy and nutrients as benthic organisms relocate downstream. Amphipods and midges constitute the bulk of drifting organisms in streams of western NY. We are investigating drift rates in streams of the region with and without invasive round gobies present. Preliminary work suggested amphipod drift rates were diminished in streams with gobies compared to stream without gobies. This research is a follow-up to those preliminary studies.

## Implementation of the Great Lakes Observing System

PIs Brian Haas and Ben Szczygiel. We received another year of funding to operate the eastern Lake Erie Buffalo State/Great Lakes Observing System (GLOS) buoy, including $5,009 for salary recovery and associated fringe costs. Continued success in funding is a result of the fact that we have reliably operated buoys for the GLOS network since 2012. Our contribution to the GLOS has been made by operating an observation buoy six miles

offshore of Dunkirk, New York. This buoy records and transmits real time measurements of water temperature, wind speed, wave height, dissolved oxygen, and several other parameters. The GLOS buoy is gaining in popularity and recent efforts to expand the user base are proving successful. We have been strengthening our relationships with the users in the Western New York Community, such as the many charter captains who utilize this buoy for planning purposes. In addition, the Dunkirk Buoy is currently being added to the National Data Buoy Center, which will help the National Weather Service with forecasting models.

Brian Haas and Ben Szczygiel deploying the buoy in May.

## Grants and Funding

### Ongoing grants (total $12,029,746, including $7,995,151 for Buffalo State)

1. Haas, B. Buffalo State University Eastern Lake Erie Buoy. National Atmospheric and Oceanographic Administration. **$10,820**. 2024–2025.
2. Goodrich, Z. East Canal Ecological Renovation at Tifft Nature Preserve, Buffalo Museum of Science. Niagara River Greenway Commission Greenway Ecological Standing Committee. $344,754 (**$18,378 for Buffalo State**). 2024–2026.
3. Clapsadl, M., B. Haas, and K. Hastings. Osprey Nesting Platform and Migrator Habitat Enhancement. Niagara River Greenway Commission. **$94,014**. 2018–2024 (no-cost extension).
4. Locke, A. Early Detection Priority Species Response: Porcelain Berry and Amur Corktree Removal in Western New York, The Research Foundation for SUNY Buffalo State University, WNY PRISM. USDA Forest Service Great Lakes Restoration Initiative Cooperative Weed Management Areas Project. **$84,613**. 2024.
5. Pennuto, C. Administration of the Western NY PRISM: Partnership for Regional Invasive Species Management. NY DEC. **$4,667,125**. 2024–2028.
6. Pennuto, C. Efficacy of predatory fish to control invasive crayfish in small ponds. USFWS, Lower Great Lakes Fisheries Unit. **$78,420**. 2023–2025.
7. Watkins, J., L. Rudstam, L. E. Burlakova, A. Y. Karatayev, and A. Hrycik. Great Lakes Biology Monitoring Program: Zooplankton, Mysis, and Benthic Components. GLRI, U.S. EPA. $6,750,000 (**$3,038,781 for Buffalo State**). 2022–2028.
8. Great Lakes Center is an associated partner institution for the joint SeeWandel-Climate project. Spaak, P., H. Hetzenauer, A. Brinker, D. Straile, M. Möst, U. Lang, K. Schmieder, H. Stibor, M. Speckle, R. Ebersbach, R. Schick, O. Köster, and A. Karatayev (associated partner). BODENSEE in STRESS - Modelling the consequences of climate change and invasive species for the Lake Constance ecosystem as a basis for integral management: BOiSMo" Interreg VI (Switzerland) €4,910,438 (not for Buffalo State). 2024–2027.

## Publications and Presentations

Last year the researchers of the GLC were very active in publishing papers and presenting their results at international and national meetings and conferences. Twelve manuscripts were published, another 4 were submitted to peer-reviewed journals. A total of 33 presentations were made by the GLC researchers, including: 27 presentations at national, international, and regional conferences; and 8 invited talks.

### Refereed Journal Publications (published/accepted)

1. Barbiero, R. P., L. E. Burlakova, J. M. Watkins, A. Y. Karatayev, and B. M. Lesht. 2024. The benthic nepheloid layer in the offshore waters of the Great Lakes and its post-dreissenid disappearance. *Journal of Great Lakes Research*. 52: 102408. DOI: 10.1016/j.jglr.2024.102408.
2. Burlakova, L. E., A. Y. Karatayev, S. E. Daniel, J. R. Meyer, T. O. Höök, S. Lawhun, K. L. Bowen, W. J. S. Currie, and P. D. Collingsworth. 2025. Video classification of hypoxic habitats and benthic communities in two productive freshwater embayments. *Ecological Indicators*. 172: 113286. DOI: 10.1016/j.ecolind.2025.113286.
3. Dong, C., L. Wang, N. Barulin, J. J. Alava, S. Liu, and D. Xiong. 2025. Maternal Daphnia magna exposure to the antidepressant sertraline causes molting disorder, multi-generational reproductive and serotonergic dysfunction. *Aquatic Toxicology*. 278: 107161.
4. Eifert, R. A., L. E. Burlakova, A. Y. Karatayev, S. E. Daniel, A. E. Scofield, and E. K. Hinchey. 2025. Could quagga mussels impact offshore benthic community and surface sediment-bound nutrients in the Laurentian Great Lakes? *Hydrobiologia*. 852: 1165-1182. DOI: 10.1007/s10750-023-05191-w.
5. Hrycik, A. R., L. E. Burlakova, A. Y. Karatayev, S. E. Daniel, R. Dermott, M. Tarbell, and E. K. Hinchey. 2024. A dataset of individual wet weights of benthic macroinvertebrates. *Limnology and Oceanography Letters*. 9: 696-715.
6. Karatayev, A. Y., L. E. Burlakova, V. A. Karatayev, J. E. Cooper, and L. G. Rudstam. 2025. Multiple invasions decimate the most imperiled freshwater invertebrates. *Biological Invasions*. 27: 85. DOI: 10.1007/s10530-025-03540-5.
7. Katona, L. R., L. E. Burlakova, A. Y. Karatayev, and Y. Vadeboncoeur. 2025. Progressive enrichment of benthic primary producer and dreissenid δ15N with depth in Lakes Erie and Ontario. *Hydrobiologia*. 852: 2371-2386. DOI: 10.1007/s10750-024-05639-7.
8. Lopes-Lima, M., A. Lopes-Lima, L. Burlakova, K. Douda, Á. Alonso, A. Karatayev, T. Hui Ng, M. Vinarski, A. Zieritz, and R. Sousa. 2025. Non-native freshwater molluscs: a brief global review of species, pathways, impacts and management strategies. *Hydrobiologia*. 852: 1005-1025. DOI: 10.1007/s10750-024-05780-3.
9. Makhutova, O. N., L. Burlakova, and A. Karatayev. 2025. Assessment of omega-3 PUFA reserves in the quagga mussel of Lake Ontario, with a special focus on its diet. *Inland Waters*. DOI: 10.1080/20442041.2025.2483570.
10. Puligilla, R. D., N. J. Roos, J. S. Bolten, N. B. Hopf, M. G. Zurich, N. Barulin, and J. Huwyler. 2025. Zebrafish as a model to assess the neurotoxic potential of propylene glycol ethers. *Environmental toxicology and Pharmacology*. 116: 2-11.
11. Shi, X., K. Xiao, G. Peng, H. Huang, D. Xiong, N. Barulin, and J. Yang. 2024. Embryo development indices for the endangered Chinese sturgeon, *Acipenser sinensis*: the role of temperature on incubation time. *Environmental Biology of Fishes*. 107(8), 899-907.
12. Wagner, J. A. and C. M. Pennuto. (*in Press*) Dynamics of *Cladophora* tissue breakdown: The role of waves and crayfish consumption. *Aquatic Ecosystem Health & Management*.

### Refereed Journal Publications Submitted (in review)

1. Harrow-Lyle, T. J., A. K. Elgin, M. D. Rowe, P. Alsip, L. E. Burlakova, A. Y. Karatayev, M. McCusker, R. Valipour, and D. C. Depew. Developing the first binational dreissenid biomass map for Lake Erie: Lessons

learned and future improvements. *Journal of Great Lakes Research*.

2. Burlakova, L. E., A. Y. Karatayev, O. N. Makhutova, S. E. Daniel, J. Scharold, A. E. Scofield, E. K. Hinchey. The benthic community of Lake Superior: analysis of spatial and temporal trends from 1973 to 2022. *Journal of Great Lakes Research*.
3. Wirebach, K. and C. M. Pennuto. Habitat suitability analysis for potential reintroduction of Lake Sturgeon (*Acipenser fulvescens* Rafinesque) in the U.S. watershed of Lake Erie. *Journal of Great Lakes Research*.

## Published Reports

1. Burlakova, L. E., A. Y. Karatayev, N. Barulin, and S. E. Daniel. 2024. Lake Huron Benthos Survey Cooperative Science and Monitoring Initiative 2022. Technical Report. USEPA-GLRI GL00E02259. Great Lakes Center, SUNY Buffalo State University, Buffalo, NY.
2. Burlakova, L. E., A. Y. Karatayev, N. Barulin, and S. E. Daniel. 2025. Lake Ontario Benthos Survey Cooperative Science and Monitoring Initiative 2023. Technical Report. USEPA-GLRI GL00E02259. Great Lakes Center, SUNY Buffalo State University, Buffalo, NY.

## International/National/Regional Conference Presentations

1. Barulin, N., A. Y. Karatayev, and L. E. Burlakova. Look deeper: 6 years of using the Benthic Imaging System in Lake Erie. 23rd Annual Faculty and Staff Research and Creativity Fall Forum, Buffalo State University. November 7, 2024 (poster). Buffalo, New York.
2. Barulin, N., S. Daniel, L. Burlakova, A. Karatayev, and L. Denecke. Comparing traditional and video methods for Dreissena Long-term Monitoring in Lakes Ontario and Erie. 68th Annual Conference on Great Lakes Research. June 2–6, 2025. Milwaukee, Wisconsin.
3. Bocaniov, S. A., C. A. Houser, A. Y. Karatayev, L. E. Burlakova, and P. Van Cappellen. New phosphorus budget for Lake Erie implies major input from coastal erosion. ASLO 2025 Aquatic Sciences Meeting, March 26–31, 2025. Charlotte, North Carolina.
4. Bocaniov, S. A., A. Y. Karatayev, P. Van Cappellen, C. A. Houser, and L. E. Burlakova. New Phosphorus budget for Lake Erie implies major input from coastal erosion. 68th Annual Conference on Great Lakes Research. June 2–6, 2025. Milwaukee, Wisconsin.
5. Burlakova, L. E., R. P. Barbiero, J. M. Watkins, and A. Y. Karatayev. The disappearance of benthic nepheloid layer in the Laurentian Great Lakes invaded by dreissenids. Ecological Society of America 2024 Meeting. August 4–9, 2024. Long Beach, California.
6. Burlakova, L. E., A. Y. Karatayev, N. Barulin, S. E. Daniel, K. Hastings, B. Tulumello, and L. E. Denecke. Great Lakes Center participates in the largest monitoring program of benthic invertebrates in the Great Lakes. 23rd Annual Faculty and Staff Research and Creativity Fall Forum, Buffalo State University. November 7, 2024 (poster). Buffalo, New York.
7. Burlakova L. E., and A. Y. Karatayev. Current and future exotic molluscs in Great Lakes: origin, distribution and impacts. Invited 40-min plenary talk. 14th Biennial Freshwater Mollusk Conservation Society Symposium. May 12–16, 2025. Ann Arbor-Ypsilanti, Michigan.
8. Burlakova, L. E., R. P. Barbiero, J. M. Watkins, and A. Y. Karatayev. The disappearance of benthic nepheloid layer in the Laurentian Great Lakes invaded by dreissenids. 68th Annual Conference on Great Lakes Research. June 2–6, 2025. Milwaukee, Wisconsin.
9. Daniel, S. E., L. E. Burlakova, A. Y. Karatayev, and L. E. Denecke. Detection of the New Zealand Mud Snail (*Potamopyrgus antipodarum*) in North Channel, Lake Huron During Benthic CSMI Survey (Virtual). 2024 Lake Huron Cooperative Science and Monitoring Initiative (CSMI) Binational Reporting Workshop. October 8–9, 2024.
10. Daniel, S. E., Hastings, K. L., A. Y. Karatayev, and L. E. Burlakova. Invasive Oligochaetes: Underreported and Understudied Invaders in the Great Lakes. 68th Annual Conference on Great Lakes Research. June 2–6, 2025. Milwaukee, Wisconsin.

11. Denecke, L. E., L. E. Burlakova, A. Y. Karatayev, and N. Barulin. Videography as an alternative method for round goby (*Neogobius melanostomus*) surveys. 23rd Annual Faculty and Staff Research and Creativity Fall Forum, Buffalo State University. November 7, 2024 (poster). Buffalo, New York.
12. Denecke, L., B. Tulumello, S. Daniel, and L. Burlakova. Shift in chironomid community assemblages of Lake Huron 2017-2022. 68th Annual Conference on Great Lakes Research. June 2–6, 2025. Milwaukee, Wisconsin.
13. Hastings, K. Photo exploration of the genus *Nais* in the Great Lakes. 23rd Annual Faculty and Staff Research and Creativity Fall Forum, Buffalo State University. November 7, 2024 (poster). Buffalo, New York.

GLC and WNY PRISM staff at the Fall Forum at Buffalo State University, November 7, 2024.

14. Karatayev, A. Y., V. A. Karatayev, L. G. Rudstam, L. E. Burlakova, B. V. Adamovich, H. A. Zhukava, K. T. Holeck, A. L. Hetherington, J. R. Jackson, C. Balogh, Z. Serfőző, C. W. Hotaling, T. V. Zhukova, T. M. Mikheyeva, R. Z. Kovalevskaya, O. A. Makarevich, and D. V. Kruk. Ecosystem responses to repeated mussels invasions in polymictic lakes. Ecological Society of America Annual Meeting. August 4–9, 2024. Long Beach, California.
15. Karatayev, A. Y., L. E. Burlakova, N. Barulin, and S. E. Daniel. Current State and Long-Term Dynamics of Lake Huron Benthos (Virtual). 2024 Lake Huron Cooperative Science and Monitoring Initiative (CSMI) Binational Reporting Workshop. October 8–9, 2024.
16. Karatayev, A. Y., L. E. Burlakova, A. Scofield, and S. E. Daniel. Current state and long-term dynamics of Lake Huron benthic invertebrates (Virtual). Annex 2 Lake Huron Partnership Management Committee Meeting. November 21, 2024.
17. Karatayev A. Y. and L. E. Burlakova. Multiple invasions decimate the most imperiled freshwater invertebrates. Extended flush talk at EAWAG Aquatic Ecology Seminar. April 2, 2025. Zurich, Switzerland.
18. Karatayev A. Y., L. E. Burlakova, V. A. Karatayev, J. E. Cooper, and L. G. Rudstam. Multiple invasions decimate the most imperiled freshwater invertebrates. 14th Biennial Freshwater Mollusk Conservation Society Symposium. May 12–16, 2025. Ann Arbor-Ypsilanti, Michigan.
19. Karatayev, A. Y. and L. E. Burlakova. Benthic research in the Laurentian Great Lakes: Past, present, and a look into the future. 68th Annual Conference on Great Lakes Research. June 2–6, 2025. Milwaukee, Wisconsin.
20. Lawhun, S., J. Watkins, A. Karatayev, L. Burlakova, and L. Rudstam. Disappearing Shrimp? Ponars confirm *Mysis* decline in Lake Michigan, benthic videos assess bottom behavior. 68th Annual Conference on Great Lakes Research. June 2–6, 2025. Milwaukee, Wisconsin.
21. Lightfoot, M., A. Scofield, L. Burlakova, E. P. Yang, and A. Karatayev. Assessing the relationship between algal composition and benthic communities in Lake Michigan. 68th Annual Conference on Great Lakes Research. June 2–6, 2025. Milwaukee, Wisconsin.
22. Monakhov Stockton, Y. and L. E. Burlakova. Presented by S. E. Daniel. Notes from the bottom (video media). 23rd Annual Faculty and Staff Research and Creativity Fall Forum, Buffalo State University. November 7, 2024 (poster). Buffalo, New York.
23. Pennuto, C. M., and E. Klimczak. 2024. Behavior weaponized: Can the winner-loser effect influence interspecific interactions during a crayfish invasion? Invasive Crayfish Collaborative, Great Lakes Aquatic Nuisance Species meeting. Sault St. Marie, Ontario, Canada (virtual).
24. Pennuto, C. M. and K. Yerofeev. 2024. Snails behaving badly: An example of maladaptive behavioral response to non-native predators. IAGLR Annual conference. Windsor, Ontario, Canada.

25. Klimczak, E. and C. M. Pennuto. 2024. Intensive trapping as a management action against red swamp crayfish. IAGLR Annual conference. Windsor, Ontario, Canada.
26. Yerofeev, K. and C. M. Pennuto. 2024. Snails behaving badly: an example of maladaptive behavioral response to non-native predators. NY Chapter AFS. Cooperstown, New York.
27. Klimczak, E. and C. M. Pennuto. 2024. Intensive trapping as a management action against red swamp crayfish. NY Chapter AFS. Cooperstown, New York.

## Invited Talks

1. Burlakova, L. E. Quagga mussel research needs and priorities. SeeWandel-Climate thematic working group "Importance of the quagga mussel." December 17, 2024. Eawag, Switzerland.
2. Burlakova, L. E., and Karatayev, A. Y. Effect of dreissenids on Great Lakes ecosystems. Invited talk at the Research Centre in Biodiversity and Genetic Resources (BIPOLIS/CIBIO). March 7, 2025. Vairão, Portugal.
3. Burlakova, L. E., and Karatayev, A. Y. Benthic program updates and research. Invited talk presented at EPA Great Lakes National Program Office, Chicago. April 3, 2025.
4. Karatayev A. Y., and Burlakova, L. E. Quagga mussels in the Great Lakes: Spread, distribution, and ecosystem impacts. Invited talk at Commission Internationale pour la protection des eaux du Léman. January 28, 2025. Nyon, Switzerland.
5. Karatayev, A. Y. Ecosystem response to repeated mussel invasions. SeeWandel Climate - Modelling the consequences of climate change and neobiota for the Lake Constance. December 17, 2024. EAWAG, Dübendorf, Switzerland.
6. Karatayev, A., and Burlakova, L. E. Benthos of the Great Lakes: Past, present, and a look into the future. Invited talk presented at EPA Great Lakes National Program Office, Chicago. April 3, 2025.
7. Karatayev, A., and Burlakova, L. E. Zebra and quagga mussels in the Great Lakes: What have we learned in 35 years of invasionю. Invited talk at the Research Centre in Biodiversity and Genetic Resources (BIPOLIS/CIBIO). March 7, 2025. Vairão, Portugal.
8. Karatayev, A., and Burlakova, L. E. Zebra and quagga Mussels: Biology, spread, impact, and control. Invited talk at EDIA, a public company that manages the Alqueva Multipurpose Project, Portugal. March 10, 2025.


Undergraduate assistant Nick Hahn and graduate student Emily Klimczak completing a crayfish trial at the Field Station to test the winner-loser effect to see if it can help native crayfish compete against invasive red swamp crayfish.

# III. Education

The GLC fulfills its educational mission directly through the classes its researchers teach, through its Master of Arts and Master of Science graduate programs in Great Lakes Environmental Science, through the support we offer to faculty teaching classes pertaining to environmental sciences, through the seminar speakers we sponsor, and through our educational activities in the community.

## Great Lakes Center MS and MA Graduate Programs

The GLC administers two interdisciplinary applied environmental science programs in Great Lakes Environmental Science (GLES). The GLES programs provide an opportunity for students to pursue graduate studies through a thesis-based Master of Arts (MA) and an internship-based Master of Science (MS). Both programs provide students with the opportunity to attain a broad understanding of the physical, chemical, biological, and social factors that comprise the Great Lakes ecosystems. GLES graduates are prepared to provide a leadership role as they address a broad range of problems and issues related to the management of resources within the Great Lakes and surrounding watersheds.

### Students enrolled in GLES Administered by the GLC in 2023–2024:

**Master of Art:**
Skyler Braeges
Danielle Dolan
Emily Klimczak

**Master of Science:**
Richard Campbell
Isabella Rusillo
Robert Salefske

## Advising Undergraduate and Graduate Students

- Lyubov Burlakova is a graduate committee member for M.S. student Sarah Lawhun (Cornell University, 2024-2025).
- Lyubov Burlakova and Alexander Karatayev are graduate committee members for Ph.D. student Julia Conrad (Eawag, Switzerland, 2025).
- Chris Pennuto was the advisor of 3 graduate students (Emily Klimczak, Allarae Prigan, and Nick Hahn) and one undergraduate student (Sarah Klawinski).

Students participating in a field trip onto Lake Erie as part of Dr. Pennuto's Aquatic Biology course. Students learned different water sampling techniques, including how to use a Van Dorn bottle.

# IV. Outreach, Service, and Professional Development

All members of the GLC have been actively involved in outreach and service to the profession, to the University, and to the community.

**Nikolai Barulin:**

- Provided an interactive program about benthic macroinvertebrates for three age groups attending the Bring Your Child to Work Day event on campus, April 25, 2025.
- Attended collaborative meeting with the U.S. Army Corps of Engineers in Buffalo, NY, January 24, 2025.
- Completed online training for Preventing Harassment & Discrimination, October 11, 2024.
- Assisted in preparation of GLC Annual Report.
- Participated in multiple phone conferences with EPA about current research and potential future projects as well as the status of various data submissions.
- Participated in meetings with our partners from Cornell University on the Great Lakes Long-term Biological Monitoring Program.
- Member of the Network of Aquaculture Centres in Central-Eastern Europe (NACEE).
- Member of the World Sturgeon Conservation Society (WSCS).
- Member of the International Association for Great Lakes Research.
- Reviewer for the *Journal of Great Lakes Research*.
- Reviewer for the *Aquaculture*.
- Co-Chaired section at the 68th Annual Conference on Great Lakes Research, June 2025, Milwaukee, WI.
- Course on Multivariate Analysis Implementing Essential Tools and Methods in PRIMER and PERMANOVA+, May 19th–23rd, 2025, at California State University, Long Beach, CA.

**Lyubov Burlakova:**

- Associate Editor for the *Journal of Great Lakes Research*.
- Associate Editor for the *Hydrobiological Journal* (Ukraine).
- Guest Editor, Special Issue "Biology and impacts of invasive freshwater molluscs" in *Hydrobiologia*.
- Member of Scientific Committee for 2024 Annual ASLO Meeting.
- Graduate Committee Member, Sarah Lawhun, Cornell University (2024 – present).
- Member of Buffalo State Sustainability Committee.
- Ruth Huppuch Research and Education Award Fund Committee member.
- Committee member for Great Lakes Center Goals 2030.
- Presented at 2024 Fall Forum on November 23, 2024.
- Helped to organize Great Lakes Center Open House, September 6, 2024.
- Assisted in preparation of Great Lakes Center Annual Report.
- Wrote articles for GLC Newsletter series.
- Participated in Big Dig V in October 2024 planting trees on campus.
- Completed online training for Preventing Harassment & Discrimination, October 3, 2024.
- Participated in collaboration between Great Lakes Center and the Swiss Federal Institute of Aquatic Science

and Technology (Dr. Piet Spaak).

- Participated in GLNPO workshop (April 2025) to present on current progress of the ongoing projects and discuss future research and grant opportunities.
- Chaired section at the 68th Annual Conference on Great Lakes Research, June 2025, Milwaukee, WI.
- Invited by Dr. Piet Spaak to the Swiss Federal Institute of Aquatic Science and Technology to collaborate on quagga mussel research within collaborative project "BODENSEE in STRESS - Modelling the consequences of climate change and invasive species for the Lake Constance ecosystem as a basis for integral management: BOiSMo," November 1, 2024 – April 30, 2025.
- Participated in multiple phone conferences with EPA, NOAA, USGS, Sea Grant etc. about current research and potential future projects.
- Participated in meetings with our partners from Cornell University on the Great Lakes Long-term Biological Monitoring Program.
- Interviewed by SWI (swissinfo) on quagga mussel research, January 2025.
- Interviewed by Tages-Anzeiger Zurich newspaper on quagga mussel research and invasion in Lake Zurich ("Once you've found quagga mussels, it's already too late," December 11, 2025).
- Interview about Science Communication by John Besley, MSU, January 30, 2025.
- Member of Aquatic Life Use Metrics - Benthic Invertebrate subgroup led by Ohio Sea Grant and Ohio EPA to develop aquatic indicators for Lake Erie.
- Member of Freshwater Mollusk Conservation Society.
- Member of the Association for the Sciences of Limnology and Oceanography.
- Member of the International Association for Great Lakes Research.
- Member of Ecological Society of America
- Member of Society of International Limnology
- Edited 6 papers for the *Journal of Great Lakes Research*.
- Reviewed one research proposal for Wisconsin Sea Grant.
- Member of Buffalo State's Friends of the Maud Gordon Holmes Arboretum.

**Susan Daniel:**

- Attended the Faculty and Staff Fall Creativity Forum presented two projects (on long-term monitoring and Yola Y. Stockton's Videography), November 7, 2024.
- Wrote articles for GLC Newsletter series.
- Assisted in preparation of GLC Annual Report.
- Provided an interactive program about benthic macroinvertebrates for three age groups attending the Bring Your Child to Work Day event on campus, April 24, 2025.
- Attended all the three-part online training for "Leading People Responsibly Series Winter 2024-2025" hosted by SUNY RF: December 12, 2024, January 14, 2025, and February 6, 2025.
- Completed online training for Preventing Harassment & Discrimination, October 11, 2024.
- Attended the Buffalo State Graduate Programs Fair to represent the GLES Masters Program, October 22, 2024.
- Attended the Buffalo State Open House to represent the GLES Master's Program, November 16, 2024.
- Continue to serve as the Great Lakes Center Safety Officer and participated in meetings of the Chemical and Biological Hygiene committee.

- Oversaw the transfer of all chemicals owned by the Great Lakes Center to the online campus inventory.
- Attended collaborative meeting with the U.S. Army Corps of Engineers in Buffalo NY, January 24, 2025.
- Participated in the Community Service Activity: No-Sew T-Shirt Totes for Kaleida Health Long Term Care, SUNY Buffalo State U. Winterim activities, January 13, 2025.
- Organized and presented to students at Harvey Austin #97 School on May 21, 2025.
- Organized and presented to students at Lovejoy Discovery School #43 on March 20, 2025.
- Assisted in prepared survey requests for the CSMI Lake Erie and LTM surveys.
- Reviewed practiced scientific presentations for IAGLR with coauthors and direct reports.
- Participated in multiple phone conferences with EPA about current research and potential future projects as well as the status of various data submissions.
- Participated in meetings with our partners from Cornell University on the Great Lakes Long-term Biological Monitoring Program.
- Member of the New York Chapter American Fisheries Society.
- Member of the World Wildlife Fund.
- Member of Buffalo State's Friends of the Maud Gordon Holmes Arboretum.
- Member of the International Association for Great Lakes Research.
- Member of the Justice, Equality, Diversity, and Inclusion Committee for the International Association for Great Lakes Research.
- Member of the International Association for Great Lakes Research Sustainers Circle.

**Lillian Denecke:**

- Trained undergraduate and graduate lab technicians.
- Participated in phone conferences with EPA GLNPO regarding ongoing research projects.
- Participated organizing and running activities with the Great Lakes Center for "Bring Your Kid to Work Day" on the Buffalo State Campus.
- Member of International Association for Great Lakes Research.

**Susan Dickinson:**

- Attended SAS Administrative Assistants Meeting (3/31/25).
- Attended President's Administrative Staff Breakfast meetings (11/4/25, 2/26/25).
- Performed administrative support for the Assistant Professor GLC/BIO joint position job search.
- Assisted with planning for and presentation given by GLC staff for Take Your Child to Work Day, April 24, 2025.
- CSEA Local 640 Treasurer beginning July 2021 (4-year term).
- Chair of Local 640's Budget Committee and Audit Committee; member of Veterans Committee, Health and Safety Committee, Grievance Committee, and Planning Committee.
- Trainings completed: Sexual Harassment Prevention (9/23/24), Workplace Violence Prevention (9/17/24), Cybersecurity Essentials (9/17/24), Title VI of Civil Rights Act of 1964 (9/17/24), Title IX (9/17/24), Navigate 360 (1/7/25).
- Member of Administration Staff Working Group.
- Member of Friends of the Maud Gordon Holmes Arboretum.

**Nick Farese:**

- Participated in a panel discussion at Audubon Community Nature Center as part of their First Friday Series to expand awareness of invasive species in the community.
- Facilitated a Water Chestnut Working Group Meeting to bring together organizations from across the region to focus on removal efforts of this priority species.
- Member of the NYS Hydrilla Task Force.
- Obtained Remote Pilot License through the Federal Aviation Administration for drone use, February 2025.

**Brian Haas:**

- Managed the setup, launching, and retrieval of the GLOS buoy in Lake Erie.
- Provided vessel field trips and tours for classes and school groups.
- Helped graduate students from Buffalo State University with research projects that were conducted in the Field Station labs.
- Provided general assistance to WNY PRISM at the Field Station.
- Installed additional plantings in the Field Station's migratory bird garden.
- Worked with campus facilities and outside vendors to replace and revamp our water treatment system at the Field Station.
- Supported local agencies including the NYSDEC and USFWS through general assistance and the use of the Field Station grounds and boat launch.
- Made strategic purchases and installations that enhanced the Field Station's operational and research capacity.
- Worked with Buffalo State Property Control and the SUNY Research Foundation to manage both state-owned and grant-awarded assets.
- Ensured boats, vehicles, and equipment were properly stored and cared for.
- Helped various departments on campus when our resources were requested.
- Worked with Field Station neighbors, including the West Side Rowing Club and the Navy Operational Support Center, and provided assistance when possible.
- Participated in a presentation given by GLC staff for Take Your Child to Work Day, April 24, 2025.

**Kit Hastings:**

- Assisted with the Great Lakes Long-term Biological Monitoring Program's Lake Erie CSMI project and Hamilton Harbor project (oligochaete taxonomy).
- Compiled a species addition proposal for *Chaetogaster setosus* and *Dero vaga* to the GLNPO database.
- Continued to work on the Great Lakes Benthic Invertebrate Guide.
- Produced two issues of GLC Newsletter (editor).
- Wrote articles for the GLC Newsletter series.
- Prepared the GLC Annual Report for publication.
- Managed the GLC website.
- Completely redesigned the GLC website, which launched December 2024.
- Improved the accessibility of the GLC website, Annual Report, and Newsletters, in compliance with Buffalo State Guidelines for Accessibility.
- Made a slideshow of GLC activities for the 2024 GLC Open House.

- Participated in webinars that pertain to my field of study, including Great Lakes research and website and document accessibility.
- Attended axe-con 2025, a virtual accessibility conference.
- Volunteered at Friends of the Buffalo State Maud Gordon Holmes Arboretum's Big Dig VI on October 19, 2024.
- Member of the Buffalo State Institutional Animal Care and Use Committee.
- Member of the International Association for Great Lakes Research.

Volunteers including Mimi Byrne, Lyuba Burlakova, and Kit Hastings at Big Dig VI helped plant many trees along Grant Street on October 19, 2024. Credit: Domenic Licata

- Member of WNY GIS User Group and NYS GIS Association.
- Member of oSTEM.
- Member of Buffalo State Bengal Allies and LGBTQ+ Resource Center.

**Brittany Hernon:**

- Facilitated 2 invasive species volunteer removal workdays to help community members to learn about and participate in invasive species management.
- Led 1 walk and talk to educate community members on invasive species identification and iMapInvasives reporting methods.
- Facilitated a Mile-a-Minute Working Group to bring together organizations from the region to focus removal efforts on this priority early detection species.

**Alexander Karatayev:**

- For six months, I was on sabbatical at Eawag, the Swiss Federal Institute of Aquatic Science and Technology, one of the world's leading centers for water research, collaborating on a project "SeeWandel-Climate Modelling the consequences of climate change and neobiota for Lake Constance." This is a five-year project involving researchers from six institutes in three countries to study the influence and interaction of various stress factors such as nutrient changes, invasive species and climate change on the ecosystem of Lake Constance with the aims to provide updated predictions of the consequences of climate change on lake ecosystem and its sustainable use. Great Lakes Center is an associated partner of this project. We've been collaborating with scientists at Eawag for the past five years and have published three papers predicting the population dynamics and ecological impact of quagga mussels in deep, pre-alpine lakes in Europe based on insights gained over more than 30 years of research in the Great Lakes. This partnership with Eawag's experts is expected to lead to several high-impact publications. Since quagga mussels are rapidly spreading across both Europe and North America, we anticipate strong interest in this work, which will help to raise the profile of our center and university. During the sabbatical, I made 6 presentations in Switzerland and Portugal, and worked on five papers, two of which were published in January 2025. I also became a committee member for a PhD student, Julie Conrad. While it was officially called a sabbatical, I continued to fulfill all of my responsibilities as the Center Director at Buffalo State University.
- Organized Great Lakes Center Open House, September 6, 2024.
- Published Great Lakes Center 2023–2024 Annual Report.
- Wrote articles for GLC Newsletter series.
- Campus Representative for the Great Lakes Research Consortium.
- Ruth Huppuch Research and Education Award Fund Committee member.

- Associate Editor of *Hydrobiological Journal* (Ukraine).
- Interviewed by Jigme Garne, Editor of Tages-Anzeiger newspaper in Zurich for an article "Once you found quagga mussels, it's already too late" published on December 11, 2024.
- Participated in the preparation of the State of the Great Lakes Report.
- Participated in multiple Lake Michigan CSMI 2025 survey planning workshops.
- Participated in GLNPO workshop (April 2025) to present on current progress of the ongoing projects and discuss future research and grant opportunities.
- Chaired section at the 14th Biennial Freshwater Mollusk Conservation Society Symposium. Ann Arbor-Ypsilanti, Michigan.
- Participated in multiple phone conferences with EPA, NOAA, USGS, and USFWS about current research and potential future projects.
- Participated in meetings with our partners from Cornell University on the Great Lakes Long-term Biological Monitoring Program.
- Interviewed by SWI (swissinfo) on quagga mussel research, January 2025.
- Member of Aquatic Life Use Metrics - Benthic Invertebrate subgroup led by Ohio Sea Grant and Ohio EPA to develop aquatic indicators for Lake Erie.
- Member of Freshwater Mollusk Conservation Society.
- Member of the Association for the Sciences of Limnology and Oceanography.
- Member of the International Association for Great Lakes Research.
- Member of Ecological Society of America.
- Member of Society of International Limnology.
- Reviewed manuscripts for the *Journal of Great Lakes Research* and *Hydrobiologia*.
- Member of Buffalo State's Friends of the Maud Gordon Holmes Arboretum.

**Andrea Locke:**

- Held multiple, open WNY PRISM Partnership and Working Group Meetings to allow for public involvement in regional invasive species issues.
- Coordinated with the Department of Agriculture and Markets to direct WNY response to Spotted Lanternfly.
- Led efforts to release of swallow-wort biocontrol agent at multiple sites; coordinated with partners and volunteers to assist with monitoring.
- Held position on Great Lakes Phragmites Collaborative Advisory Committee and Funding Sub-Committee.
- Participated in Great Lakes Action Agenda Lake Erie Sub-Basin Work Group and sub-committee on Cattaraugus Creek.
- Participated in the NYS Cooperative Agricultural Pest Survey Work Group.
- Participated in Tonawanda Creek/Erie Canal Hydrilla Demonstration Project Collaborative as part of Advisory Committee.
- Held position on 18 Mile Creek Technical Advisory Committee.
- Attended multiple NYS Invasive Species Program Meetings.
- Reviewed and updated priority species lists for western New York: Approaching Region, Early Detection, Data Gap.
- Held Resume Building Workshop for WNY PRISM summer staff.
- Assisted partners with invasive species management planning, including native plant community restoration,

for public lands.

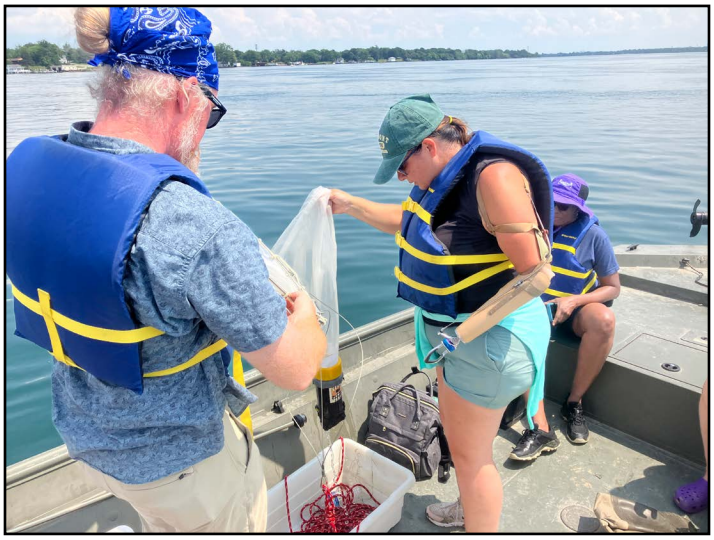
- Attended Post Treatment Data Monitoring Workshop, New York Invasive Species Research Institute, Ithaca, NY, August 2024.
- Attended Leading with Calm & Clarity Workshop, Research Foundation for SUNY, online, April 2025.

**Christopher Pennuto:**

- Workshop coordination/presentation for 2024 NY Master Teachers Program.
- Coordinator, GLC Graduate programs.
- Campus Open House event presentation.
- Summer orientation event presentation.
- Girls Who Game microscopy workshop (60 Buffalo middle school girls).
- YELP (young environmental leaders program) kick-off presentation/tour.

**Rachel Taylor:**

- Served as regional representative for DEC led Invasive Species Education and Outreach Committee and Social Media Sub-Committee.
- Coordinated with community scientists for Trail Survey Program, including data collection and review.
- Coordinated Boot Brush Station Program to support partners in invasive species spread prevention efforts.
- Coordinated with community scientists for Hemlock Woolly Adelgid Surveys, including survey locations and data collection.
- Coordinated with Department of Agriculture and Markets, partners, and community scientists to facilitate and implement spotted lanternfly survey and trapping efforts.
- Hosted one invasive species removal volunteer workday in partnership with the Friends of Letchworth State Park to help community members learn about and participate in invasive species management.



The GLC held a 4-day Master Teacher professional learning workshop on a range of Great Lakes Topics. During the field portion of the workshop, the teachers learned how to collect plankton from one of the GLC vessels on the Upper Niagara River.

# V. Field Station Activities

## Educational Support and Outreach

We have continued to provide support to Buffalo State classes through field trips and station tours. In addition, we have helped graduate students working on projects at the Field Station and within the wet labs. Talks are underway with West Side Rowing about supporting some of their summer camps with educational lessons at the Field Station. We also provided support to the GLC summer workshop for the Master Teacher's Program last year and will provide boat support again this coming summer.

## Expanding Multidisciplinary Collaborations

We have been making strong efforts to ensure that the campus community is aware of the opportunities available at the Field Station. Part of our mission is to coordinate with the campus to make our one-of-a-kind regional waterfront facility accessible. We are actively working with the Department of Social Work and the Department of Art and Design to brainstorm collaborations and provide site visits and course support.

## Osprey Nesting Platform and Habitat Enhancement Project

In 2024–2025, we completed the final installation of plantings as part of the final no cost extension of the Nesting Platform and Habitat Enhancement Project funded through the Niagara River Greenway Commission (no cost extension 2024) ($94,104, PI's Clapsadl, Haas, and Hastings). This final phase included the planting and caging of 61 new native shrubs and the addition of 5 more tree swallow houses across the Field Station grounds.

## Other Projects

We provided field and laboratory support for multiple funded projects, including the deployment/retrieval of the GLOS (Great Lakes Observing System) buoy in Eastern Lake Erie. We have continued a regular maintenance program for our research boats. This program, coupled with the ability to store the boats in the boat storage building out of the sun, rain, and snow, has enabled us to keep the boats in good working order.

Brian Haas meeting with the Social Work Department.

Brian Haas hired Ben Szczygiel and Emily Klimczak for one day this fall to help him safely retrieve the Dunkirk buoy.

# VI. Western New York PRISM Activities

Western New York Partnership for Regional Invasive Species Management (WNY PRISM) is a sponsored program of the Research Foundation for SUNY Buffalo State University and is hosted by the Great Lakes Center. Funding for WNY PRISM is provided by the Environmental Protection Fund through a contract with the NYS Department of Environmental Conservation. Funding for WNY PRISM, through a new contract that began January 1, 2024, supports continued operations through December 31, 2028.

## Introduction

Western New York Partnership for Regional Invasive Species Management (WNY PRISM) works to address invasive species priorities using a coordinated partnership network, for which we provide leadership, technical assistance and opportunities for collaboration. Our goal is to improve, restore and protect local aquatic and terrestrial resources by improving the effectiveness of invasive species management efforts, engaging the public in management actions, and increasing awareness of invasive species issues throughout our eight-county region. By fostering regional collaboration, the impact of invasive species will be minimized, and the natural resources and beauty of western New York will be preserved.

WNY PRISM addresses invasive species issues as identified in the WNY PRISM Strategic Plan (2019-2024), which was developed through a year-long collaborative process involving regional partners in 2019, and updated in 2022. The original plan put forth an ambitious program designed to provide the framework by which the invasive species management needs of western New York may be met. The 2022 updates served to strengthen and expand upon the established framework by addressing shifted priorities, expanded programs and new opportunities.

The strategic plan identifies six goals associated with WNY PRISM's established core functions (Partnership Coordination, Information Management, Education and Outreach, Prevention, Early Detection/Rapid Response, and Habitat Management and Restoration), which are further broken down into objectives and strategies for implementation. The strategic plan is supported by annual work plans that identify specific tasks WNY PRISM staff will focus on in any given year. WNY PRISM operates on the calendar year, and the WNY PRISM 2024 and 2025 Annual Work Plans provided the framework for FY25.

## Program Highlights and Accomplishments

Western New York Partnership for Regional Invasive Species Management (WNY PRISM) continues to address invasive species priorities through our many programs and essential partnerships with regional stakeholders. Since being established in 2014, WNY PRISM has recorded over 25,000 invasive species presence/absence data points, held and/or participated in 480 educational events, conducted nearly 78,000 boat inspections, completed 120 Crew Assistance Program Projects, surveyed, monitored and managed 40 early detection sites with 7 sites reaching "presumed eradicated" after 7 years of no plants found, hired 184 seasonal employees, and worked with 224 partner organizations and agencies.

WNY PRISM maintains an Approaching Region Priority List and Early Detection Priority Species List, along with a Data Gap Species Priorities (Priority Invasives), which provide guidance for prioritizing survey and management activities for region. The lists were updated for 2025 with Japanese stiltgrass (*Microstegium vimineum*) being removed from the early detection list, due to its continued spread within the region, and being replaced with sticky sage (*Salvia glutinosa*). The approaching region received a change with water soldiers (*Stratiotes aloides*) replacing hardy kiwi (*Actinidia arguta*). The Data Gap Species List also saw updates heading into the 2025 season with sycamore maple (*Acer pseudoplatanus*) and rugosa rose (*Rosa rugosa*) replacing wild chervil (*Anthriscus sylvetris*) and yellow floating heart (*Nyphoides peltata*).

WNY PRISM administers three community scientist programs including the Hemlock Woolly Adelgid Hunters

Program, Trail Survey Program, and Spotted Lanternfly (SLF) Monitoring Program. These programs were developed to engage people with data collection in support of established priorities and associated programs. By working with the public on collecting scientific data, WNY PRISM builds relationships with individuals, increases public awareness of invasive species and expands regional capacity to address invasive species issues. Thirty-seven community scientists participated across all programs, contributing approximately 128.25 volunteer hours and the data collected has contributed to improved invasive species management efforts within the region.

Education and outreach events, whether held by WNY PRISM or our partners, offer an opportunity to reach a wide variety of audiences who have expressed interest in invasive species management and who are actively seeking more information. WNY PRISM held and/or attended forty-four events with at least one event in each county and recorded 2,426 direct contacts and 29,778 attendees. Attendance numbers for larger events were either provided by the host organization or are estimates based on staff observations.

Community Science and Engagement Program Manager, Rachel Taylor, gave out invasive species tattoos at the Reinstein Woods Fall Festival on September 21, 2024.

WNY PRISM's Boot Brush Station Program has been highly successful, with fifty-four boot brush stations being placed since the program began in 2016. The program aims to improve regional spread prevention efforts by providing partners with the signs and building materials necessary to install boot brush stations at popular trailheads and public access areas on their properties. The signs provide information on invasive species and advice on how visitors can help stop the spread of invasive species by cleaning off their footwear before and after hiking. New Boot Brush Stations were placed at sites in Cattaraugus, Chautauqua, Erie, Genesee, Niagara and Wyoming counties.

WNY PRISM's Watercraft Inspection Stewardship Program, which runs Memorial Day through Labor Day each year, had a very successful 2024 summer season. Thirteen launches were selected and staffed by two Lead Stewards and eleven Stewards. Launches included one site on the Allegheny Reservoir (Onoville Marina), one site on the Buffalo River (Ohio Street Kayak Launch), one site on Cuba Lake (Cuba Lake Boat Launch), four sites on the Erie Canal (Amherst Veterans Canal Park, North Tonawanda Botanical Gardens, Widewaters Marina and West Canal Park and Marina), two sites on Lake Erie (Sturgeon Point and Hanover Town Boat Launch), one site on Lake Ontario (Olcott Harbor) and three sites on the Niagara River (Gratwick Riverside Park, Griffon Park and Niawanda Park). Lead Stewards were placed at Ohio Street Kayak Launch and Widewaters Marina. Stewards conducted 10,077 watercraft inspections, had 23,567 interactions with members of the public and achieved an inspection acceptance rate among boaters of 87.2%.

During an inspection, Stewards remove all organic matter from watercraft, including native and invasive species. Stewards identified and removed 808 individual, invasive organisms (interceptions) from inspected boats. The most intercepted invasive species was Eurasian watermilfoil (*Myriophyllum spicatum*, 395) followed closely by curly pondweed (*Potamogeton crispus*, 314). Additional species intercepted include brittle naiad (*Najas minor*, 33), zebra mussel (*Dreissena polymorpha*, 33), Hydrilla (*Hydrilla verticillata*, 22), spiny water flea (*Bythotrephes logimanus*, 7), and quagga mussel (*Dreissena bugensis*, 4). Stewards stationed at Olcott Harbor and Hanover Town Boat Launch had the highest percentage of inspections (50%) that resulted in an organism being found, while the Steward stationed at Widewaters Marina had the lowest, with no interceptions.

The WNY PRISM early detection program addresses the survey, removal and spread prevention of Tier 2 and Tier 1 species, with a focus on established early detection species and approaching region species priorities. Terrestrial early detection efforts focused on porcelain berry (*Ampelopsis glandulosa*), slender false brome

(*Brachypodium sylvaticum*), Japanese stiltgrass, mile-a-minute (*Persicaria perfoliata*) and amur corktree (*Phellodendron amurense*), and management was carried out on 61.20 acres across 22 sites. Slender false brome manual removal was carried out at five sites, resulting in the removal of 10.25 bags of plants, while herbicide treatment was carried out at two sites, resulting in 24.26 total acres treated. Japanese stiltgrass hand-pulling was implemented at eight sites, resulting in the removal of 6.5 bags of plants, and herbicide treatment was carried out at two sites. Japanese stiltgrass chemical and manual removal was carried out over 30.5 acres and as part of survey and monitoring efforts, 1,114 acres were surveyed to map new plants ahead of treatment or to conduct site monitoring.

Aquatic early detection efforts focused on water hyacinth (*Oshuna crassipes*), water lettuce (*Pistia stratiotes*), and red swamp crayfish (*Procambarus clarkii*). Three water lettuce and two water hyacinth early detection sites, covering 634.6 acres, were surveyed during the field season. Water hyacinth was observed in a portable water garden placed on a dock near Tonawanda Island and a 114.2-acre survey was conducted in the waters around the island in response. No water lettuce or water hyacinth were found during survey efforts. Around 1,100 crayfish were collected by project team members at the Park School, one of two known sites for red swamp crayfish. Of those collected, seventeen were calico crayfish (*Faxonius immunis*), which is a native species, while the rest were red swamp crayfish. In September 2024, a new population of red swamp crayfish was reported and confirmed in Two Mile Creek, in Tonawanda.

Crew Assistance Program (CAP) continues to be one of WNY PRISM's most successful programs, improving invasive species management across the region by assisting partners with invasive species surveys and mapping, invasive species removal, habitat management, and restoration projects. Eight projects consisting of three survey and mapping projects, one survey and management project, and four removal and restoration projects were selected for implementation. Completed projects resulted in 201.83 acres surveyed and 14.17 acres managed. Reports including summaries of the completed work, the collected data and recommendations for future management actions, were provided to partners for each of the eight completed projects.

Crew Assistance Program assisted Niagara County Soil and Water Conservation District with stem injection of knotweed at sites across Niagara County.

CAP assisted Audubon Community Nature Center, in Jamestown, NY, with water chestnut removal in July.

CAP worked with project partners to remove mile-a-minute from Oak Orchard Wildlife Management area in August.

## Program Highlights

- WNY PRISM has worked with 224 partner organizations, including 7 new partners in 2024.
- Hired 17 summer staff – Invasive Species Management Assistants (3), Education and Outreach Assistant (1), and Watercraft Inspection Steward/Environmental Educators (13).
- Hired seasonal Field Crew Leader to assist with project coordination and Crew supervision.
- Held 2 Partner Meetings with 58 attendees (Spring Meeting – 27,

Fall Meeting – 31).

- Conducted a review and update of Tier Rankings and updated WNY PRISM priority species lists.
- 4,160 records submitted by 148 unique users were uploaded to iMapInvasives, including 77 unique species.
- The top five recorded invasive species for WNY PRISM were Eurasian watermilfoil (613), Japanese stiltgrass (180), curly pondweed (173), HWA (143), and flowering rush (141).
- HWA was the top not-detected species with 304 records.

WNY PRISM's 2025 summer staff.

- Released and monitored *Hypena opulenta* swallow-wort biocontrol agents at 3 sites across western New York.
- Coordinated 3 Community Science Programs: Hemlock Woolly Adelgid Hunters, Spotted Lanternfly Trap Monitoring and Trail Survey. 37 volunteers contributed 128.25 hours.
- Obtained 444 signatures for WNY PRISM's Pledge to Protect program.
- Updated 102 invasive species profiles on the WNY PRISM website to include interactive presence and distribution maps.
- WNY PRISM staff responded to 114 public inquiries.
- Facebook and Instagram posts generated 60,707 impressions.
- Tabled at 16 events, delivered 13 presentations, and held 7 Walk and Talks and 5 workshops.
- Events resulted in 2,426 direct contacts and had 29,778 attendees.
- The Watercraft Inspection Stewardship Program achieved an 87.2% acceptance rate with 808 interceptions – the most encountered species were Eurasian watermilfoil (395) and curly pondweed (314).
- Boat Stewards conducted 10,077 boat inspections working at 13 launches.
- Stewards conducted 530 Walk-Up Surveys and 411 Angler Surveys – no invasive species were observed.
- Terrestrial early detection survey and management was carried out at 22 sites encompassing 61.2 acres.
- Aquatic early detection surveys were carried out at 5 sites, encompassing 634.6 acres.
- Early detection priority species removal efforts resulted in 34 sites managed with a combination of herbicide and manual removal and efforts totaled 412.4 acres treated.
- Developed 6 Boot Brush Stations for partners – stations were installed ahead of NY Invasive Species Awareness Week.
- The Crew Assistance Program received 16 proposals from 13 partners and resulted in 8 completed projects, including 201.83 acres surveyed and 14.17 acres treated.

- Completed 77-acre survey of Cassadaga Lakes Nature Park and treated 3.18 acres of mugwort, Japanese barberry, and privet.
- Facilitated WNY Water Chestnut Working Group and assisted with survey and removal efforts.

## Additional Projects

### East Canal Ecological Renovation at Tifft Nature Preserve (2023 – 2025)

The East Canal Ecological Renovation Project involves twenty-four acres of riparian and shoreline habitat along the East Canal, which will be renovated through intensive management of invasive plants, and thoughtful, comprehensive revegetation efforts. This project is an extension of previously completed work and will leverage and protect the ecological outcomes of earlier projects by improving plant community structure and species diversity, and by aiding in the replacement of the existing riparian tree canopy with a new and more diverse cohort of trees.

Planting American basswood in restoration areas, 2024.

In 2024, WNY PRISM assisted with activities including native planting and invasive species removal using foliar and cut stump treatments and worked with Project Manager Zach Goodrich on project planning and coordination of field efforts. Invasive species removal efforts focused on bush honeysuckle (*Lonicera* spp.), common buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Frangula alnus*), multi-flora rose (*Rosa multiflora*), tree of heaven (*Ailanthus altissima*) and knotweed (*Reynoutria* spp.) while restoration efforts included native planting of American basswood trees and the organization and construction of tree cages.

## Collaboration

WNY PRISM staff participate in and/or facilitate several local, statewide, and regional collaboratives to better provide support for the region we serve. WNY PRISM facilitates and/or participates in the following local, regional, and statewide collaboratives:

- Buffalo State Arbor Day Committee
- Great Lakes Action Agenda
- Great Lakes Environmental Sciences Professional Science Masters Advisory Board
- Great Lakes Hydrilla Collaborative
- Great Lakes Phragmites Collaborative
- Great Lakes Slender False Brome Working Group
- iMapInvasives Terrestrial Spatial Prioritization Advisory Group
- iMapInvasives Tier Ranking Working Group
- iMapInvasives Tools Planning
- Invasives Crayfish Collaborative
- NYS Aquatic Coordinators Working Group
- NYS Hydrilla Task Force
- NYS PRISM Education and Outreach Committee
- NYS Terrestrial Coordinators Working Group
- Phragmites Adaptive Management Framework
- Spotted Lanternfly Monitoring Group - AGM
- Swallow-wort Research Group
- Watercraft Inspection Stewardship Program App (WISPA)
- Watercraft Inspection Stewardship Program Manual Update
- WNY Hemlock Woolly Adelgid Collaborative
- WNY Mile-A-Minute Working Group
- WNY PRISM Aquatic Working Group
- WNY PRISM Education and Outreach Working Group
- WNY PRISM Terrestrial Working Group
- WNY Water Chestnut Working Group

## WNY PRISM Steering Committee Members

- Sharon Bachman, Cornell Cooperative Extension of Erie County
- Megan Cochran, New York Sea Grant
- Aaron Heminway, New York State Office of Parks, Recreation and Historic Preservation
- Colleen Keefer, U.S. Fish and Wildlife Service – Lower Great Lakes Fish and Wildlife Conservation Office
- Jenny Landry, New York State Department of Environmental Conservation
- Leslie Moma, New York State Department of Transportation
- Christopher Pennuto, SUNY Buffalo State University
- Richard Ruby, U.S. Army Corps of Engineers – Buffalo District
- Mike Shaw, U.S. Department of Agriculture – Natural Resources Conservation Service
- Jonathan Townsend, Royal Fern Nursery

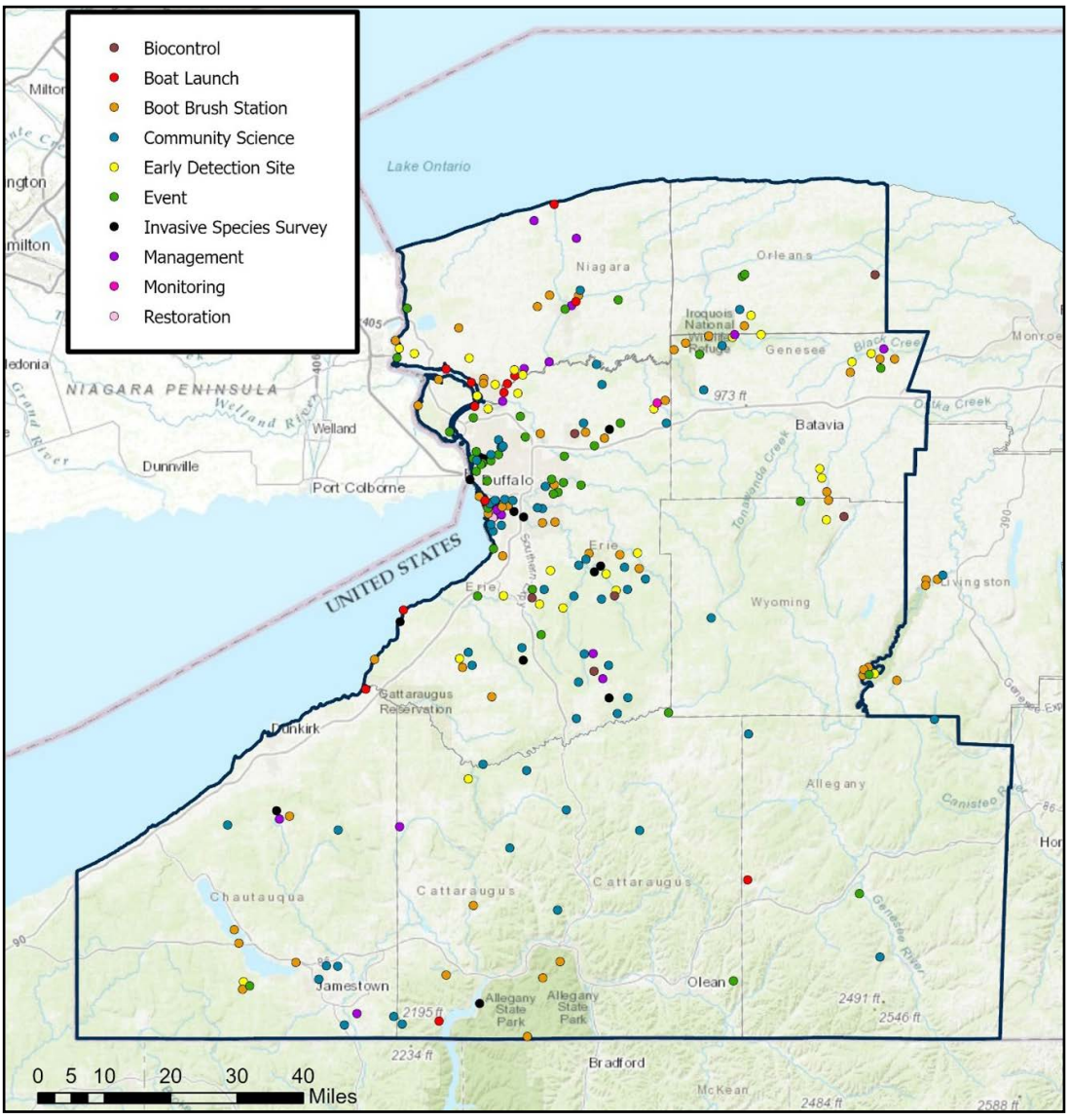
## Presentations, Workshops and Trainings

1. Taylor, R., and T. Leenders. Walk and Talk: David and Margaret Naetzker Preserve, WNY PRISM, Ashville, NY, July 27, 2024.
2. Taylor, R. Pathways of Invasive Into (and out of) Your Garden, Master Your Garden Educational Series, Albion, NY, August 3, 2024.
3. Taylor, R., and D. O'Donnell. Walk and Talk: Tillman Road Wildlife Management Area, WNY PRISM, Clarence, NY, August 17, 2024.
4. Hernon, B. Post-Treatment Data Collection Workshop, WNY PRISM, Buffalo, NY, September 5, 2024.
5. Taylor, R., and H. Rola. Walk and Talk: Pfeiffer Nature Center, WNY PRISM, Portville, NY, October 12, 2024.
6. Farese, N. WNY PRISM's Aquatic Invasive Species Program, WNY PRISM Fall Partner Meeting, Buffalo, NY, October 17, 2024.
7. Locke, A., N. Farese, N. Huff, N. Morey, and T. Draves. WNY PRISM Fall Partner Meeting, WNY PRISM, Buffalo, NY, October 17, 2024.
8. Taylor, R., A. Locke, N. Farese, and H. Rola. Western New York Partnership for Regional Invasive Species Management (WNY PRISM): Partnering to Protect Western New York from Invasive Species, Faculty and Staff Research and Creativity Fall Forum, Buffalo, NY, November 7, 2024.
9. Taylor, R., and B. Hernon. Hemlock Woolly Adelgid Hunters Training, WNY PRISM, Springville, NY, January 18, 2025.
10. Taylor, R. Invasive Species and the Greenhouse Industry, Winter Greenhouse Growers School, East Aurora, NY, January 23, 2025.
11. Taylor, R., and B. Hernon. Hemlock Woolly Adelgid Hunters Training, Springville Field and Stream Club Meeting, Springville, NY, February 6, 2025.
12. Farese, N. Water Chestnut Management: The "Nut-in" to it, Rural Landowner's Meeting, Yorkshire, NY, March 1, 2025.
13. Hernon, B. Getting to the root of the problem: Management of invasive trees and shrubs, Rural Landowner Workshop, Yorkshire, NY, March 1, 2025.
14. Locke, A. Invasive Species in the Landscapes: from backyards to ecosystems, Buffalo and Erie County Botanical Gardens, Buffalo, NY, March 27, 2025.

WNY PRISM led an informational Walk and Talk at Tillman Road Wildlife Management Area in August, with guest speaker Dave O'Donnell from the Eastern Monarch Butterfly Farm.

15. Taylor, R. Invasive Species: Remedies and Replacements, Tree Care Clinics Speaker Series, Mayville, NY, April 14, 2025.
16. Locke, A., M. Cochran, and C. Keefer. WNY PRISM Spring Partner Meeting, Basom, NY, April 17, 2025.
17. Taylor, R. Trail Survey Training, WNY PRISM, Clarence, NY, May 31, 2025.
18. Locke, A. 2025 Invasive Species Update – Western New York Edition, Erie County Master Gardner's', Buffalo, NY, June 3, 2025.
19. Taylor, R., N. Harper, and C. Garrell. Invasive Species – Why They're a Problem and How You Can Help, Environmental Field Days, Gasport, NY, June 4, 2025.
20. Locke, A. Importance of Invasive Species Management, Southern Tier Local Government Conference, Houghton, NY, June 5, 2025.
21. Locke, A., J. Randall, and R. Taylor. Walk and Talk: Lytle Nature Preserve, Lockport, NY, June 7, 2025.
22. Hernon, B., and R. Taylor. Invasive Plant Species ID & iMapInvasives Training, WNY PRISM, Depew, NY, June 9, 2025.
23. Hernon, B. Terrestrial Management Workshop: Invasive Trees and Shrubs, WNY PRISM, Basom, NY, June 12, 2025.

Visit our website for more information about WNY PRISM.
WNY PRISM's Annual Reports are available online.



WNY PRISM – Where We Worked