

Iowa Lakeside Laboratory Regents Resource Center

Fiscal Year 2023 Annual Report



Drone View of Iowa Lakeside Laboratory

jml

This report is submitted to the Iowa Board of Regents and the Council
of Provosts as an annual update on activities and financial report for
FY23

The Iowa Lakeside Laboratory was established in 1909 by Dr. Thomas Macbride for the
purpose of Studying of Nature *in* Nature. For more than 100 years, students have im-
mersed themselves in experiential learning, which builds upon and enhances their studies at
the Regents Universities.



Staff of the Iowa Lakeside Laboratory Regents Resource Center

Dr. Mary Skopec, Executive Director

Matthew Fairchild, Facilities Manager

Dennis Heimdal, State Hygienic Laboratory Chemist

Megan Cook, State Hygienic Laboratory Assistant Chemist

Ashley Scheve, Educational Coordinator

Dr. Rebecca Kauten, Scientist-in-Residence Post-Doc Fellow

Kassi Cherry, Head Cook/Housekeeper

Table of Contents

Lakeside History.....	4
The Year in Review.....	5
University Collaboration.....	6
Partnerships with Field Stations...7	
Student Success.....	8
Research.....,	9
Community Engagement.....	12
Budget Review.....	17

Iowa Lakeside Laboratory History

Iowa Lakeside Laboratory Regents Resource Center

The Iowa Lakeside Lab Regents Resource Center (Lakeside) is owned by the state of Iowa and operated through the Iowa Board of Regents. Lakeside's 147-acre campus is located on scenic West Okoboji Lake, on Little Miller's Bay. Since 1909, the bay and adjacent natural areas have been used as outdoor classrooms for Lakeside's university courses and outreach programs. The campus is open all year, and visitors are welcome to visit during daylight hours.

Mission:

The mission of the Iowa Lakeside Laboratory Regents Resource Center (ILLRRC) is to provide facilities and programming as a field station and community resource to support scientific education, research, and outreach programs of the Regents universities.

Friends of Lakeside Lab

The Friends of Lakeside Lab supports Lakeside through funding for scholarships, environmental education, research and water quality monitoring. Many of the programs listed in this report would not be possible without the generous support of The Friends. In 2023, The Friends of Lakeside provided **\$205,000** in funds to support room, meals and tuition scholarships, internships and our K-12 education coordinator.



Picture: Lakeside Laboratory after the construction of the Stone Labs (1936-38). Photo looking east, stone gates are visible along what is now Highway 86.

The Year in Review



Ornithology student banding birds to understand migration patterns.

Highlights from 2023

This year Iowa Lakeside Laboratory celebrated several significant anniversaries. The internationally renowned Ecology and Systematics of Diatoms course was offered for the 60th year and nearly every diatomist in the world is linked back to Lakeside in either a direct or indirect way. The course was first offered by Dr. John Dodd, an ISU professor of botany. His student and colleague, Dr. Eugene F. Stoermer, was an Okoboji native and continued to offer the class, building it and Lakeside Lab, into the epicenter of diatom learning. To commemorate this anniversary, Lakeside offered special lectures on diatoms, partnered with the Pearson Lakes Art Center to feature an art exhibit of diatom art and SUI students Andrew Burgess and Catherine Gulick produced a short film on the importance and relevance of diatoms in the 21st century.

The other significant anniversary for Iowa Lakeside Laboratory is the 25th anniversary of the construction of the Waitt Laboratory Building. This was the first year-round classroom and laboratory building added to Lakeside. The construction of Waitt Lab provided critical space for college courses as well as our K-12th grade offerings. It also houses the State Hygienic Laboratory, which offers water quality testing services for drinking water utilities, wastewater agencies, environmental agencies and residents in northwest Iowa. Since the construction of the Waitt Lab a quarter-century ago, the programming needs have outpaced the available space and additional year-round facilities are necessary. The Friends of Lakeside Laboratory initiated a capital campaign in 2022 to build a new Innovation & Discovery Lab and Residence Hall. The private fundraising goal is nearly complete and we hope to move into the design phase of the new Discovery & Innovation Lab this fall.

Course enrollment continues to be strong in core courses such as Ecology and Systematics of Diatoms, Ecology and Systematics of Algae, Field Archaeology, Ecology and Ornithology. However, enrollment continues to be limited by available housing with students preferring the motel units over the rustic cabins. Efforts to provide improved housing should assist with future recruiting efforts.

Several groups hosted meetings or events at Lakeside including: the 2023 Okoboji Writers Retreat, Prairie Pothole Joint Venture Fish & Wildlife meeting, Storm Lake 4H Family weekend, Invasive Carp Technical Meeting, and the Shallow Lakes Restoration Tour.

University Collaboration

Iowa Healthy Lakes Initiative: A multi-dimensional approach to measuring, informing, and solving Iowa's Harmful Algal Bloom Challenge

Andrew Burgess
University of Iowa

Background

What are HABs?

- Cyanobacteria, commonly called blue-green algae, are naturally occurring photosynthetic bacteria found in freshwater and marine environments.
- When conditions are favorable, such as in shallow, slow-moving water with elevated nutrients, cyanobacteria can multiply rapidly, forming dense, green blooms (HABs), primarily in the spring and summer months.
- HABs produce toxins that threaten wildlife, damage livestock operations, and can cause respiratory issues.

Why is this research urgent?

- Last year, the Department of Natural Resources conducted a statewide HAB risk assessment to determine the most vulnerable areas for HABs, and to identify potential management strategies.
- Statewide HAB risk assessment was completed during the summer. Statewide HAB risk assessment results are being used to inform management strategies.
- The results were then presented to various stakeholders, including the public, to gather input and feedback.

Why does this research matter?

- Climate change and increased population density are increasing the risk of HABs. This research is important to the Department of Natural Resources and the University of Iowa, as well as the public.
- Understanding the 2021-2022 HAB risk assessment results is important to the Department of Natural Resources and the University of Iowa, as well as the public.
- Understanding the 2021-2022 HAB risk assessment results is important to the Department of Natural Resources and the University of Iowa, as well as the public.

Progress

Research Goals

- The DNR and the University of Iowa have conducted several projects related to HABs, including a statewide HAB risk assessment in 2021-2022.
- The research team is currently working on a multi-dimensional approach to measuring, informing, and solving Iowa's HAB challenge.
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Timeline and Method

- The research team is currently working on a multi-dimensional approach to measuring, informing, and solving Iowa's HAB challenge.
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Approach

Measurement

- The DNR and the University of Iowa are currently working on a multi-dimensional approach to measuring, informing, and solving Iowa's HAB challenge.
- The research team is currently working on a multi-dimensional approach to measuring, informing, and solving Iowa's HAB challenge.

Understanding

- The DNR and the University of Iowa are currently working on a multi-dimensional approach to measuring, informing, and solving Iowa's HAB challenge.
- The research team is currently working on a multi-dimensional approach to measuring, informing, and solving Iowa's HAB challenge.

Reasons

- The DNR and the University of Iowa are currently working on a multi-dimensional approach to measuring, informing, and solving Iowa's HAB challenge.
- The research team is currently working on a multi-dimensional approach to measuring, informing, and solving Iowa's HAB challenge.

References

1. Burgess, A. W., et al. (2021). "Iowa's Harmful Algal Bloom Challenge: A Multi-Dimensional Approach to Measuring, Informing, and Solving Iowa's Harmful Algal Bloom Challenge." *Journal of Environmental Quality*, 50(1), 1-15.
2. Burgess, A. W., et al. (2022). "Iowa's Harmful Algal Bloom Challenge: A Multi-Dimensional Approach to Measuring, Informing, and Solving Iowa's Harmful Algal Bloom Challenge." *Journal of Environmental Quality*, 51(1), 1-15.
3. Burgess, A. W., et al. (2023). "Iowa's Harmful Algal Bloom Challenge: A Multi-Dimensional Approach to Measuring, Informing, and Solving Iowa's Harmful Algal Bloom Challenge." *Journal of Environmental Quality*, 52(1), 1-15.
4. Burgess, A. W., et al. (2024). "Iowa's Harmful Algal Bloom Challenge: A Multi-Dimensional Approach to Measuring, Informing, and Solving Iowa's Harmful Algal Bloom Challenge." *Journal of Environmental Quality*, 53(1), 1-15.

Acknowledgements

Co-PIs: Susan Meerdink, Mary Skopec, Adam Skibbe, Matthew Dannenberg, Lyndy Holdt, Drew Howing, Michael Weber, P.I. Drew Howing

University of Iowa's Healthy Lake Jumpstart Program aims to understand harmful algal blooms. Year 2 of the Project continued in 2023.

Highlights from 2023

- University of Iowa Jumpstarting Tomorrow: Iowa Healthy Lakes Initiative: A multi-dimensional approach to measuring, informing, and solving Iowa's Harmful Algal Bloom Challenge.
- University of Iowa: Iowa Healthy Lakes Initiative Feasibility Grant Development, Validation, and Application of a Multiplexed Immunoassay for Simultaneous Quantification of Multiple Cyanobacterial Toxins Nervana Metwali, PhD1, Mary P. Skopec, PhD2, Lyndy Holdt, BS1. Department of Occupational and Environmental Health 2. University of Iowa Lakeside Laboratory
- University of Iowa Interdisciplinary, Scalable Solutions for a Sustainable Future (ISSSF): A hard rain's gonna fall: Responses of Iowa's bur oak to increased precipitation variability PI: Matthew Dannenberg (Geographical and Sustainability Sciences, GSS) Co-PIs: Susan Meerdink (GSS), Mary Skopec (Iowa Lakeside Laboratory), Adam Skibbe (GSS)
- University of Iowa ISSSF: Hyperspectral satellite remote sensing: The new tool for detecting harmful algal blooms (HAB) events in Iowa's lakes PI: Susan Meerdink (Geographical and Sustainability Sciences) Co-PI: Mary Skopec (Iowa Lakeside Laboratory)
- Iowa State University: Dr. Michael Weber Fisheries Research in Northwest Iowa. Assessment of Invasive Carp Movement in Northwest Iowa Streams. The team was housed at Lakeside Lab in the summer of 2023.
- Iowa Lakes Community College: Blanding's Turtle Nesting Success, P.I. Drew Howing (Iowa Lakes Community College), Lakeside interns field assistance.

Partnerships with Field Stations



Iowa Lakeside Laboratory

Assessing Today's Undergraduate Field Experience

TELL US YOUR STORY

Are you over 18 and an Earn-to-Learn intern?

Help make the undergraduate field station experience a success for everyone!

SHARE YOUR THOUGHTS
This anonymous survey assesses the field experience for interns like YOU at field stations and marine labs worldwide



THIS STUDY HAS BEEN APPROVED BY THE UNIVERSITY OF IOWA IRB

- free to skip any questions
- can stop at any time
- anonymous, secure data
- no penalty for not participating

SURVEY AVAILABLE THRU SAT. JUNE 3!
Completion may take 12-15 minutes

MORE CONTACT INFO:
rebecca-kauten@uiowa.edu
irb@uiowa.edu

Informational flyer for the pilot project to assess undergraduate field experiences.

New for 2023

The Organization of Biological Field Stations (OBFS) provides opportunities for field stations to collaborate on research, data collection, and information exchange. A recent Bulletin for the Ecological Society of America (Mcdermott, et al, 2023) noted the need for a tool to assess the experiences of undergraduates at field stations and to build processes to ensure the successful participation of students. A survey instrument was constructed and piloted at Iowa Lakeside Laboratory in the summer of 2023.

The study consists of three Qualtrics-based online surveys distributed for anonymous participation among summer 2023 Iowa Lakeside Laboratory Earn-to-Learn internship programs. An invitation to participate will be distributed to approximately 30 undergraduate intern contacts via email, as well as be prominently displayed on campus for participation at key data collection periods within the summer field season. The invitation will include a link to participate in the survey during the scheduled collection period, as well as a QR code for immediate data collection. Anonymized data will be collected at each point of inquiry, which will also serve as the platform for anonymized comparative data analysis.

Survey 1: To be administered within the first 10% of the 2023 summer intern season (May 21 to June 3)

Survey 2: To be administered at the midpoint (40-60%) of the 2023 summer intern season (June 25 to July 8)

Survey 3: To be administered following 90% of the 2023 summer intern season (July 30 to August 12)

The goal of this assessment is to compare current conditions to expectations, provide an objective platform for constructive feedback, and emphasize constructive approaches to addressing critical issues commonly occurring within immersive learning experiences.



Organization of Biological Field Stations

Supporting environmental research, education, and public understanding

Iowa Lakeside Laboratory is a member of the Organization of Biological Field Stations. OBFS members develop research projects and funding through the National Science Foundation on a regular basis.

Student Success



Colin Vecera (2023 Intern and student at University of Maine) measures stream flow to the Iowa Great Lakes. Colin is also a graduate of the College Prep Diatom Course, which is offered to high school students interested in the natural sciences.

Career-Ready Skills

Career-ready skills are practical, hands-on skills applicable to field work (water quality testing, instrument calibration, instrument trouble-shooting, navigation, GPS and GIS), data analysis (statistics, spreadsheets, data analytics), and communication (report writing, public speaking, working with the public and social media). Lakeside focuses on preparing students to acquire these skills and use them with our partners. Key partners include the Iowa Department of Natural Resources, Iowa Department of Agriculture and Land Stewardship, Dickinson County Conservation Board, Dickinson County Board of Health, Friends of Lakeside Laboratory among many other entities.

Internships

Twenty-five students and recent graduates participated in an internship at Lakeside during the summer of 2023. Lakeside internships build practical skills such as deploying sensors, managing data, problem solving, public speaking, and teamwork. All interns are offered the opportunity to lead or engage in a research project and ninety-percent of interns participated this year. Projects are listed in the following section. Interns complete exit interviews at the end of their term. These interviews provide an opportunity for staff to comment on areas of strengths and avenues for improvement, which give interns insights to the future work environment. Comments from the interns on their experience underscore the importance of building skills that are difficult to obtain in the classroom.

“Leading the weekly water sampling team at Lakeside, I had the opportunity to grow into an efficient, collaborative, and compassionate leader. I’m grateful for all the new skills in my toolbox.”

~Allie Malleris, University of Colorado at Boulder

Green Iowa AmeriCorps

University of Northern Iowa coordinates the Green Iowa AmeriCorps program, which provides three key areas of service in communities around Iowa including Energy Efficiency, Sustainable Schools and Land and Water Stewardship. Lakeside Lab serves as a host site for Land and Water Stewardship members. In 2023, Lakeside hosted one eleven-month member and four summer members. Projects included water quality monitoring, identification of bat species using acoustic monitoring, SCUBA assessment of lake bed vegetation, land stewardship and environmental education. Members come from various institutions including Regents Universities and community colleges.

“AmeriCorps has given me invaluable opportunities to grow in my chosen field”

~ Trevor Sippel, Green Iowa AmeriCorps Member, Graduate of Loras College.

Research



Lyndy Holdt (University of Iowa, B.S. Public Health, M.S. Candidate Public Health) conducts a vegetation survey using SCUBA techniques in West Okoboji

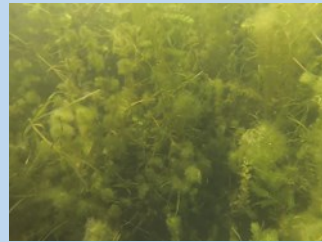
Student Research

Interns at Lakeside Lab are offered the opportunity to contribute to or develop a research project. Students were mentored by Lakeside staff, faculty from the Regents Universities or partner institutions. Financial support for student research was provided by the Friends of Lakeside, Inc., Iowa DNR, the Okoboji Protective Association and a grant from the Dickinson County Clean Water Commission.

Research projects are listed in the next section.

Scientist-in-Residence

The Scientist-in-Residence Fellowship (SIRF) program was created for early career scientists to build their research portfolio while working in the Iowa Great Lakes. The SIRF post-doc also mentors undergraduate students in research projects. *A short synopsis of the Scientist-in-Residence Fellowship*



Photos from left to right: 1. SCUBA sample locations in Miller's Bay of West Okoboji, 2. Bluegill nest, 3. Example of dense aquatic vegetation, 4. Example of anchor drag and lake bed disturbance.

Student Research

FY 2023 Projects

- Brian Evans (University of Arizona) Acoustic Determination of Bat Species in Northwest Iowa
- Brynn Hogue (University of Iowa) Carbon sequestration potential of patch-burn-grazing (PBG) land management: Judd Wildlife Area and Kirchner Prairie
- Bridget Dennehy () Carbon sequestration potential of patch-burn-grazing (PBG) land management: Judd Wildlife Area and Kirchner Prairie
- Olivia Calvin (University of Northern Iowa) Modeling Water Quality in the Milford Creek Watershed
- Alex McGinnis (Drake University) Starting a Floristic Inventory at Iowa Lakeside Laboratory
- Mikaila Neuzil (Iowa State University) Water Quality Analysis of the Little Sioux Watershed Using Chemical and Physical Data
- Athena Sheridan (University of Iowa) Beaver Dam Camera Trap Analysis at Fen Valley, Iowa
- Brady Kramer (St. Mary's University) Reconnaissance Survey and Biodiversity Analysis of Soil Organisms, Iowa Great Lakes Region
- Lyndy Holdt (University of Iowa) A Public Health Perspective on Harmful Algal Blooms in Iowa Lakes
- Charles Anderegg (University of Iowa) Iowa Great Lakes Sensitive Areas and Land Use Project
- Trevor Sippel (Loras College) Assessing the Little Sioux Watershed Using BMIBI
- Paige Leibrecht (University of Iowa) Diatom Voucher Flora of a Recovering Fen
- David Hebrink (University of Iowa) Modeling of Urban and Nonpoint Source Pollution to Milford Creek
- Andrew Burgess (University of Iowa) Iowa Healthy Lakes Initiative: A multi-dimensional approach to measuring, informing, and solving Iowa's Harmful Algal Bloom Challenge
- Allie Malleris (University of Colorado-Boulder) Iowa Lakeside Laboratory Water Monitoring Program
- Sam Taylor (University of Iowa) Remote Sensing of Harmful Algal Blooms in Big Spirit Lake
- Catherine Gulick (University of Iowa) Video Documentary on the Nesting Success of Trumpeter Swans in Northwest Iowa
- Nicole Quist (University of Iowa) Bur Oak Blight Determination in the Okoboji Area

Students completing research projects during the summer of 2023 presented results at a research symposium on July 25, 2023

Scientist-in-Residence

Scientist-in-Residence and Experiential Learning Coordinator

Dr. Rebecca Kauten (University of Iowa, Ph.D. 2019: Geographical and Sustainability Sciences) is Iowa Lakeside Laboratory's scientist-in-residence (SIR). The Friends of Lakeside Laboratory funded this post-doc fellowship to support research of special interest to the Iowa Great Lakes. The program is now entering its fourth year and has expanded to include mentoring undergraduate research projects and developing career ready skills for interns. Dr. Kauten's research in 2023 has focused on four main projects: Comparison of Land Use Changes to 25 years of Water Quality Monitoring of CLAMP volunteers, Milford Creek Watershed Analysis, Evaluation of a Reconstructed Fen near Estherville, Iowa, and An Assessment of Recreational Conditions in the Iowa Great Lakes Region, Publications from these projects are in process with undergraduate students as co-authors on all of the papers.



TOP: Prairie Ecology Students Assess Kirchner Prairie, RIGHT: Example posters from Student Research

A Public Health Perspective on Harmful Algal Blooms in Iowa Lakes

Lyndy Holdt, B.S.
Iowa Healthy Lakes Initiative (IHLL)

INTRODUCTION

Harmful algal blooms (HAB) in Iowa are a threat to lakes, streams, and drinking water. The production of cyanobacteria and other toxins has led to the development of HABs in Iowa lakes, streams, and drinking water. Cyanobacteria blooms in Iowa water bodies most commonly produce the toxin microcystin, a hepatocarcinogenic toxin that can cause liver damage, kidney failure, and other health problems. Other toxins produced by cyanobacteria include neurotoxins, dermatitis, and other health problems. The Iowa Department of Natural Resources (DNR) has been monitoring HABs in Iowa lakes, streams, and drinking water since 2012. In 2023, DNR reported that HABs were present in 10 of 100 sampled water bodies. This poster will discuss the public health impacts of HABs in Iowa and the role of the IHLL in addressing this issue.

RESEARCH AIMS

- What do the public and public health officials know about harmful algal blooms (HAB) in Iowa?
- What do the public and public health officials know about the risks of HABs in Iowa?
- What do the public and public health officials know about the benefits of HABs in Iowa?
- What do the public and public health officials know about the management of HABs in Iowa?
- What do the public and public health officials know about the prevention of HABs in Iowa?

REFERENCES

U.S. Environmental Protection Agency. (2017). *Blue-Green Algae: National Blue-Green Algae Action Plan*. U.S. Environmental Protection Agency, Washington, DC.

U.S. Environmental Protection Agency. (2018). *Blue-Green Algae: National Blue-Green Algae Action Plan*. U.S. Environmental Protection Agency, Washington, DC.

U.S. Environmental Protection Agency. (2019). *Blue-Green Algae: National Blue-Green Algae Action Plan*. U.S. Environmental Protection Agency, Washington, DC.

ACKNOWLEDGEMENTS

Thank you to the Iowa Healthy Lakes Initiative and the Iowa Lakeside Laboratory for their support of this project.

Iowa Lakeside Laboratory Regents Resource Center Field Research Program

Determining potential effects of afforestation on soil nitrogen availability in upland prairies and wetlands in northwestern Iowa

Iowa Lakeside Laboratory Prairie Ecology Course
Summer 2023 Undergraduate Field Research Experience

Abstract

The purpose of this study was to determine the potential effects of afforestation on soil nitrogen availability in upland prairies and wetlands in northwestern Iowa. We collected soil samples from 10 sites in the region and analyzed them for total nitrogen (TN) and nitrate-nitrogen (NO₃-N). We found that TN and NO₃-N concentrations were significantly higher in afforested sites compared to non-afforested sites. This suggests that afforestation may increase soil nitrogen availability in upland prairies and wetlands in northwestern Iowa.

Methodology

We collected soil samples from 10 sites in the region. The sites were selected based on their location and land use. We collected soil samples from the 0-10 cm depth and analyzed them for TN and NO₃-N. We used a Kjeldahl method to determine TN and a cadmium reduction method to determine NO₃-N.

Anticipated Results & Contingencies

We anticipate that TN and NO₃-N concentrations will be significantly higher in afforested sites compared to non-afforested sites. This suggests that afforestation may increase soil nitrogen availability in upland prairies and wetlands in northwestern Iowa. Contingencies include the possibility that TN and NO₃-N concentrations may not be significantly higher in afforested sites compared to non-afforested sites. This could be due to a variety of factors, including differences in soil type, climate, and land use history.

References

U.S. Environmental Protection Agency. (2017). *Blue-Green Algae: National Blue-Green Algae Action Plan*. U.S. Environmental Protection Agency, Washington, DC.

U.S. Environmental Protection Agency. (2018). *Blue-Green Algae: National Blue-Green Algae Action Plan*. U.S. Environmental Protection Agency, Washington, DC.

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Acknowledgements

Thank you to the Iowa Lakeside Laboratory and the Iowa Lakeside Laboratory Prairie Ecology Course for their support of this project.

Iowa Lakeside Laboratory Regents Resource Center Undergraduate Field Research Program

Carbon sequestration potential of patch-burn-grazing (PBG) land management: Judd Wildlife Area and Kirchner Prairie

Bryann Hogue & Bridget Demahy
Iowa Lakeside Laboratory

Abstract

The purpose of this study was to determine the carbon sequestration potential of patch-burn-grazing (PBG) land management at the Judd Wildlife Area and Kirchner Prairie. We collected soil samples from 10 sites in the region and analyzed them for total carbon (TC) and soil organic carbon (SOC). We found that TC and SOC concentrations were significantly higher in PBG sites compared to non-PBG sites. This suggests that PBG land management may increase carbon sequestration in upland prairies and wetlands in northwestern Iowa.

Methodology

We collected soil samples from 10 sites in the region. The sites were selected based on their location and land use. We collected soil samples from the 0-10 cm depth and analyzed them for TC and SOC. We used a dry combustion method to determine TC and a Walkley-Black method to determine SOC.

Anticipated Results & Contingencies

We anticipate that TC and SOC concentrations will be significantly higher in PBG sites compared to non-PBG sites. This suggests that PBG land management may increase carbon sequestration in upland prairies and wetlands in northwestern Iowa. Contingencies include the possibility that TC and SOC concentrations may not be significantly higher in PBG sites compared to non-PBG sites. This could be due to a variety of factors, including differences in soil type, climate, and land use history.

References

U.S. Environmental Protection Agency. (2017). *Blue-Green Algae: National Blue-Green Algae Action Plan*. U.S. Environmental Protection Agency, Washington, DC.

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Acknowledgements

Thank you to the Iowa Lakeside Laboratory and the Iowa Lakeside Laboratory Prairie Ecology Course for their support of this project.

Iowa Lakeside Laboratory Regents Resource Center Undergraduate Field Research Program

Community Engagement



The Field Archaeology Course often draws a crowd of onlookers. The 2023 dig was at the Abbie Gardner Sharp Cabin, which was the site of the 1857 Spirit Lake conflict. The excavation is an opportunity for impromptu lessons for people passing by the site including the kids pictured above.

Value to the Iowa Great Lakes

STEM Education

Life-Long Learning

Community Technical Assistance

Arts and Culture

STEM Education



Students as young as pre-school age learn basic STEM skills including collecting, observing, and recording their observations.

21st Century Skills for K-12

Lakeside Laboratory provides unique opportunities for K-12 students to meet Next Generation Science Standards (NGSS) through inquiry and project-based work. Lakeside staff work with school districts and teachers to design programs that meet curriculum goals and enrich student learning. The hands-on and immersive programming helps students develop 21st Century Skills including problem solving, critical thinking and communicating the results of their work. Students often interact with the scientists on campus, which enhances learning and provides role-models for future careers.



Above: Girls in STEM Camp was awarded the Governor's STEM Council Seal of Approval.

Formal School Year Programs: Fall 2022 – Spring 2023

2095 total students served

Informal Programs (each pre K–12 session capped at 12 students)

47 programs (3-5 days) for ages pre K- 12 students

543 students participating (includes camps offered with Okoboji Sailing School. Iowa State Extension and Iowa Great Lakes Fishing Club). This represents a 30% increase from 2022.

“Violet had an incredible time! The staff was so kind, the activities were super engaging, and Violet learned a ton. It was a fabulous camp and are never disappointed when we participate in Lakeside Lab activities. Thank you!”

Life-Long Learning

IOWA LAKESIDE LAB'S



WILD WEDNESDAYS 2023

7pm in Mahan Hall
A free, weekly summer learning series for families, children, and "kids at heart"

JUNE 7 Marvelous mammals	JULY 19 Wild edibles
JUNE 14 Bird nerds	JULY 26 The rock cycle
JUNE 21 What's a pollinator?	AUGUST 2 Gone fishing
JUNE 28 The secret life of amphibians	AUGUST 9 Reptile roundup
JULY 5 Kayak clean-up	AUGUST 16 Wild at heART
JULY 12 Macroinvertebrates	



Wild Wednesdays draw families to Lakeside to experience hands on and nature-based learning.

Self-guided Inquiry

Visitors to the Iowa Great Lakes are encouraged to explore the Lakeside Lab campus. A self-guided tour takes you through the restored prairie, woodlands and around the historic campus. Each year hundreds of visitors bring their kids to enjoy the scavenger hunt that allows families to explore on their own.

Prairie Lakes Conference/Blue Water Festival

The Prairie Lakes Conference is part of the Clean Water Week in the Iowa Great Lakes. The conference's purpose is to share information on the latest water quality research to resource managers, community officials and interested citizens. Lakeside Laboratory organizes the conference, which focused on highlighting conservation practices and watershed improvement around the Iowa Great Lakes. The event commenced with a field tour by John Boettcher and his daughter Emily who shared insights on how they have successfully implemented cover crops in NW Iowa. Other tour stops included shallow lakes restoration projects, wetland restoration and the Spirit Lake fish hatchery.

Tuesday Night Lecture Series

Lakeside Lab sponsors a Tuesday Night Lecture series from mid-May to early August. Eleven speakers brought unique and informative presentations to a delighted audience. Topics ranged from nanotechnology and diatoms to understanding lichens, predicting fire intensity in Southern California and the writings of Bernt Olaf Wolden. 750 people attended the lectures in person, while another 3,000 watched the presentations on Facebook Live. Presentations are archived on the Iowa Lakeside Laboratory YouTube channel.

Wednesday Night Family Events

"Wild Wednesdays" allow families the opportunity to explore nature and science based topics using hands on methods. One hundred and forty two participants attended sessions ranging from fishing to wild art. The events also serve as professional development for the Lakeside interns. Interns develop the topics, determine the curriculum and activities featured during the event and facilitate the discussion with the members of the public.

Community Technical Assistance

Lakeside Lab serves as a nexus for Regent University expertise in the Iowa Great Lakes. Faculty and staff research a variety of ecological, sustainability and water quality issues.

Harmful Algal Bloom Assessment

Researchers are using hyperspectral sensors to test whether they can detect the early formation of harmful algal blooms (HABs). These blooms can be problematic for drinking water supplies that use surface waters.

Water Quality Monitoring

Working with the Iowa Great Lakes community to evaluate the effectiveness of water quality improvement investments and to determine where future improvements will be the most beneficial. Buoys measure short-term changes in water chemistry, which is vitally important to the understanding and continued protection of the Iowa Great Lakes. Data have been used by drinking water supplies, natural resource managers, and recreation enthusiasts.

Bur Oak Blight

Researchers are examining the effect of bur oak blight on infected trees and comparing healthy trees to infected ones with the goal of understanding natural resistance to the disease.

Aquatic Invasive Species Management

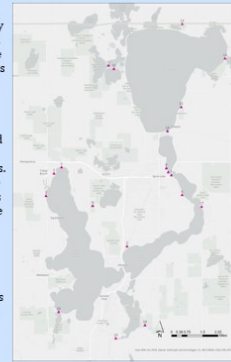
Lakeside is working with the community to develop strategies to manage excessive aquatic plant growth in the Iowa Great Lakes. The discovery of Eurasian Watermilfoil in the Iowa Great Lakes is providing a new challenge that will require an innovative approach for control and removal. An ISU research team is evaluating the effectiveness of the electric fish barrier on Asian Carp migration into the Iowa Great Lakes.

Research poster highlighting the water quality monitoring program for the Iowa Great Lakes.

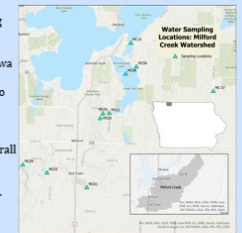
Iowa Lakeside Laboratory Water Quality Monitoring Program

Alexandria Malleris | University of Colorado Boulder | Lakeside Laboratory

The IHR monitoring project collects weekly samples and data from 20 locations within the entire Iowa Great Lakes region. These data will be the basis for modeling a "nutrient budget" for the Iowa Great Lakes, conducted by the Iowa Geological Survey and its partners. Tributaries draining to the major lake systems within the region serve as the focus of data collection. The model outputs can then be used to forecast and assess how environmental changes at the watershed-scale may affect regional or local water quality conditions.

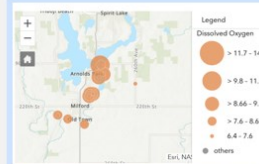


The Milford Creek Watershed monitoring project is an ongoing partnership between Lakeside Lab and the Iowa Great Lakes Sanitary District. Objectives are to collect chemical and physical data from ten locations within the watershed to assess overall quality, with a focus on nutrient loading from urban and rural sources. Ten sites within the watershed are sampled weekly.

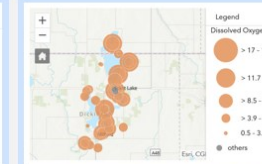


Project Objectives:
For both projects, weekly sampling activities collect flow, dissolved oxygen, specific conductance, pH, temperature, transparency, and stream channel morphology.

Data Collection:
Data is recorded using a Survey123 application to enable geotagging and real-time data interpretation.



Dissolved Oxygen Levels for Milford Creek Sites 1-10



Dissolved Oxygen Levels for IHR Sites 1-20



Arts & Culture

The Artist-in-Residence program and Writer in Residence Program aims to create opportunities for collaboration, partnership, and reflection between artists, scientists, and community members. Artists are encouraged to use the area as their studio and to interact freely with scientists, field study courses, local residents, and visitors. A high priority of the program is exploring relationships between art and science. Preference is given to artists whose work engages with ecology, science, and natural history in unique and collaborative ways. The residency program is offered with an eye towards Long Term Ecological Reflections, a national partnership between biological field stations that support thoughtful relationships between art and science. Artists and writers are required to conduct a workshop, open house or other event to showcase the residency to the community. Eight artists and four writers completed residencies at Lakeside Lab in 2023.



2023 Artists

Mirzam Perez, Grinnell University

Isabel Beavers, California

Wild Prairie Winds Quintet

Johnny DiBlasi, Iowa State University

Lyndsay Nissen, Ames

Parts Per Million Collective/ Edward Kelley and Emily Newman

Kayla Shomar-Corbett, Oberlin

Sara Suárez, California

2023 Writers

Zoey Fahy Stindt & Natalie Deam, Iowa State University

Tegan Daly, Iowa State University

Tom Fate, Author of *The Long Way Home: Detours*

Photo by Sara Suarez “My art practice centers on film, video and photography, and in my time at Lakeside Lab I focused on making photo/video work studying the surrounding prairie landscapes and environment. And so I spent a lot of time venturing into expanses of prairie near the lab, observing, listening, taking photos, getting stung by thistles. I’m not from this region, not familiar with this land, and I felt mesmerized by the intense energy of life and the biodiversity that is so visible even to a casual observer. I used the scanner in one of the labs to make botanical images with plants I collected, and assemblages reflecting the different micro-communities of plants I encountered in the prairie. It started as a curious experiment and a way to study these plants more closely, and I found it opening a visual conversation with the herbarium.”

Budget Review

			Grants Included	Grants Included	Grants Included	Grants Included	
IOWA LAKESIDE LABS REGENTS RESOURCE CENTER	FY18 Actual	FY19 Actual	FY20 Actual	FY21 Actual	FY22 Actual	FY23 Actual*	FY24 Budget
REVENUE							
Carry forward	35,621	98,576	154,203	136,276	379,329	172,635	(44,310)
Regent university allocation	592,061	598,778	592,061	592,061	592,061	592,061	592,061
Room and Board	39,206	78,007	15,196	38,773	54,259	70,290	75,000
Center revenue	126,704	106,426	67,045	146,281	142,340	147,013	135,000
Friends & Other Support (grants)	100,333	102,337	95,772	248,714	187,498	231,811	205,950
Gifts (Indv/Foundation)	--	--	--	--	--	--	52,675
TOTAL REVENUE	893,925	984,123	924,277	1,162,104	1,355,487	1,213,810	1,016,376
EXPENDITURES							
Salaries and benefits	506,152	497,618	441,813	504,950	639,826	730,537	663,566
Travel and hospitality	55,288	53,283	27,759	21,518	69,309	77,731	55,000
Supplies and Other	29,708	31,166	24,105	19,437	66,225	68,202	35,000
Utilities	63,110	74,914	71,778	55,067	80,559	96,080	92,000
Maintenance and repairs	91,468	100,491	193,816	109,478	183,491	161,103	97,810
Equipment	3,867	34,252	20,291	26,663	86,433	66,467	15,000
Marketing	999	889	611	399	150	150	1,000
Scholarship Expense	44,756	37,309	9,988	45,264	56,859	57,850	57,000
TOTAL EXPENDITURES	795,349	829,921	790,161	782,774	1,182,852	1,258,120	1,016,376
NET BALANCE	98,576	154,203	134,116	379,329	172,635	(44,310)	-

² Includes one time GEF proceeds for fire damages

³ Beginning FY21, Includes Friends of Lakeside Lab funding transitioned to grant reporting. Outstanding grant funds are include in this Net Balance (adjusted after the grant/calendar year is completed)

* as of 6/30/23