Iowa Lakeside Laboratory Regents Resource Center

Fiscal Year 2022 Annual Report

2022 Iowa Lakeside Laboratory Interns

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 FY22

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 immersed 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

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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 programing 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.

Picture of Shimek Lab. One of the five stone labs built on campus in the 1930s, Shimek was originally used as the library. Today, Shimek Lab houses classes such as Field Archaeology.

The Year in Review

Ecology student discovered a snake during class.

Highlights from 2022

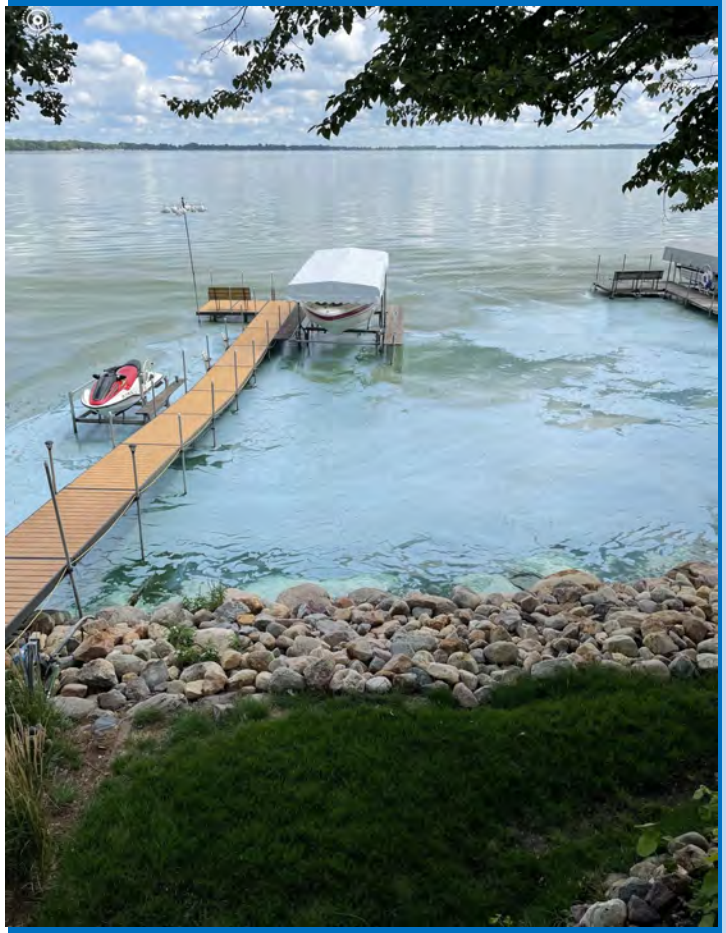
Iowa Lakeside Laboratory continues to see a resurgence in interest for hand's on and immersive classes. Students are seeking experiences that allow them to interact with faculty and peers in environments that foster mentorship and collaboration. However, enrollment in Lakeside classes is limited by the physical constrains of campus, primarily due to the lack of housing space. In 2022, thirty-five interns occupied nearly half of the existing housing units. To address this situation, the Friends of Lakeside Lab along with Lakeside Lab initiated a capital campaign. The campaign goals include building a new residence hall to replace the outdated motel units, building a new laboratory and classroom space to alleviate space constraints in Waitt Lab and renovating the Limnology Lab by adding ADA compliant walkways and stabilizing the lakeshore. Fundraising by the Friends of Lakeside Lab began in June of 2022 and will continue into 2023.

Ecology, Aquatic Ecology and Field Archaeology continue to be the most in-demand courses. Students looking to complete field requirements for environmental science or sustainability comprise the majority of students in these classes. However, new courses continue to be developed and have expanded to those outside the more traditional biology or environmental science programs. "Making Kin(ship) within Place: Literature and Multispecies Kinship" is a humanities course that takes advantage of the unique location of Lakeside Lab.

On-line courses continue to be offered, but include a significant field component in the student's home environment. For example, Ecology and Systematics of Algae require students to collect algae samples and share pictures with the instructor on-line. These creative approaches bring the expertise to the student when they physically are unable to travel (e.g. international students), but in a way that maintains the rigorous curriculum. Additionally, K-12 teachers are beginning to seek out these courses to fulfill endorsement in earth science, biology and other sciences.

"Lakeside has provided me with so much experience that has helped me learn what I want to do with my studies! Without attending Lakeside first as a student and then as an intern, I would still be undecided about my future career" *Megan A. University of Iowa*

University Collaboration



University of Iowa's Healthy Lake Jumpstart Program aims to understand harmful algal blooms, such as this one on Big Spirit Lake that formed in August of 2022

Highlights from 2022

- University of Iowa Jumpstarting Tomorrow: Iowa Healthy Lakes Initiative: A multi-dimensional approach to measuring, informing, and solving Iowa's Harmful Algal Bloom Challenge. Team members:

Team Leader and Team Member(s)

Name	Professional Title	Role (Team Leader or Team Member)	College	Department
Elizabeth Stone	Professor	Team Member	Liberal Arts and Sciences	Chemistry
Mary Skopec	Executive Director	Team Member	University College	Iowa Lakeside Laboratory
Charles Stanier	Professor	Team Member	Engineering	Chemical and Biochemical Engineering
Xun Zhou	Associate Professor	Team Leader	Business	Business Analytics
Greg LeFevre	Assistant Professor	Team Leader	Engineering	Civil and Environmental Engineering
Marc Linderman	Associate Professor	Team Member	Liberal Arts and Sciences	Geographical and Sustainability Sciences
Peter Thorne Thorne	Professor and Department Head	Team Leader	Public Health	Occupational and Environmental Health
Elise Pizzi	Assistant Professor	Team Leader	Liberal Arts and Sciences	Political Science
Susan Meerdink	Assistant Professor	Team Leader	Liberal Arts and Sciences	Geographical and Sustainability Sciences
Kylah Hedding	Assistant Professor	Team Member	Liberal Arts and Sciences	Journalism and Mass Communication

- 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 1. 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. Dr. Weber's graduate students are engaged in several projects related to fisheries management. The team was housed at Lakeside Lab in the summer of 2022.

- Iowa Lakes Community College: Blanding's Turtle Nesting Success, P.I. Drew Howing (Iowa Lakes Community College), Lakeside interns field assistance.

Partnerships with International Field Stations

Jace Bell (University of Northern Iowa) served as Lakeside Lab intern studying water quality in 2022..

New for 2022

Through regular communication and networking with members of the Organization of Biological Field Stations, research projects related to bioacoustics monitoring and data analysis, and monitoring for ecological effects of sustainable grazing practices are in development with partners at the Iracambi Field Station in the Brazilian rain forest, the James San Jacinto Mountains and Oasis de los Osos Reserves, affiliated with the University of California-Riverside and statewide biological reserve system, and the Centro de Investigaciones Científicas de las Huastecas "Aguazarca" (CICHAZ), biological research station in Calnali, Hidalgo, Mexico.

Through these research alliances, students, interns and faculty alike may participate in collaborative data collection, analysis and field station exchange experiences in the months and years to come. The partnership with Iracambi emphasizes the data management and informatics strengths of Lakeside researchers. The project scopes with the James Reserve and CICHAZ afford Lakeside researchers the opportunity to compare grazing regimes and related sustainability efforts in two distinctively different ecoregions that rely heavily on agriculture for economic viability.

OBFS

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

Jamie Skow (Iowa State University graduate and Green Iowa AmeriCorps member) assists with a Blanding's Turtle tracking project.

Career-Ready Skills

Career-ready skills are practical, hand's 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

Thirty-five students participated in an internship at Lakeside during the summer of 2022. The goal of the internships are to build practical skills that prepare students for their chosen career or for graduate school applications. All interns were offered an opportunity to participate in or lead a research project. In addition to research, intern work included environmental education programming, public relations and marketing, aquatic invasive species education, land stewardship (invasive species removal, trails maintenance, controlled burns, etc.) and water monitoring. Interns complete exit interviews at the end of their term. Comments on their experience underscore the importance of building skills that are difficult to obtain.

"Lakeside opened up a door for so many possibilities for research. The instructors and the faculty will do whatever they can to support you in your future endeavors".

~Mikaela Lunsford, University of Iowa

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, Sustainable Schools and Land and Water Stewardship. Lakeside Lab serves as a host site for Land and Water Stewardship members. In 2022, Lakeside hosted two eleven-month members and five summer members. Projects included turtle tracking, water monitoring, land stewardship and environmental education. Members come from various institutions including Regents Universities and community colleges. Ages range from college freshman to recent graduates with an emphasis on building career ready skills.

"I moved to Iowa Lakeside Lab because I wanted to do something different. Lakeside has given me the experiences I needed to get my dream job, being a volunteer in the Peace Corps. Thanks to my time here, I leave to be an agricultural sciences promoter in Paraguay in September. I fully believe that if I had not come to Lakeside, I would not have gotten this job."

~ Natalie Schwarz, Green Iowa AmeriCorps Member, Graduate of Westminster College, Ohio.

Research

Mikaela Lunsford (University of Iowa) collects soil samples at Neppl Fen, part of a multiyear project to document fen restoration in Northwest Iowa.

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.

A short synopsis of student research is provided in the next section.

Scientist-in-Residence Fellowship

The Iowa Great Lakes community is keenly interested in supporting research aimed at understanding local resource issues. 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. Funding for the program is provided by the Friends of Lakeside Lab.

A short synopsis of the Scientist-in-Residence Fellowship research is provided in the next section.

Student Research

FY 2022 Projects

- Ashley Kleve (Iowa State University) Hydrologic Response to Fen Restoration
- Olivia Miller (Iowa State University) Crayfish Food Preference in NW Iowa.
- Jamie Skow (Iowa State University) Groundwater Monitoring in the Iowa Great Lakes
- David Hebrink (University of Iowa) Modeling of Urban and Nonpoint Source Pollution to Milford Creek
- Krishna Akondy (University of Iowa) Public Health Assessment of Non-State Owned Beaches
- Irvin Alcaraz (University of Iowa) Blanding's Turtle Tracking & SCUBA Assessment of Lake Bed Disturbance
- Alex Hawthorne (Iowa State University) SCUBA Assessment of Lake Bed Disturbance
- Jace Bell (University of Northern Iowa) Fireworks and Lake Water Quality
- Bennett Fate (Iowa State University) Nutrient Enrichment in Prairies
- Sarah Orr (Iowa State University) Nutrient Enrichment in Prairies
- Mitchell Griffin (University of Iowa) Bur Oak Blight
- Michael Steele (University of Northern Iowa) Development of Low-Tech/No Tech Videos
- Bailey Bergman (Upper Iowa University) Development of Low-Tech/No-Tech Videos
- Mikaela Lunsford (University of Iowa) Development of Low-Tech/No-Tech Videos
- Emma Cody (Iowa State University) SCUBA Assessment of Lake Bed Disturbance
- Lauren Pearson (University of Iowa) Bur Oak Blight
- Mattie Snyder (Luther College) Potential Establishment of an Environmental Education Hub in Des Moines
- Grace Parrott (Luther College) Potential Establishment of an Environmental Education Hub in Des Moines

Student Research continued

FY 2022 Projects

- Mari McClure (Northern Michigan University) Pollinator Habitat Assessment
- Megan Weinberger (University of Iowa) Bur Oak Blight & Insect Gall Presence in Prairie Species
- Lien Tran (University of Iowa) Fireworks and Lake Water Quality
- Amanda Caraballo (University of Iowa) Invasive Species in Restored Oak Savannah & Harmful Algal Bloom Monitoring
- Ellie Jones (Coe College) - Tributary Monitoring of the Iowa Great Lakes & Recreational Assessment of Miller's Bay
- Natalie Schwarz (Westminster College) Development of Youth Education
- Clinton Sabers (Fox Valley Technical College) Blanding's Turtle Tracking & SCUBA Assessment of Lake Bed Disturbance
- Mark Gottemoller (Iowa State University) Nutrient Enrichment in Prairies
- Mainul Islam (University of Iowa) Bur Oak Blight
- Jamie Tigges (University of Iowa, B.S. 2019) Nesting Success for Purple Martins in Okoboji, IA.
- Joseph Rabaey (University of Minnesota) Environmental Data Initiative—Iowa Great Lakes Buoy Synthesis
- Austin Holland (University of Iowa, Ph.D. candidate) Conservation Decision-making in the Iowa Great Lakes.
- Drew Hutchinson (University of Iowa, M.A. 2020) Virtual Campus and Digital Library

Students completing research projects during the summer of 2022 presented results at a research symposium on August 4, 2022.

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 third year and has expanded to include mentoring undergraduate research projects and developing career ready skills for interns. Dr. Kauten's research in 2022 has focused on three main projects: Milford Creek Watershed Analysis, An Assessment of Recreational Conditions in the Iowa Great Lakes Region, Trends Analysis in Lake Monitoring Data. Publications from these projects are in process with undergraduate students as co-authors on all of the papers.

Career-based skill development for interns prepares students for the next phase of life. Students learn project management, data management, field data collection, equipment troubleshooting and maintenance, communication and reporting skills. Lakeside Lab is building partnerships with agencies currently experiencing staffing shortages to assist with critical project needs.

Iowa Lakeside Laboratory students assisting state ecologist John Pearson with a systematic floristic inventory of Kirchner Prairie, Clay County, IA

Community Engagement

Dr. Rebecca Kauten, Lakeside Scientist-in-Residence, explains results from water quality monitoring during a field tour.

Value to the Iowa Great Lakes

STEM Education

Life-Long Learning

Community Technical Assistance

Arts and Culture

STEM Education

Students try their hand at shelter building as part of "School of the Wild". This innovative program immerses students in outdoor learning using an interdisciplinary philosophy. The program was developed by The University of Iowa and is expanding to schools across the State. Staff from Iowa Lakeside Lab along with ISU Extension and Dickinson County Nature Center are offering the program to Northwest Iowa elementary school students.

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.

Students learn about jobs in fisheries as part of a career day at Lakeside Lab.

Formal School Year Programs: Fall 2021 – Spring 2022

1456 total students served

Total numbers were lower due to Covid restrictions in the fall of 2021.

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

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

421 students participating (includes camps offered with Okoboji Sailing School. Iowa State Extension and Iowa Great Lakes Fishing Club)

"Girls in science camp allowed my daughter to explore potential careers that she had no idea existed. She's 13, but thinking that she wants to major in science in college after this experience." ~ Heather

Life-Long Learning

Megan Weinberger (University of Iowa) shares research on Bur Oak Blight with community members at the Blue Water Festival in Okoboji.

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. Visitors can access information regarding the campus using a virtual tour guide: https://lakesidelabdigitallibrary.org/view360/waittTour/index.html. Lakeside secured an Iowa Department of Natural Resources REAP-CEP grant to give teachers in STEM fields tools to engage students using low-tech/no-tech activities. Each activity is accompanied by a short video, which explains the topic and activity. Videos are available on Lakeside's YouTube channel and cross referenced to make them searchable: https://www.youtube.com/channel/UCq1GAng0kMoYp33W61r2DEw/videos

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 includes both field tours of water quality best management practices and formal presentations. The conference also serves as a forum to share research conducted by Regent faculty and students with community members in Northwest Iowa. Lakeside interns presented research on Bur Oak Blight, Land Use changes in the Iowa Great Lakes Watershed, Carbon Sequestration and LiDAR in Natural Resource Management.

Tuesday Night Lecture Series

Lakeside Lab sponsors a Tuesday Night Lecture series from mid-May to early August. Fifteen speakers brought unique and informative presentations to a delighted audience. Topics ranged from raising crickets for human consumption to the interconnection of public health and river basin development in Egypt. 1500 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 hand's on methods. Two hundred and fifty six participants attended sessions ranging from amphibians to star gazing. 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.

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.

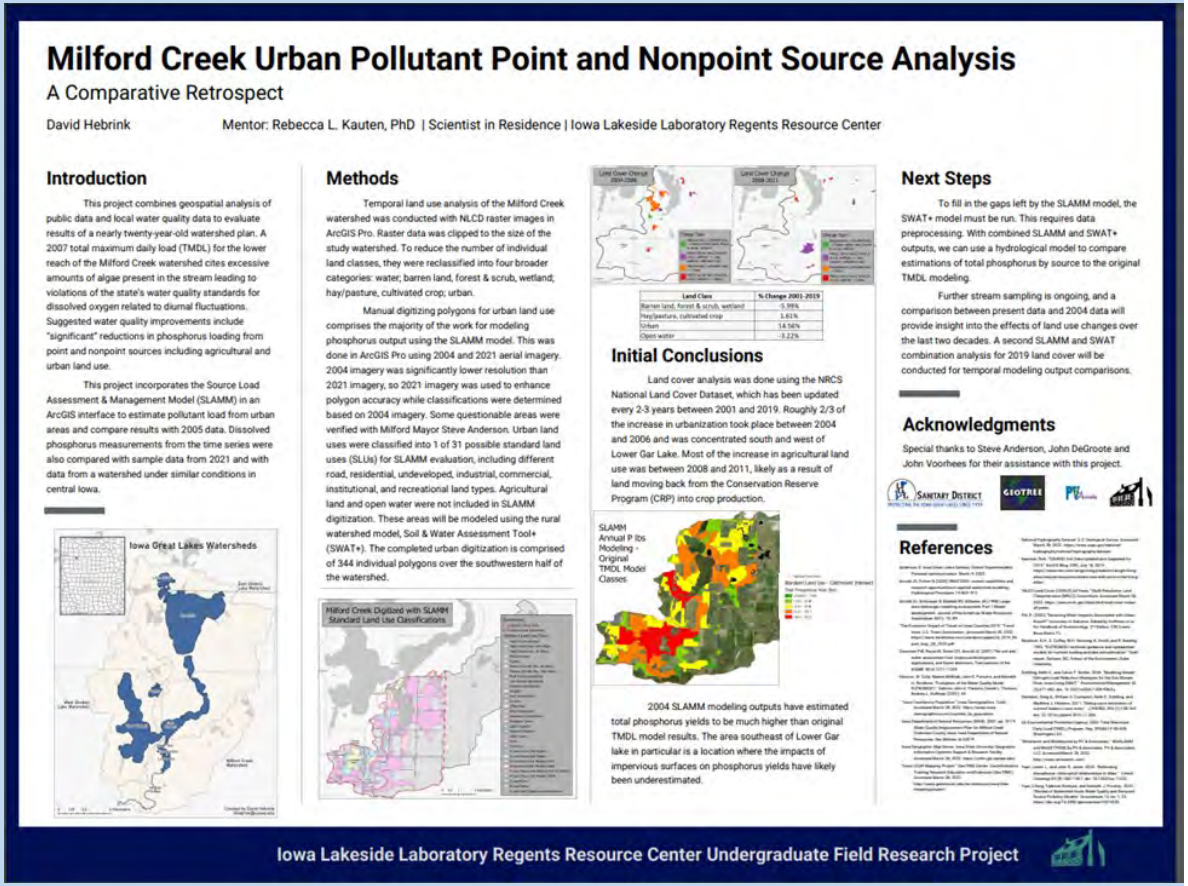
Bur Oak Blight

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 on the sources of phosphorus to the Milford Creek in Dickinson County.

Arts & Culture

Artist-in-Residence (AIR) and Writers-in-Residence (WIR) programs connect humanities professionals to the students and faculty at Lakeside. The program aims to create opportunities for collaboration, partnership, and reflection between artists, scientists, and community members. Artists are encouraged to interact freely with scientists, field courses, local residents, and visitors. A high priority of the program is exploring relationships between art and science. Six artists and four writers completed residencies at Lakeside Lab in 2022.

2022 Artists

Julia Bianco, Argentina

Mariceliz Pagán Gómez, Puerto Rico

Zahra Jewanjee, Pakistan & UAE

Dayna Kriz, Umoⁿhoⁿ, Póⁿka, Mes-kwaki, and Ho-Chunk nations

Austin Stewart, Ames, IA

Sharon Stewart, Ames, IA

2022 Writers

Zachary Calhoun, Iowa State Univer-sity

Natalie Deam, Iowa State University

Okwudili Nebeolisa, University of Iowa

Taylor Sklenar, Iowa State University

University of Iowa - Grant Wood Art Colony Fellow Elena V. Smyrniotis installed her exhibit "The Bee Project" at Lakeside in 2022. Left: The exhibit encircles a bur oak on campus. Right: Information on the "The Bee Project" instructs visitors how to create their own bee using found objects. For more information: https://grantwood.uiowa.edu/TheBeeProject

Budget Review

IOWA LAKESIDE LABS REGENTS RESOURCE CENTER	FY18 Actual	FY19 Actual	FY20 Actual	FY21 Actual (Grants Included)	FY22 Actual (Grants Included)	FY23 Budget (Grants Included)
REVENUE						
Carry forward	35,621	98,576	154,203	136,276	379,329	172,635
Regent university allocation	592,061	598,778 [2]	592,061	592,061	592,061	592,061
Room and Board	39,206	78,007	15,196	38,773	54,259	50,000
Center revenue	126,704	106,426	67,045	146,281	142,340	95,000
Friends & Other Support (grants)	100,333	102,337	95,772	248,714	187,498	190,130
TOTAL REVENUE	**893,925**	**984,123**	**924,277**	**1,162,104**	**1,355,487**	**1,099,826**
EXPENDITURES						
Salaries and benefits	506,152	497,618	441,813	504,950	639,826	663,723
Travel and hospitality	55,288	53,283	27,759	21,518	69,309	65,000
Supplies and Other	29,708	31,166	24,105	19,437	66,225	45,000
Utilities	63,110	74,914	71,778	55,067	80,559	85,000
Maintenance and repairs	91,468	100,491	193,816	109,478	183,491	161,253
Equipment	3,867	34,252	20,291	26,663	86,433	20,000
Marketing	999	889	611	399	150	2,000
Scholarship Expense	44,756	37,309	9,988	45,264	56,859	57,850
TOTAL EXPENDITURES	**795,349**	**829,921**	**790,161**	**782,774**	**1,182,852**	**1,099,826**
NET BALANCE	**98,576**	**154,203**	**134,116**	**379,329** [3]	**172,635**	**-**

[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)

The FY21 carryover was used to upgrade the IT infrastructure in 2022. The remainder of the carryover will be applied to critical maintenance issues in FY23.