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Lakeside 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.
Aquatic Ecology student sets a trap to collect crayfish in a NW Iowa wetland.

**The Year in Review**

*Highlights from 2021*

Iowa Lakeside Laboratory returned to in-person classes in 2021 and the response was overwhelmingly positive. Enrollment in summer courses this year was the highest recorded over the past five years. A few factors contribute to these enrollment numbers. A record number of students were able to secure internships with Lakeside in 2021. The majority of these interns also registered for a class to optimize their time on campus. Additionally, several students opted to stay for a second session course due to the positive relationships they had built with the faculty and other students. Lastly, enrollment numbers were enhanced by a few on-line courses. Growth in enrollment beyond 2021 numbers will be challenging since the Lakeside campus was at or above capacity the entire summer. Goals for 2022 will include an evaluation of expanding courses and internships into the fall and spring months.

Students continue to be drawn to the foundational courses: Ecology, Aquatic Ecology and Field Archaeology. These courses often have significant waitlists and we will examine ways to accommodate more students in 2022. A new course, Introduction to Research and Inquiry, was offered in response to the number of students expressing interest in undergraduate research. The course served as a two-week orientation for students intending to participate in research projects during the summer. The course focused on helping students define research questions, determine achievable outcomes for a summer project, formulating the appropriate methodology to collect data and linking data assessment methods and reporting results to their initial question.

On-line courses included: Ecology and Systemics of Diatoms, Algae, Glacial Geology and Environmental Geology. The on-line courses remain in the course offerings since they offer the opportunity for students around the world to participate in highly specialized topics such as the taxonomic identification of diatoms and algae. By structuring the courses to have both synchronous and asynchronous elements, professionals are also able to attend these courses. For example, the Glacial Geology and Environmental Geology course was held in a hybrid model that allowed students to attend on campus, but also allowed for teachers to earn continuing education credit toward licensing requirements.

*Everything that I learned in my previous classes came together at Lakeside. Being in the field helped me prepare me for the my next steps in my career.* ~ Jamie S., Prairie Ecology, 2021
Student Success

Ashley K., sophomore and first generation student at Iowa State University, assists with research on purple martin nesting success in the Okoboji region.

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-four students participated in an internship at Lakeside during the summer of 2021 and is triple the number of interns hosted in 2019. 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. 95% of the interns chose to participate at some level in research and a list of their projects is provided in the next section. 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.

“Within the infinite amount of experiences and knowledge that I have gained at Lakeside Lab, I believe the most impactful moments come when I can sit alone with my thoughts looking out at West Lake on the dock. Most of the time, I think about how much I enjoy doing my research and how this has encouraged me to pursue grad school”

~ Ashley K., Iowa State University

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. In 2021, Lakeside hosted two full-time members and six summer members. Projects included water monitoring, invasive species control, land stewardship, environmental education and stormwater assessment. Members represent a spectrum of students from various institutions including Regents Universities and community colleges. Ages range from freshman to recent graduates.
Research

Wren R. (University of Iowa, B.S. Biology Major, M.A.T (4+1) Science Education) evaluates the restoration success of a fen near Estherville, IA.

Research was conducted in partnership with the Iowa Department of Natural Resources and the U.S. Natural Resources Conservation Service.

Student Research

Undergraduate research continues to be a focus for Lakeside. In 2021, the majority of interns and students expressed interest in being part of a research project. Students were mentored either 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 through a REAP-CEP grant, 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.
FY 2021 Projects

- Olivia Calvin (Coe College) received the James W. Cravens undergraduate research fellowship. Oliva examined the recreation pressure in the Iowa Great Lakes.

- Ashley Kleve (Iowa State University) investigated the hydrologic response in a restored fen near Estherville, IA.

- Wren Renquist (University of Iowa) developed a floristic inventory to assess fen restoration near Estherville, IA.

- Emma Cody (Iowa State University) examined changes in zooplankton population dynamics related to zebra mussel invasion in West Okoboji Lake.

- Emma Onstad (Iowa State University) evaluated dung beetle food preference in Northwest Iowa.

- Ross Fix (University of Iowa) investigated policy approaches for watershed improvements using two case study watersheds in Iowa and Wisconsin.

- Madeleine Sarasio Meyer (Truman State University) revisited the initial watershed plan for Milford Creek, comparing spatiotemporal datasets.

- Emmeline Kraus (Iowa State University) assisted with research evaluating purple martin nesting success in NW Iowa.

- Ashley Brent (Iowa State University) measured the performance of biochar as a nutrient reduction tactic for freshwater ecosystems.

- Jamie Skow (Iowa State University) investigated the history of the Union Slough wetland complex.

- David Hebrink (University of Iowa) used drones and remote sensing technology to develop maps of vegetation restoration at a fen near Estherville, IA.

- Leah Albers (University of Iowa) completed an assessment of the public health outcomes regarding beach monitoring strategies in Okoboji, IA.

*Picture: Oliva Calvin (Coe College, B.S. Math, 2022) conducts tests on a water sample to determine the effectiveness of biochar on removing nutrients.*
FY 2021 Projects

- Mari McClure (Northern Michigan University) examined the cultural history of NW Iowa and eastern South Dakota.
- Tucker Diveley (University of Vermont) researched mollusk population changes in the Iowa Great Lakes.
- Susan Hill (Allegheny College, B.S. Environmental Science 2021, Green Iowa AmeriCorps member) investigated pollinator friendly lawn practices.
- Charity McDaniel (Iowa State University) assisted with research on purple martin nesting success in Okoboji, IA.
- Jamie Tigges (University of Iowa, B.S. 2019) investigated nesting success for purple martins in Okoboji, IA.
- Joe Mohan (University of Maine, Ph.D. candidate) received a Becker Family Graduate Research Fellowship in 2020. Joe’s research is a synthesis of diatom data collected at the Ashfall fossil beds in order to reconstruct the paleohistory of the area.
- Austin Holland (University of Iowa, Ph.D. candidate) received the Becker Family Graduate Research Fellowship in 2020. Austin is examining the conservation decisions in the Iowa Great Lakes and factors that motivate individuals and organizations to engage in conservation.
- Drew Hutchinson (University of Iowa, M.A. 2020) is creating a virtual Lakeside campus using a 360 degree camera and drone photography. The virtual campus can be used by students, visitors or researchers to see campus features remotely including unique plant species.
- Travis Scheirer (University of Iowa, B.A. 2018) is evaluating the impacts of grazing strategies on water quality in Judd Wildlife Area.

Students completing research projects during the summer of 2021 were encouraged to present and/or publish their results. Lakeside hosted a research symposium at the end of the summer to provide students an opportunity to communicate their results to donors and to the community. Several students completed posters to share at their home institutions. A few students submitted their research for publication in national and international journals.

*Picture: Student measures dissolved oxygen using a water quality sonde.*
Scientist-in-Residence

Scientist-in-Residence Post-Doc

Dr. Rebecca Kauten (University of Iowa, Ph.D. 2019: Geographical and Sustainability Sciences) is Iowa Lakeside Laboratory’s first scientist-in-residence (SIR) under a new program created in partnership with The Friends of Lakeside Lab. The fellowship is a post-doc position for early career scientists and start-up funds for their research. The SIR engages in research, which is has been identified as a priority for the Iowa Great Lakes. Additionally, the SIR mentors undergraduate research projects and conducts outreach and education activities for the community.

Dr. Kauten is entering her second year as the Lakeside SIR and continuing her research on recreation pressure on the Iowa Great Lakes and ecological restoration projects including the Neppel Fen restoration. Dr. Kauten is currently supervising two honors thesis projects for students, which is a continuation of the research they started during their time at Lakeside in 2021.

Top: Analysis of community survey data regarding perspectives on recreation in the Iowa Great Lakes.

Left: David Hebrink (University of Iowa, B.S. Environmental Sciences Biosciences, 2023) uses the Lakeside drone to map the Neppel Fen near Estherville, IA.
Community Engagement

Value to the Iowa Great Lakes

STEM Education

Life Long Learning

Community Technical Assistance

Citizen Science

Arts and Culture

Summer camps promote informal science education and inquiry for students in grades K-12.
Our granddaughter loved every minute and made us go to ‘frog camp’ when she came home each day.

~ Charlene

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.

Left: Students work on observing and sketching features based on observations; Right: Student uses a key to identify a prairie plant specimen.

School Year Programs: Fall 2020 – Spring 2021

1150 total students served

Total numbers were lower in 2021 due to Covid restrictions in many schools.

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

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

118 students participating (includes camps offered with Okoboji Sailing School)

“Our granddaughter loved every minute and made us go to ‘frog camp’ when she came home each day."

~ Charlene
Life Long Learning

Lakeside sponsors events to promote stewardship of the Iowa Great Lakes. Regular trash removal events not only clean the lakeshore of unwanted garbage, but give people a chance to see the lake ecosystem from different perspectives.

Self-guided Inquiry

Based on the success of Lakeside’s 2020 Daily Nature Video series, Lakeside staff secured an Iowa Department of Natural Resources REAP-CEP grant to create a series of low-tech/no-tech science videos. These videos are an informal and engaging way for students of all ages to learn science and math topics using nature as the teacher. Videos will freely available on Lakeside’s YouTube channel and cross referenced to make them searchable.

Prairie Lakes Conference

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. The 2021 conference was held on August 5-6th and featured speakers on changes to the Iowa Great Lakes water quality, oak savannah restoration, blue-green algae monitoring, fen wetland restoration, shoreline protection and more. This year, the conference was live-streamed on Facebook Live. Adding a virtual component allowed more than 5,000 views of the presentations.

Tuesday Night Lecture Series

The Tuesday night lecture series returned in 2021. Fifteen speakers presented on topics ranging from Inkpaduta and the environmental history of the Iowa Great Lakes to Solar Energy. Topics such as “Did Dinosaurs Pee?” engaged learners of all ages. More than 2000 people attended the lectures in person, while another 4,000 watched the presentations on Facebook Live.
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.

**Habitat and Shoreline Restoration**
Developing, implementing, and monitoring habitat and shoreline restoration projects to protect water resources and the environment.

**Stormwater Management.**
Documenting stormwater management practices and maintenance of those practices for the Dickinson County Clean Water Commission.

**Curlyleaf Pondweed Management Task Force**
Working with the community to develop strategies to manage excessive aquatic plant growth in the Iowa Great Lakes.

*Left: Water quality buoy on Big Spirit Lake measures wave height along with water quality.*

*Right: Water at the bottom of the lake is devoid of oxygen in late July. Fisheries biologists use this information to understand and manage for sudden fish die-off events.*
The Cooperative Lakes Area Monitoring Project (CLAMP) is a volunteer lake monitoring program started in 1999. Volunteers collect water samples throughout the summer on nine lakes in the Iowa Great Lakes. The goal of CLAMP is to provide long-term monitoring data for resource managers, communities impacted by the lakes, and to educate local citizens about lake ecology. Forty-five volunteers collected water samples from early June through September in 2021 and dedicated more than 300 hours to the program.

New in 2021, Lakeside piloted a Bur Oak Blight assessment program. Based on the research of ISU scientists, the Bur Oak Blight (BOB) program allows citizens to visually assess the status of blight in their oak trees and track the progress of the disease through time.

*Left: CLAMP volunteer monitors Center Lake for water quality. Right: Volunteer assesses a Lakeside Bur Oak for severity of blight infestation.*
Arts & Culture

Arts and Culture are an integral piece of the education and outreach efforts at Lakeside. Artist-in-Residence and Writers-in-Residence programs connect early career humanities professionals to the students and faculty at Lakeside. These rich interactions promote greater understanding of the world and foster creative thinking that builds problem solving skills. New in 2021, Imagine Iowa Great Lakes partnered with Lakeside to offer a Public Artist-in-Residence program. The Public AIR program focused on bringing an appreciation of the natural world to the Iowa Great Lakes community. The competitive selection process shifted through applications from artists around the world and the residency was granted to Space Saloon, a global art collaborative focused on interactive design. For more information on the project, visit https://spacesaloon.com/The-Ripple-Effect.

Pop-up art installations were located in a variety of settings around the Iowa Great Lakes. The short-term installations focused on creating interactive experiences between community participants and nature. Left: A sound-scape installation invited families to sit and listen to the sounds of nature. Right: Space Saloon poster of art installations overlaying a map of the Iowa Great Lakes.
### Budget Review

The FY21 Carryover is due to several factors including outstanding grant funds and maintenance delays due to Covid supply issues. The majority of the carryover will be applied to critical maintenance issues including overdue network upgrades in FY22.

<table>
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<tr>
<th>IOWA LAKESIDE LABS REGENTS RESOURCE CENTER</th>
<th>FY17 Actual</th>
<th>FY18 Actual</th>
<th>FY19 Actual</th>
<th>FY20 Actual</th>
<th>FY21 Actual</th>
<th>FY22 Budget</th>
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<td>Carry forward</td>
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<td>154,203</td>
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<td>598,778</td>
<td>592,061</td>
<td>592,061</td>
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<td>Center revenue</td>
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<td>Maintenance and repairs</td>
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1. Improvement costs donated hours: FY15: $127,785, FY16: $108,180, FY17: $74,833
2. Includes one time GEF proceeds for fire damages
3. FY21 includes Friends of Lakeside Lab funding transitioning to grant reporting. Outstanding grant funds are included in this Net Balance (adjusted after the grant/calendar year is completed)