

# 2020-21 ANNUAL REPORT



W.K. Kellogg  
Biological Station  
MICHIGAN STATE UNIVERSITY



# HERE FOR THE LONG HAUL



DEAR FRIENDS AND NEIGHBORS,

We're approaching the end of a year that bears the imprint of a still-active pandemic while also revealing glimmers of more familiar routines. Looking back on the past year—my second as director of the W.K. Kellogg Biological Station—I'm reminded of how our long legacy of excellence in research and community engagement has sustained us through challenging times and propels us toward a bright future.

If you grew up in the area, you may have longstanding ties to KBS. You might have frequented the Kellogg Bird Sanctuary as a youngster, returning as an adult with your own children. Maybe you've noticed research experiments set up on the shores of Gull Lake, just north of the instantly recognizable windmill, or the neatly shaped plots of switchgrass along 40th Street. Maybe you've attended weddings or dinners at the Kellogg Manor House.



KBS has a long history of groundbreaking aquatic research, some of which began decades ago and continues today. Inquiries into how factors like groundwater and invasive species impact toxic algal blooms in Gull Lake are two examples. A 45-year-old study of turtle populations in nearby Garside Marsh is another.

Our commitment to education and outreach—to the general community and K-12 students in particular—also is longstanding. I'm tremendously proud of our staff and students who design and facilitate this programming for nimbly adjusting to the changing needs of our greater community during a time of increased isolation for us all.

I hope you enjoy reading some of the highlights from the past year, and I look forward to seeing you at the Station.

With gratitude—  
**Fredric Janzen**  
KBS Director

# GOING WITH THE FLOW

THE KBS LEGACY OF EXCELLENCE IN AQUATIC ECOLOGY RUNS DEEP.

On a summer day, more than five decades ago, a graduate student conducting research at KBS pulled a turtle out of nearby Sherriff's Marsh, gently marked a number on its underside and returned it to the marsh. That act of curiosity about the lives of turtles there set off a research project that continued for 35 consecutive years.

**Thanks to that long-term data, and a return to capture-and-mark data collection in 2018 at the site—by then known as Garside Marsh—we know that some turtles marked more than 40 years ago are still living there.** That study continues today under the auspices of **Dr. Sarah Fitzpatrick's lab.**

The Garside Marsh study is just one example of the type of locally and globally relevant research that KBS scientists have been pursuing in aquatic ecosystems for decades.



**TOXIC ALGAE MONITORING STUDY ON GULL LAKE**

In the 1990s, the zebra mussel was first observed in Gull Lake. **Dr. Stephen Hamilton** and some of his colleagues began studying the invasive shellfish and looking at connections to toxic algae, which also had increased in the lake. Some 20 years later, in 2010, a mass die-off of zebra mussels in Gull Lake presented an opportunity to further test that relationship—an experiment that would not have been possible without long-term data.



**FROM LEFT: J. WHITFIELD GIBBONS, BRENDAN REID**

**Aquatic ecologist Elena Litchman** came to KBS as an assistant professor in 2005. Since then, she's published foundational research on the structures within communities of freshwater and marine phytoplankton, which are microscopic algae. Continuing that research at KBS over nearly 20 years, **Litchman won the 2021 G. Evelyn Hutchinson Award**, which recognizes limnologists or oceanographers whose research has contributed significantly to the body of knowledge in their fields, and who are expected to continue legacies of scientific excellence.



**ELENA LITCHMAN**

Water has always been at the center of the KBS identity—as a defining feature of our landscape and at the heart of our research and conservation efforts. The KBS Aquatic Ecology Fund helps to ensure this important work continues in the future.

# SHARING OUR SCIENCE

FURTHERING OUR EDUCATION & OUTREACH MISSION WITH K-12 PROGRAMS.



Many of us can relate to having an experience as a young child that perseveres as a crystal-clear memory decades later. For nearly 30 years, KBS has been hosting unforgettable programs for kids and helping K-12 educators share science in classrooms indoors and out.

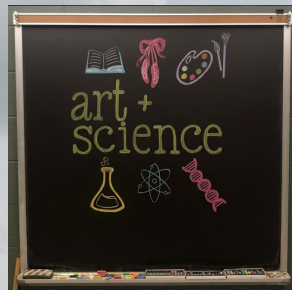


FROM LEFT: MELISSA KJELVIK & ELIZABETH SCHULTHEIS

**Data Nuggets, a project that has created free STEM classroom activities since 2011, was founded by Elizabeth Schultheis and Melissa Kjelvik**, both of whom conducted doctoral research at KBS. Data Nuggets lesson plans are used widely in K-12 settings and are part of an ongoing study that seeks to understand how

science instruction that contains diverse scientist role models affects student attitudes about science.

**The KBS K-12 Partnership, a professional learning program, brings together K-12 science educators, ecologists and environmental scientists to improve science teaching.** Educators participate and co-create content while earning stipends and continuing-education credits. This usually takes place in person, in the field at KBS, but last year programming shifted to an online format.



ART BY CORINN RUTKOSKI

Still, the K-12 Partnership team—**Kara Haas, Misty Klotz, visiting scholar Joelyn de Lima, and 2021-22 outreach fellows Kyle Jaynes and Elizeth Cinto Mejía**—was able to engage with teachers through meaningful explorations of science teaching and learning, including an impactful summer institute, which explored the intersection of art and science.

Another example of a quick pivot to online programming is the **Exploring with Scientists series, which was designed and launched during the pandemic.**

Geared toward upper-elementary and middle school students, Exploring with Scientists has been offered as a live, virtual field trip, a free asynchronous presentation, and a hybrid option. Students have a chance to interact with KBS scientists, learn about their research, and—perhaps most importantly—connect the dots and understand how people find and follow a path to a career in ecology.



ELIZETH CINTO MEJÍA

We're fortunate to have so many graduate students at KBS who share our passion for teaching and communicating science. Because of them, Exploring with Scientists will be back with new content in spring 2022. We're grateful for their work, which broadens access to research experiences for all.

We invite you to join us this coming year to learn more about ecology. Visit [kbs.msu.edu/events](https://kbs.msu.edu/events) to find programs, in-person and virtual, for children and adults.



## **MAKING CONNECTIONS BELOW THE SURFACE**

As part of the Fitzpatrick Lab at KBS, Ph.D. student Isabela Borges' research focuses on the evolutionary ecology of small populations. She's looking at the mutually beneficial relationship between plants and rhizobia, a nitrogen-fixing bacterium.

That research earned Borges two student research awards in 2021 from the American Society of Naturalists, the oldest scientific society dedicated to the study of ecology, evolution and behavior.

"Isabela's research addresses an important, and previously unexplored, link between evolution and ecology that may have major consequences for natural populations in fragmented environments," says Sarah Fitzpatrick.

**"That is, what happens to species interactions when habitats shrink and become more isolated?"**

The best time to transition to no-till farming practices may have been decades ago. The second-best time may be now. Recent research from KBS postdoc Sarah Cusser, faculty Nick Haddad and G. Philip Robertson, and others, highlight the importance of long-term agricultural and ecological research.

The study used nearly 30 years of data from annual cropping plots at the KBS Long-term Ecological Research program site to look at how employing continuous no-till versus conventional agriculture practices affect profitability and ecological health.

They found that continuous no-till management eventually resulted in increased values in yield and soil water availability, and that surveys of 10 years or less often returned conflicting results that were not representative of the longer-term benefits.

**Discoveries like this remind us of the critical role that long-term research plays in developing a deeper understanding of the world around us.**



## **TAKING A LONG VIEW ON NO-TILL FARMING**



## NEW ECONOMICS ON THE FARM

Soils store more carbon than trees, yet forested lands are the source of far more carbon credit sales than are agricultural fields.

Thanks to a new database of soil carbon levels created by KBS researcher and MSU Foundation Professor Bruno Basso with colleague Kristofer Covey, farmers will have a new tool to inform decisions on using sustainable agricultural practices, and opening the possibility of selling carbon credits.

**Samples collected through the project, My Soil Organic Carbon, or MySOC, will establish a national soil carbon inventory, the first of its kind.**

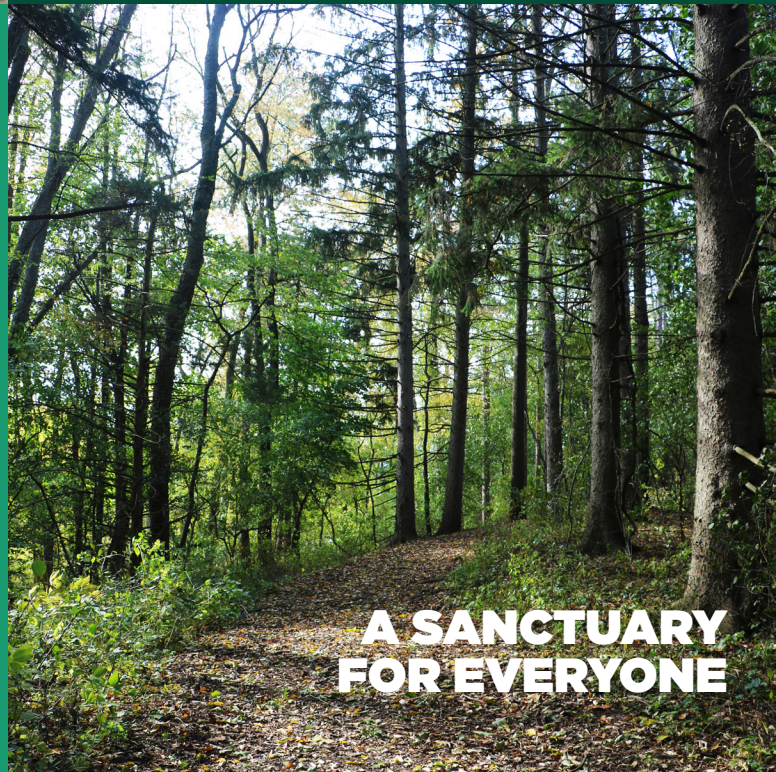
Basso has attributed the robustness of the modelling used in MySOC, in part, to the decades of data collected at the KBS Long-term Ecological Research site—the only LTER site in the nation focused on agricultural research.

The COVID-19 pandemic brought a renewed appreciation for the value of natural, outdoor, public areas.

Even in the earliest days, when storefronts were shuttered, offices empty, and events canceled, Bird Sanctuary, Manor House and KBS grounds staff worked to make sure our public, outdoor spaces remained open and accessible to all. These efforts came while also navigating school closures, children at home, stress and loss, like so many others in our community.

Their work has been deeply appreciated, by their colleagues at KBS and within the wider community. In 2020, despite the cancellation of in-person programs, the Bird Sanctuary saw a 27% increase in visitation over the previous fiscal year. Friends of the Sanctuary also stepped up to help fund bird care during a time of diminished revenue.

**We're so grateful to everyone who works to support Kellogg Biological Station.**



**A SANCTUARY  
FOR EVERYONE**

# THANK YOU

FOR YOUR GENEROSITY TO KBS IN 2020-21

Each year, contributions to KBS are made in memory or in honor of people whose lives have made lasting impacts. These gifts have been recognized in this list.

## In memory of:

1. Charles C. Ashley
2. Larry Beach
3. Nancy Bernard
4. Hazel Conrod
5. Thomas Dvorak
6. Richard Harwood
7. Gary Johnson
8. Laura Johnson
9. Leonard Matchinski
10. Roy O'Connell
11. Margaret Sisco
12. Bob Welker

## In honor of:

13. David Dvorak
14. Tiffany Greenfield
15. Lindsey Kemmerling
16. Patricia A. Werner, Ph.D.

## BECAUSE OF YOUR SUPPORT

The Bird Sanctuary was able to raise more than \$5,000 on Giving Tuesday 2020 to support the care of our resident birds.

On Give Green Day 2021, our original fundraising goal was exceeded by 200%.

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W.K. Kellogg  
Biological Station  
MICHIGAN STATE UNIVERSITY

3700 E. Gull Lake Dr.  
Hickory Corners, MI 49060

**ANNUAL REPORT WRITING & DESIGN:** CARA BARNES **PHOTOGRAPHY:** KBS FACULTY & STAFF, KBS ARCHIVES, BILL KRASEAN, LEA ROSELLI, KURT STEPnitz **EDITING:** SARAH CARROLL, FREDRIC JANZEN

## IN MEMORIAM



Over the past year, we said goodbye to two long-time researchers and members of the Kellogg Biological Station community.

Don Hall (pictured), freshwater ecologist and MSU professor emeritus of zoology, was one of the first resident faculty hired at KBS by then-Director George Lauff. He joined KBS in 1969.

Richard “Dick” Harwood MSU’s first C.S. Mott Chair of Sustainable Agriculture, created a long-term research project at KBS—the Living Field Laboratory, which ran from 1994 to 2014. In November 2020, a Bur Oak tree was planted in Harwood’s honor near the Long-term Ecological Research field lab.