Sea Grant Michigan

Upwellings

MARCH 2020

GET TO KNOW OUR GREAT LAKES STATE

MEET THE DIRECTOR

HIGH WATER // MICHIGAN'S THUMB

NATIONAL OCEAN SCIENCES BOWL // GREAT LAKES NEIGHBORS

BECOMING A YOOPER // STAFF AWARD // FUNDED RESEARCH

Meet Michigan Sea Grant's new director

By Thomas Johengen

I've served as Michigan Sea Grant's director for a little over three months, and every day I learn more about the incredible ways that MISG connects its research, communications, outreach, and education to support coastal communities and resource managers across the state. Having spent nearly 30 years as a research scientist focused on tackling some of the Great Lakes' most challenging issues — such as harmful algal blooms, hypoxia, and invasive species — I appreciate the commitment and expertise that MISG brings to connect this research to Michigan residents and decision makers. I am continually amazed by the organization's efforts to develop well-informed public stewards at all levels ranging from K-12 students, to resource managers, to legislative representatives. A perfect example of this is Extension Educator Brandon Schroeder, who was honored in February with a Michigan State University Distinguished Staff Award (see page 15).

As I begin my new position, I'm fortunate to lean on the experience and leadership that former Interim Director Catherine Riseng brings to the program. Catherine has expanded her role at MISG and now serves as both our research program manager and the assistant director for our Ann Arbor office. I commend Catherine on her steady leadership of the program during the past 16 months and for overseeing a successful national review of the program last summer. I appreciate her support and counsel as we continue expanding our program and its impact.

I also feel fortunate to have had several opportunities to represent our program at regional and national levels. A month before I officially started, I attended the biannual Great Lakes Sea Grant Network meeting in Sault Ste. Marie, hosted by MISG. The meeting provided an opportunity to meet many of our Extension staff, spend an afternoon with the seven other Great Lake program directors, and kayak through the Soo Locks with National Sea Grant Director Jon Pennock. You can't ask for a better meeting venue than that! At the national level, I attended the fall Sea Grant Association meeting in San Juan, Puerto Rico, where I met leaders from each of the 34 state programs. In addition, there were several open meetings with NOAA leadership to discuss budgets, annual reporting, national visioning efforts, and new research initiatives.

MISG has the pleasure of announcing our current round of funded research projects and graduate fellowships (see page 14). We were pleased with the number, quality, and diversity of proposals that we received. We are excited about a new regional collaboration with our sister Sea Grant programs at Wisconsin and Illinois-Indiana, focused on sediment transport and shoreline protection around Lake Michigan.

We are currently processing applications for two prestigious national fellowships: the NOAA Coastal Management Fellowship and the Knauss Fellowship. We have outstanding applicants for each program that we are excited to put forward for consideration. We wish those candidates the best of luck during the selection process and are confident that the host programs will be as excited about their applications as we are.

Thank you for your interest in the work of MISG and enjoy learning many more exciting details in this issue.

ABOUT TOM

Thomas Johengen began serving as Michigan Sea Grant's director on November 1, 2019. He continues working part-time as a research scientist at the Cooperative Institute for Great Lakes Research (CIGLR, formerly CILER) at the University of Michigan. His current grant projects include developing models to forecast the timing and impact of hypoxia in Lake Erie, and improving monitoring approaches to quantify harmful algal blooms and their associated biotoxins. He operates jointly out of Michigan Sea Grant's Ann Arbor office and the NOAA Great Lakes Environmental Research Laboratory, also in Ann Arbor.

Tom earned his Ph.D. at the University of Michigan, with prior degrees coming from Florida State University and Michigan State University.

Michigan prepares for another year of high water

"Buckle your seat belts."

That's what Michigan Sea Grant Extension Educator Mark Breederland says to waterfront communities anticipating another year of record-high Great Lakes levels. Buckle your seatbelts, batten down the hatches, and get ready for more erosion, flooding, and possible property damage in 2020.

For the past year, high water levels have been a topic of conversation, stress, and tears in communities around the Great Lakes.

Most of the Great Lakes' high water records were last set in 1986 and 1987. Fluctuations in water levels are normal with monthly, yearly, and sometimes decade-long cycles. But this time feels different. It took the lakes about three decades to dip down to their record-setting lows of 2013. After only six years, waters crested high enough in 2019 to break all-time records in Lakes Superior, Erie, Ontario, and St. Clair (with Lakes Huron and Michigan not far behind).

This year is shaping up to be another doozy. As of January 2020, the surface of Lake Michigan and Lake Huron (which hydrologically function as one body of water) sat about 17.5 inches higher than the previous year. Considering that every additional inch of these linked lakes corresponds to about 790 billion gallons of water, the sheer volume of extra water is hard to fathom.

The impact of this excess volume is all over the news: flooded docks, eroded dunes, collapsing roads and houses, inaccessible public spaces, and hits to waterfront businesses and economies. The contributing factors have been much discussed, as well. Climate change seems to be making the region wetter, and arctic air masses from previous winters have sheathed the Great Lakes in ice, preventing water from evaporating into the dry winter air. While climate scientists can't forecast exactly how climate change will affect the Great Lakes in the long term, these wild fluctuations might be here to stay.

Michigan Sea Grant has been one of the voices bringing this information to hard-hit coastal communities. Since last summer, Michigan Sea Grant Extension educators have teamed up with the U.S. Army Corps of Engineers and NOAA colleagues, including the National Weather Service, to present the latest science and resources at public meetings in towns like Manistee, Marquette, and Port Huron.

Mark Breederland, based in Traverse City, has hosted several of these meetings. "People want to know how the Great Lakes operate," says Mark. "They may not often think about the connectedness of these freshwater seas, which stretch all the way from Lake Superior to the St. Lawrence River. But they see the storms and power of the lakes — and now at high water levels, even smaller storm systems can cause great damage."

Elliot Nelson, educator for the eastern U.P., also ran a lake levels workshop last fall, and Martha Gerig, a new educator serving the western U.P., hosted a meeting this February.

The press coverage and high attendance at these meetings — both in-person and through online broadcasts — indicates that lake levels weigh heavily on many Michigan minds, and if the forecasts are accurate, that won't change much in 2020. Watch for upcoming community meetings with Extension educators at *michiganseagrant.org/events* and let us know if you'd like to have a meeting in your area. In the meantime, plenty of online resources can be found on Michigan Sea Grant's lake levels page at *https://bit.ly/2wAvTt5* and the U.S. Army Corps lake levels webpage at *https://bit.ly/3bRUGZG*

Exploring the Saginaw Bay area with Meaghan Gass

From the glittering blue waters of Grand Traverse Bay to the bustling Detroit River, Michigan Sea Grant Extension educators can be found living near the water in coastal communities around the state.

This not only helps them stay up to date with the challenges and opportunities of coastal residents — it also makes them experts on some of the state's most beautiful and engaging places to visit. Read upcoming issues of *Upwellings* for more features on the regions where our Extension educators live, work, and play.

If you look at the waving hand of Michigan's mitten, Saginaw Bay sits in the pocket between the forefinger and "Thumb." This large Lake Huron bay is home to sizable coastal wetlands, important migratory bird habitat, and lively fisheries. Along the coast and further inland, the Saginaw Bay region and Thumb are dotted with farm fields and bustling communities.

Since 2018, Meaghan Gass has served as Michigan Sea Grant's Extension educator for the Saginaw Bay area. Meaghan lives in Bay City, with offices in Bay City and Standish. She may be a recent transplant, but she's found lots to love about her new home.

Meaghan and her canine companion enjoy the Bay City Riverwalk, which runs along the Saginaw River where it cuts through downtown Bay City. Depending on the season, riverwalk travelers may encounter live music performances or displays by local artists.

Veterans Memorial Park on the river's west shore serves as a community gathering place — when it's not filling its dual role as a floodplain management tool. If the river rises, this low-lying property floods first, alleviating the risk of water damage to other city infrastructure.

This large Lake Huron bay is home to sizable coastal wetlands, important migratory bird habitat, and lively fisheries.

Bay City also offers plenty of indoor pursuits. The annual Hell's Half Mile festival is a four-day bonanza of independent films and music each September. Folks can also enjoy music, movies, comedy shows, and more at the quirky State Theatre, built in 1908 and remodeled in 1930 to resemble a Mayan pyramid. Before catching a show, Meaghan recommends the tasty, locally sourced fare at MI Table near the east bank of the river.

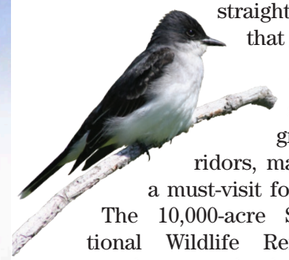
Outside of Bay City, the adventures continue. Meaghan points visitors to Bay City State Park, just downstream of town, for great hiking, camping, and swimming. Former rail lines have been converted into a trail network that links Bay City with nearby Saginaw and Midland. Visitors to Midland can explore Dow Gardens and Whiting Forest, which boasts a unique elevated boardwalk that brings visitors 40 feet up into the tree canopy. In Frankenmuth, raise a pint at Oktoberfest, take sides in the great chicken dinner restaurant rivalry, and pick up festive treasures at Bronner's Christmas Wonderland. Around Port Austin, find a burgeoning community art scene that includes colorful crosswalks and several painted barns tucked into the surrounding farmland. Pop by the Au Gres-Sims Schools, where students recently built a water-filtering rain garden on school property.

JULIAN

MICHIGAN MUNICIPAL LEAGUE

MICHIGAN MUNICIPAL LEAGUE

For fans of local produce, Meaghan recommends stocking up at Midland's great farmers market or filling a bucket with fresh blueberries in Tawas City (or any of the other u-pick farms around Bay County). Keep some cash on hand for impromptu stops at the area's wealth of fruit and veggie stands, where produce comes straight from the hands that grew it.



The Thumb sits along major migratory bird corridors, making the region a must-visit for bird watchers. The 10,000-acre Shiawassee National Wildlife Refuge maintains marshes, grasslands, and floodplain forests that provide crucial habitat for migratory waterfowl. Between the spring and fall migration seasons, a 6.5-mile self-guided auto route allows visitors into unique ecosystems at the heart of the refuge. Visitors and locals can also help these habitats thrive by volunteering at the refuge's Earth Day litter clean-up.

A visit to the Saginaw Bay area wouldn't be complete without some fish! Whether folks are looking to catch or eat fish, or if they're angling to learn more about the legacy and current state of fishing in the area, the Great Lakes Fisheries Heritage Trail website has a wealth of curated recommendations for museums, fish markets, research centers, and more. Visit *greatlakesfisheriestrail.org*.

As a Michigan Sea Grant Extension educator, Meaghan works with researchers and natural resource agencies to help boost the Bay's native fish populations. She's spreading the word about a new rocky spawning reef at the southern end of the Bay that provides a safe place for fish to lay eggs; find details at *michiganseagrant.org/saginawbayreef*. In the fall, she can often be found on the banks of a Saginaw Bay-area river, delivering baby lake sturgeon raised in hatcheries to their new homes. Stop by one of these riverside release events in August or September for a chance to meet and hold these incredible little fish.

The Bay supports a thriving fishery for walleye and perch available to recreational, commercial, and charter anglers. If the wintertime conditions are right, give ice fishing a try.

The Bay Port Fish Company has been fishing commercially since 1895. Today, the family-run business runs four boats in Lake Huron and Saginaw Bay. Meaghan suggests finding their fresh, smoked, and frozen fish in their Bay Port retail store or at regional farmer's markets during the warmer months. Visitors can also enjoy Bay Port Fish Company products at the annual August Fish Sandwich Festival.

The famous fish sandwich isn't the only food item celebrated with annual festivities. Sebewaing hosts a June Sugar Festival to honor the local sugar beet crop, and Caseville throws a Cheeseburger Festival (which, despite its name, leans more toward Jimmy Buffett than meaty sandwiches) each August.

Beyond fish and food, there are plenty of ways to explore Saginaw Bay's shores. Snap a photo nearly anywhere as the sun rises over the Bay, then end the day in Caseville to capture a watery sunset. Rent a kayak from Port Austin Kayak and paddle out for a photo at the iconic Turnip Rock. Snorkel, dive, or paddle over one of the region's shipwrecks, like the 1884 schooner *Dorcas Pendell* near Harbor Beach on the Lake Huron side of the Thumb (SCUBA-certified divers can check out Double Action Dive Charters). Au Gres' Riverside Park boasts a new universally accessible kayak launch so everyone can enjoy paddling the river and the Bay. While at the park, look for the new stormwater-friendly bioswale, due for installation this spring by students from Au Gres-Sims School District, who also constructed a rain garden at their school.

NATIONAL OCEAN SCIENCES BOWL

#GLBOWL

INSPIRING THE NEXT GENERATION OF WATER LEADERS

What do sea otters, meteorites, scurvy, and the speed of sound have in common? They're all topics studied by intrepid high schoolers competing in the annual National Ocean Sciences Bowl (NOSB).

NOSB is a national academic competition where teams of high school students compete for regional and national titles. The matches feature quiz bowl-stye rounds that test a team's ocean and Great Lakes knowledge. The wide-ranging questions cover everything from biology, chemistry, and geology to technology, history, and economics.

Michigan Sea Grant annually hosts the regional Great Lakes Bowl at the University of Michigan. This regional tournament draws teams from around Michigan to showcase what they've learned about the watery parts of our world.

HOW DOES THE COMPETITION WORK?

Each team includes four high school students. Teams come from high schools, homeschool groups, 4-H clubs, or any other setting where curious teenagers hang out. Groups are usually spearheaded by one or more adults who may be parents, teachers, club leaders, or academic coaches. Team coaches don't need an encyclopedic knowledge of marine and freshwater science and history — all they need is an ability to wrangle teens, help students access books and online materials, and get a working grasp of the competition rules.

"I always was interested in ocean science, but I didn't really gain a passion for it until we started competing in [NOSB]. I love working with my team, and we have a lot of fun."

Pearl Daskam, Cass City homeschoolers

Sue Steuver Battel leads a team of homeschooled high school students from Cass City, up in Michigan's Thumb. Michigan Sea Grant Extension Educator Meaghan Gass visited the students to talk about invasive species, and her casual mention of the Great Lakes Bowl fell on eager ears. "We knew next to nothing about ocean science. Our team was young so most of them hadn't even taken chemistry or physics yet. We did our best to prepare and they did well enough to want to do it again. We are adding a second team this year because they told their friends how fun it was."

The NOSB website contains a wealth of study guides, reading materials, sample questions, and other resources to help teams get ready for the big day. Michigan Sea Grant also has a library of useful textbooks and practice buzzer systems that coaches can check out during the year.

When the annual Great Lakes Bowl rolls around, the teams and coaches trek to Ann Arbor, with the option to come the night before — the program will pay for travel costs and hotel rooms. The Saturday competition begins with a round-robin set of face-offs. In each round, a flurry of multiple-choice queries is answered by whichever team is quickest to hit their Jeopardy-style buzzer. The rapid-fire quizzing is accompanied by written challenge questions that test teams' ability to analyze data and synthesize science and math concepts.

After the round-robin, teams enter an elimination bracket and compete until one team emerges as the year's champion. The winning team has the chance to compete at the national competition in April.

WHAT ARE THE BENEFITS OF COMPETING?

On one level, the rewards of winning are clear: top finishers in the Great Lakes Bowl can receive cash prizes, trophies, medals, or other benefits. National prizes have included cruises on aquatic research vessels, visits to scientific laboratories, lab equipment, scholarships, medals, and more.

But students don't have to win to reap the rewards of participating in NOSB. Being on a team looks great on a college or scholarship application and shows future employers that a student is curious, hard-working, and able to work well with others. Teachers and coaches might be

"I really enjoy [NOSB]. It's been able to create a community around me. I found really cool friends that I would never meet before."

Madison Patel, Dexter High School

able to use their work with NOSB to flesh out grant applications or qualify for awards.

At its heart, though, NOSB is about giving the next generation a passion for science, learning, and caring about the oceans and Great Lakes. Many students walk away from the experience with new dreams of studying marine biology, oceanography, or other STEM (science, technology, engineering, and mathematics) fields. They learn about fascinating creatures and habitats, ground-breaking scientific discoveries, and threats to the future of our planet's watery worlds.

Cheryl Wells recently retired from teaching at Dexter High School. She started a team in 1998 and continued coaching until 2015, taking 10 teams to nationals. "[NOSB] was a place for really bright students to find their niche," she says. "Many of these students have majored in marine sciences in college." Cheryl says that NOSB shaped her, too, calling it "a highlight in my career." She currently shares her passion for the ocean with senior citizens in her community's adult learners program — and her grandchildren's elementary classes.

Sue Steuver Battel can see the effects of NOSB on her homeschool group, too. "I love watching the students make connections between various disciplines. They're learning that physics and chemistry and biology and more all come together to help us understand our ocean environments. One of the students wants to be a marine biologist now and another wants to add environmental sustainability as a college minor. Mostly, I love watching their confidence grow."

In 2020, Sue and her co-coach brought two teams to the Great Lakes Bowl. "I'd encourage any 4-H club, homeschool group, or school teacher to just do it. Pull together a team of eager learners and see what they can do."

I'M INTERESTED IN STARTING A TEAM! WHAT'S NEXT?

- Contact Michigan Sea Grant!
- Get your team excited by visiting an aquarium or watching some ocean-themed documentaries.
- Start learning!
- Borrow buzzers and textbooks from Michigan Sea Grant as needed.
- Apply in December for the February competition.
- Not quite ready to compete? Michigan Sea Grant can help you and your team observe the competition to better prepare you for next year.

Check out the resources at:
michiganseagrant.org/nosb
nosb.org

THOUGHTS FROM CHERYL

- Feed stomachs as well as brains. Coordinate to have parents provide meals or snacks at team practices, or plan practice sessions at restaurants.
- Get students invested by having them write practice questions or teach a topic to the group.
- Connect science to culture — find learning opportunities in events like the Discovery Channel's Shark Week.
- Digital resources are great, but don't forget textbooks!

THOUGHTS FROM SUE

- In competition, students can use what they know to guess what they don't know.
- Get familiar with the buzzers. Practice with buzzers from Michigan Sea Grant and help students strategize when to buzz in.
- Encourage students to practice with their friends.
- Students might surprise you. Pull together a team of eager learners and see what they can do.

GLANSIS
GREAT LAKES
AQUATIC NONINDIGENOUS SPECIES
INFORMATION SYSTEM

GREAT LAKES WATER LIFE

Getting to Know Our Great Lakes Neighbors

LEARN MORE ABOUT THE BIODIVERSITY IN THE GREAT LAKES WITH GREAT LAKES WATER LIFE AND GLANSIS

By El Lower and Rochelle Sturtevant

A first-grade student asks his teacher if sharks live in the Great Lakes. An angler pulls up a strange-looking fish she's never seen before in her favorite fishing spot. A high school student gets assigned a science project about zebra mussels in Lake Michigan. A researcher is tracking the spread of an invasive aquatic plant and needs to find a map of where it's been spotted through the years. Where can each of these folks go to learn more about the creatures that live in the Great Lakes region?

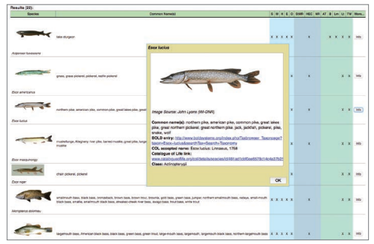
The biodiversity of the Great Lakes has inspired both scientific research and public interest for centuries, and in a changing ecological landscape, it's more important than ever for both scientists and citizens to get to know the flora and fauna in their communities.

Michigan Sea Grant staff, along with researchers at the NOAA Great Lakes Environmental Research Laboratory and a team of regional partners, support two comprehensive databases featuring the aquatic plants, animals, and microorganisms of the Great Lakes. The Great Lakes Water Life database hosts basic information on all aquatic species found in the region, while the Great Lakes Aquatic Nonindigenous Species Information System provides more in-depth information on nonindigenous aquatic species, including those that have harmful impacts.

WHAT IS GREAT LAKES WATER LIFE?

The recently-launched Great Lakes Water Life database (GLWL) is a comprehensive, accessible inventory of aquatic species native to the Great Lakes region. GLWL is designed to support environmental researchers and managers by hosting a broad range of ecological information and tools, including identification guides for native species, records of rare or unfamiliar taxa, lists of expected species in a specific area, summaries of broad-scale biodiversity patterns, and more. This site is also available for public use to students, citizen scientists, and other Great Lakes residents who want to learn about native species in their area, providing new opportunities for outreach and education online.

That elementary school teacher wanting to check for sharks can use Great Lakes Water Life to search for a list of fish and pull up common names, photos, and locations that each native species has been found in — and can reassure her students that out of the 178 fish species native to the basin, none of them are Great Whites.



Lots of native species, but no sharks here.

GLWL allows users to search for species by taxa, origin, domain, and broad geographic location. Click the 'info' button and each species result links to taxonomic information, a bibliography of references and sighting information, links to Barcode of Life DNA markers, and more. The database also includes links to other taxonomic keys and field guides to native species, information about the purpose and history of this project, and a user contribution portal where researchers can share new photos, sightings, and collection records to be added to the site.

WHAT DOES TAXONOMIC INFORMATION INCLUDE?

Taxonomy is the science of naming, describing, and classifying living organisms: taxonomic information shows how species are biologically related to one another.

Likewise, the angler who reeled in an unusual fish might start her search for what it is on Great Lakes Water Life by looking through the list of species commonly found in her area or going to one of the linked online identification keys.

WHAT IS GLANSIS?

Aquatic invasive species have been a serious problem for the Great Lakes since the 1800s. By the mid-1990s, the Great Lakes were facing an invasion rate of nearly two new species every year. As of 2020, 187 aquatic nonindigenous species are established in the Great Lakes, where many of them negatively impact environmental, economic, and human health. While not all introduced species are at an equal risk of becoming harmful, some of these animals, plants, and microorganisms can disrupt food webs, outcompete native species, clog waterways, and even transmit parasites and disease. The ability to accurately identify these organisms, track their spread, and access information about how to control them is a necessity for environmental researchers, resource managers, and citizen scientists.

WHAT'S THE BARCODE OF LIFE?

The Barcode of Life Data System, also known as BOLD, is a database dedicated to recording the unique gene sequences of all living species — think of it as a DNA library that helps scientists identify and classify living organisms using genetic information.

The Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) is designed to meet these needs and more. Designed as a "one-stop shop" for information on aquatic invaders, the database provides identification and management information, maps of sightings, and reference material for more than 250 nonindigenous and watchlist species in the Great Lakes basin. A partnership with the U.S. Geological Survey Nonindigenous Aquatic Species database enables GLANSIS to provide a seamless interface with their national database of reports for the inland lakes.

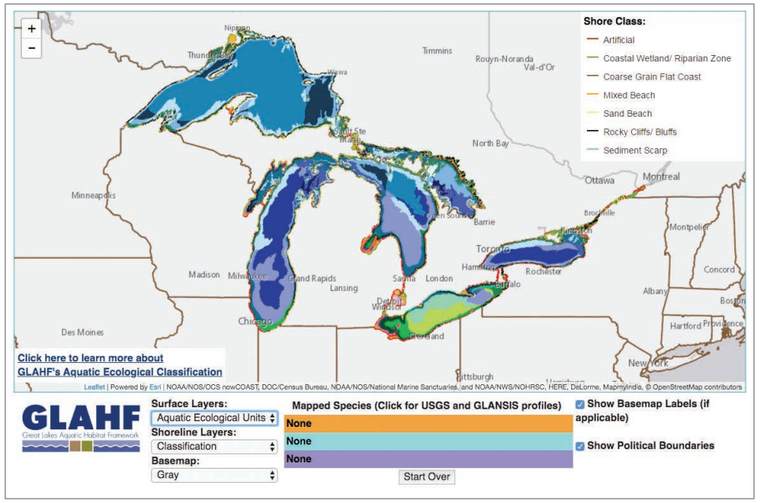
WHAT IS GLAHF?

The Great Lakes Aquatic Habitat Framework is a comprehensive spatial framework, database, and classification for Great Lakes ecological data. It hosts ecological data along with mapping and visualization tools for waterways in the Great Lakes basin, allowing researchers to effectively communicate and map their findings across the region.

GLANSIS is designed to be a toolkit for both researchers and local residents to learn more about aquatic invasive species using a growing collection of online resources. The list generator search feature allows users to look up information by scientific and common names, taxonomic groups, and specific lakes and their drainages to generate species lists and access information about each species. The high school student with the project on zebra mussels, for example, can find information on how to identify them, their history and spread through the Great Lakes, their impact on the ecosystem, and what legislators and environmental managers have done to try to control their negative impacts and spread — all conveniently located in one place.

Another tool, the Map Explorer, displays all sightings of a chosen species on habitat map layers provided by the Great Lakes Aquatic Habitat Framework (GLAHF). The map explorer also allows users to quickly map sightings of selected "hot button" species like grass carp and rusty crayfish with a single click. The researcher looking for information about the spread of invasive aquatic plants, for example, can display sightings of three different species on the map at once, or use date ranges to track the spread of a single invasive plant over time.

The recently debuted Risk Assessment Clearinghouse provides side-by-side comparisons of risk assessments for individual species, the respective methods used to produce them, and access to full bibliographies of relevant risk literature. By using the Risk Assessment Clearinghouse, a staff member of a state environmental agency, for instance, could quickly access all the risk assessment information for a particular species and decide whether or not to issue a permit to import it. Other new additions include a Frequently Asked Questions section (which includes instructions for tool use, the criteria the GLANSIS team uses for whether a species should be included in the database, and the history and legacy of the program), as well as a user contribution portal (where researchers can share their own verified reports of species sightings, identification photos, general feedback about the site, and participate in peer review). If our angler still can't find information about her mystery fish, she can get in touch with the GLANSIS team to learn more and report her find — she may have discovered a new invader in her area.



The Map Explorer in action.

LEARNING MORE ABOUT OUR ECOLOGICAL NEIGHBORS

GLANSIS and GLWL run in parallel with one another to more comprehensively document the non-native aquatic species that have been introduced to the Great Lakes, along with native species that may be expanding their range as climate and environmental conditions change over time. Cross-linking the two systems helps GLANSIS to provide DNA information on non-native species and identify species that may be expanding their ranges, highlighting the value of the native species inventory to monitoring for and understanding the impact of aquatic invaders.

Teachers, students, local residents, and researchers can each use the toolkits these databases provide to expand their knowledge of the thousands of different plants, animals, and microorganisms living in the Great Lakes, and how their lives can impact our own. Together, these two databases can help scientists and environmental managers make informed decisions based on the best available research collected in one place — and inspire citizens to learn more about the many unique creatures that call the Great Lakes home.

BECOMING A *Yooper*

906

SISU

Lauren N. Jescovitch

"No, I am not a native to Michigan. No, I have never visited Michigan's Upper Peninsula (U.P.) for a family vacation. My first time in the U.P. was this past summer!" I find myself saying this as I settle into my new job with Michigan State University Extension and Michigan Sea Grant stationed in the Houghton/Hancock area.

As an Extension educator, I want to learn about my community and their culture to help address concerns about the Great Lakes. So, I decided to write about my personal experiences with "becoming a Yooper." First, what is a Yooper (like U.P.-er; pronounced as yü-per)? A Yooper is a nickname given to a resident of the U.P. of Michigan. Starting as a regional term, the word Yooper was finally added to the Merriam-Webster dictionary in 2014. So, I am technically a Yooper already, but I think there is more to becoming a Yooper.

Yoopers seem to have some common experiences, including trekking across the land on snowshoes. Snowshoeing is a form of hiking, but in deep snow. The snowshoe has been designed so that your weight is dispersed, so you only sink into the snow a few inches. Thus, if the snow is waist deep or more, you can still walk relatively easily. Snowshoes are great for exploring through the woods, visiting frozen waterfalls, or hiking to a fishing or hunting camp. I use them to explore new U.P. trails with my dog.

If someone asked me to draw a snowshoe before I moved to the U.P., I would have drawn tennis rackets. However, I have learned that there are many types of snowshoes based on use. Generally, modern models are smaller and made of aluminum, while traditional snowshoes are elongated and have the netting that has the "tennis racket" look. Typically, the traditional pair, such as Iverson, allows for a quieter excursion while the modern pairs, such as Tubbs, can grip for a more extreme terrain.

According to *Skiing, Snowboarding, and Snowshoeing* by Tim Stotte, the oldest snowshoes were dated between 3800-3700 B.C. and found in the Dolomites mountain range in Italy. In 2016, a survey by the Outdoor Industry Association found that approximately 3.5 million Americans above the age of 6 participated in snowshoeing. Snowshoes are made for young kids and adults, so it is a fun and relatively inexpensive activity to get the family outside throughout the long U.P. winters.

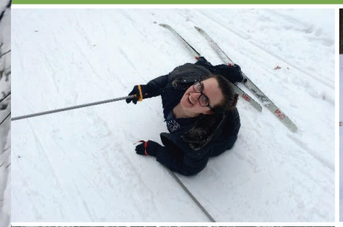
"Have you gone hard-water (ice) fishing yet?" I'm asked. But no, I have not gone … yet. This is surprising to my family and friends, but I have to say, the investment in ice-fishing in a new place can be pricey. I plan to go ice-fishing, but for now, I have invested in snowshoeing.

Snowshoes can cost from around $50 to over a couple hundred dollars depending on what you will use them for and the user weight (total weight of user plus what they are carrying); I bought a nice pair for $130. A local second-hand sports store is a good place to start. So, if I was to grow up in the U.P., snowshoeing would have been most likely one of the first outdoor activities. I am happy to say that I am starting the process of becoming a Yooper!

UP

Wintery adventures with Michigan Sea Grant staff

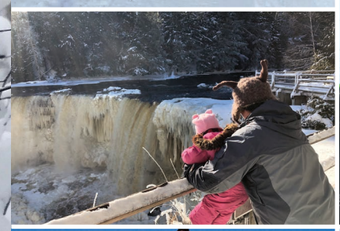
Our staff members know how to make the most of a Michigan winter! When the cold weather hits, we grab our snowshoes, strap on cross-country skis, scope out the best sap-tapping maple tree, and start excavating a snow fort. Of course, we also know the value of a cozy fire — or a vacation to a tropical locale. Join us in celebrating everything Michigan's winters have to offer!





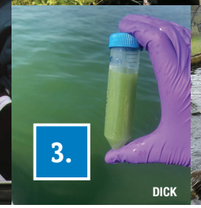


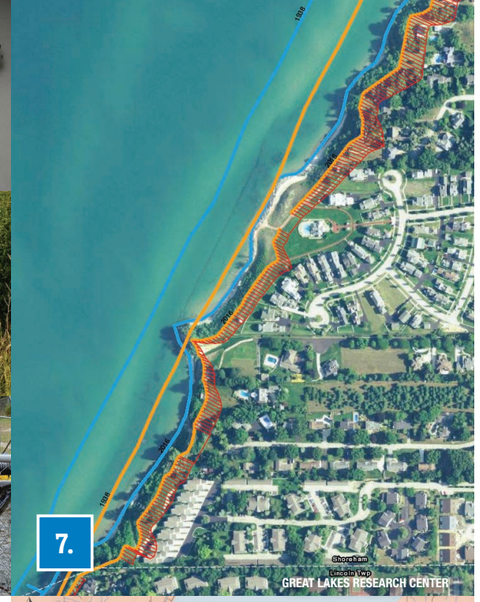


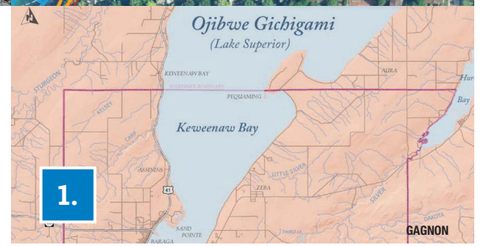












Black terns, tribal knowledge, and algal blooms

MICHIGAN SEA GRANT FUNDS NEW RESEARCH PROJECTS IN 2020

Every two years, Michigan Sea Grant supports a wide variety of research projects led by teams based at Michigan colleges and universities. This includes funding for graduate students pursuing research for their thesis or dissertation. Three projects and three graduate student fellowships were chosen for the 2020-2022 funding cycle, in addition to a regional research project funded by Michigan, Wisconsin, and Illinois-Indiana Sea Grants. Together, all projects will receive about $835,000 in research funding over two years.

1. Michigan's tribal communities hold a wealth of environmental knowledge. Valoree Gagnon, director of university-indigenous partnerships at Michigan Technological University, will work with tribal groups to synthesize, honor, and spread indigenous community knowledge about natural resources and environmental science. The goal of this project is to help integrate indigenous knowledge into stewardship, governance, and research for natural resources in the Great Lakes region.

2. As natural resource managers reassess the way they stock trout and salmon species in Lake Michigan, Assistant Professor Kelly Robinson from Michigan State University will update models that forecast salmonine fish populations while incorporating benefits, risks, and tradeoffs of different stocking strategies. Lake Michigan's fishery stakeholders will be part of the decision-making process.

3. Gregory Dick, an associate professor at the University of Michigan, will develop models to help determine why some strains of harmful algal blooms are more toxic to humans and animals than others. This project aims to enhance the ability to forecast algal bloom toxicity and help guide policies to prevent toxic blooms.

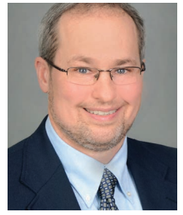
4. Graduate Fellow Erin Eberhard at Michigan Technological University will collaborate with Michigan's Department of Environment, Great Lakes, and Energy to investigate how nutrients move through watersheds to coastal ecosystems where wetlands, streams, and lakes meet. This project will provide key understanding of nitrogen cycling in Great Lakes coastal regions.

5. Black terns, a threatened species in Michigan, nest in places vulnerable to flooding and water level fluctuations. Graduate Fellow Jennifer Fuller from the University of Michigan will work with the Audubon Society to study how water levels affect black tern colonies in the St. Clair Flats near Lake St. Clair, home of one of the largest black tern colonies in the Great Lakes region. This research will inform conservation management strategies for these vulnerable bird populations.

6. Graduate Fellow Will Otte at Northern Michigan University will work with U.S. Geological Survey research staff to look for overlapping habitat and dietary needs among several types of lake trout in Lake Superior. This research will help natural resources professionals understand and manage trends in lake trout populations.

7. Managing Lake Michigan's shorelines requires an understanding of physical, biological, and social factors, especially as climate change is influencing weather patterns. A diverse regional research team including investigators from universities in Michigan, Wisconsin, and Indiana aims to foster resilient coastal communities around Lake Michigan by tracking the movement of sediment along the shoreline, assessing attitudes about lakeside development and protection, and devising a framework for empathetic decision-making about coastal resources.

Brandon Schroeder receives Distinguished Academic Staff Award



What do Great Lakes fisheries science, coastal tourism, invasive species, tagging monarch butterflies, and working closely with students and teachers have in common?

They are just part of a day's work for Michigan Sea Grant Extension Educator Brandon Schroeder. This winter, Michigan State University honored Brandon with a Distinguished Academic Staff Award during its annual Awards Convocation. The award recognizes academic staff for extraordinary achievement, excellence, and exceptional contributions in advising, curriculum development, outreach, extension, research, or teaching.

Since 2004, Brandon has served northern Lake Huron coastal communities as a Michigan Sea Grant Extension team member. In addition to applying science-based knowledge to address Great Lakes issues, he is a passionate proponent of place-based education and Great Lakes literacy.

Through the Northeast Michigan Great Lakes Stewardship Initiative, which Brandon helped launch, he works with youth who apply environmental science, technology, engineering, and math to help conserve Lake Huron's biodiversity, manage invasive species, and more. Thousands of students in northeast Michigan have participated in these STEM opportunities. Brandon is also co-leader of the award-winning 4-H Great Lakes Natural Resources Camp, a week-long science-focused camp for students. He also facilitates relationships among Lake Huron researchers, managers, and fishery stakeholders to help them better understand and respond to the lake's ecological changes.

"Bringing stakeholders together in collaboration is part of Michigan Sea Grant's mission," says Program Leader Heather Triezenberg. "Brandon works hard to make sure that everyone has an opportunity to share in decision-making. He excels at helping diverse groups have productive dialogue."


ELLIS

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Upwellings is published by Michigan Sea Grant, a collaborative effort of the University of Michigan and Michigan State University and part of the NOAA-National Sea Grant network of 34 university-based programs. Michigan Sea Grant helps to foster economic growth and protect Michigan's coastal, Great Lakes resources through education, research, and outreach.

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Upwellings
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Photos by Michigan Sea Grant, unless noted.

MICHU-20-801

Michigan Sea Grant is funded by the National Oceanic and Atmospheric Administration and the State of Michigan.
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