Sea Grant Michigan

Upwellings

SEPTEMBER 2019

GREAT LAKES CAREERS *BUILD* GREAT LAKES LEGACIES

SAGINAW BAY STURGEON RESTORATION //

EXTENSION EDUCATOR FAREWELLS //

WOMEN WHO FISH // EASTERN U.P. ADVENTURES

ASIAN CARP STUDY // PROBLEMS WITH PLASTIC

Notes from the Director

Catherine Riseng
Interim Director, Research Program Manager

I have now been serving as Michigan Sea Grant's interim director for over a year. During that time, we have worked hard to continue serving Michigan's coastal communities as a resource for Great Lakes research, outreach, and education.

The search continues for the next MISG director. I am grateful for the search committee's efforts, and we anticipate announcing a new director this fall. I look forward to working with the new director in the program's next chapter.

This year has challenged many Michigan and Great Lakes residents. Months of record-setting high water levels have eroded shorelines, damaged homes and roads, and dampened tourist activity. MISG partnered with the U.S. Army Corps of Engineers to offer workshops for coastal communities seeking information and resources around water levels. Participants received up-to-date information about present and predicted lake levels and got connected to resources to help them cope and recover.

At MISG, we have the honor of working with countless folks who are leaving their mark on our freshwater seas. When I think about MISG's wide network of partners and shared projects, I'm continually astonished by the variety of people who dedicate their passion, free time, or vocation to the Great Lakes.

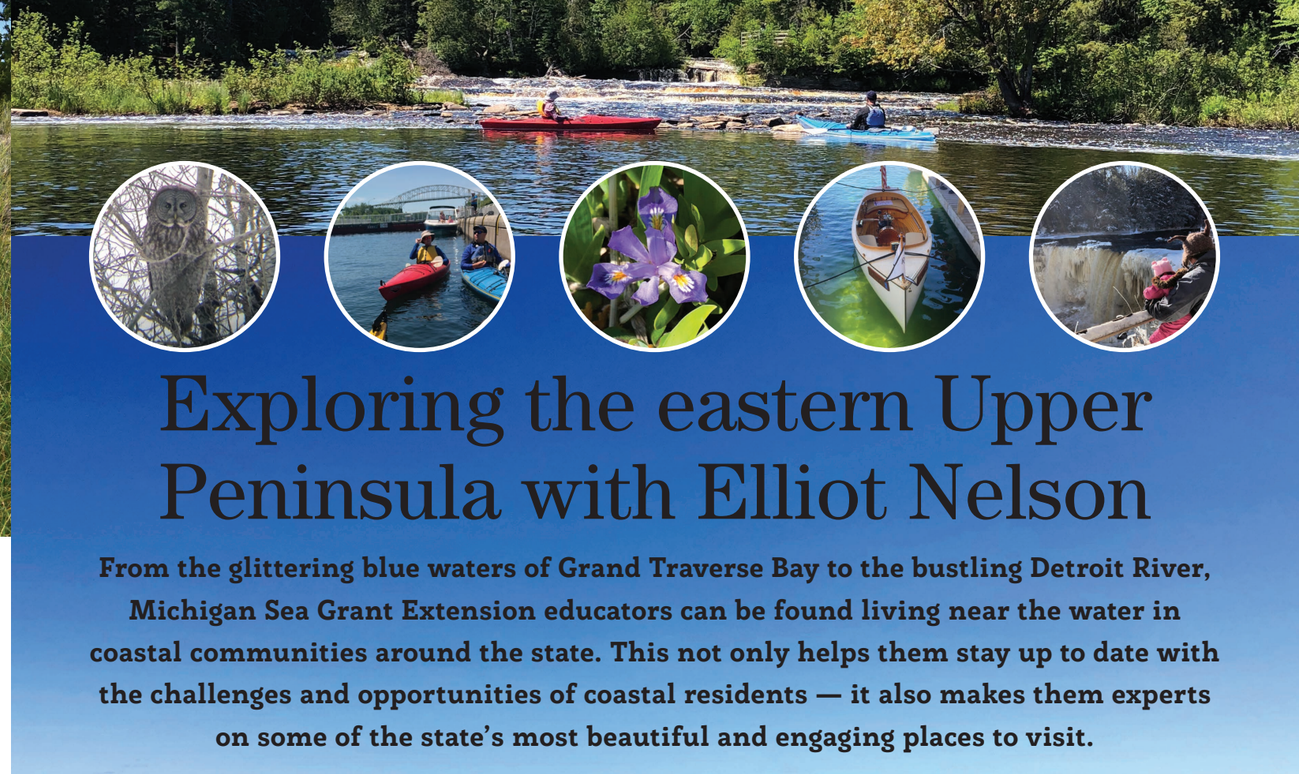
Many of our stakeholders, from teachers to chefs, computer scientists to storytellers, have positively affected the Great Lakes. Whether someone spends their career researching a native freshwater fish or picks up three pieces of trash every time they visit the beach, their actions strengthen Great Lakes ecosystems and coastal communities and build a legacy for future generations of Michigan residents and visitors.

This year, we said a grateful farewell to two of our longest-serving Extension educators. Steve Stewart's programs helped thousands of southeast Michigan students and community members form personal connections with Lake Erie and Lake St. Clair. Ron Kinnunen's training programs helped many Upper Peninsula commercial and Tribal fishing operators stay in and grow their businesses while meeting safety regulations. We are indebted to both for their dedicated service and transformative work on behalf of MISG.

We also support undergraduate and graduate students on the cusp of shaping their own Great Lakes legacies. Over the summer, our first four undergraduate interns worked on projects related to Great Lakes stewardship alongside colleges, non-profits, and community groups. They used drones to track Lake Superior shoreline erosion, planted rain gardens in urban Grand Rapids, modeled growth patterns of invasive *Phragmites*, and investigated lake trout diets in Lake Superior. The students presented their work at an August symposium on the University of Michigan's Ann Arbor campus. We're proud of this diverse group of hard-working students and eager to see what our 2020 interns will accomplish.

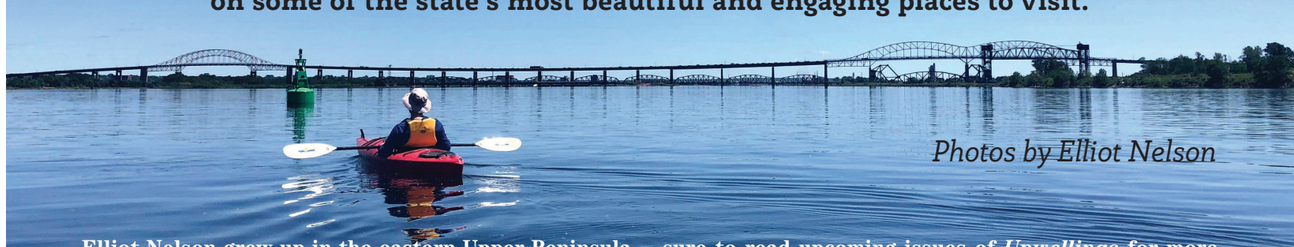
In September, staff from Sea Grant programs in the Great Lakes region will gather in Sault Ste. Marie, Michigan. We will learn about each program's initiatives and look for new ways to collaborate and enhance each other's projects. This meeting will help us identify priorities and plan for 2020 and beyond.

In honor of this event, we're featuring tips for visiting the eastern Upper Peninsula, straight from Extension educator and Sault Ste. Marie resident Elliot Nelson. Watch upcoming issues of *Upwellings* for more regional highlights from educators. In this issue, you'll also read about efforts to restore lake sturgeon in the Saginaw Bay region, research from some of our graduate student fellows, and more.



Exploring the eastern Upper Peninsula with Elliot Nelson

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.



Photos by Elliot Nelson

Elliot Nelson grew up in the eastern Upper Peninsula. After receiving his master's degree at the School for Environment and Sustainability at the University of Michigan, he returned in 2016 to serve as a Michigan Sea Grant Extension educator for Sault Ste. Marie and the other communities in his six-county district. He shares his infectious love of birding and kayaking with folks from Munising to Manistique, Brimley to Brevort.

Visitors to the Upper Peninsula often hear about the tinted cascades at Tahquamenon Falls State Park and the excellent rock-picking at Whitefish Point. But what about all the other hidden gems the eastern U.P. has to offer? Whether you're a resident or visitor, let Elliot's insights inspire your next northern adventure. And be sure to read upcoming issues of *Upwellings* for more regional highlights from our educators.

"Wherever you get it, eat some fish while you're here," Elliot says. Tribal and commercial fisheries supply local restaurants and markets with fresh lake whitefish, walleye, and lake trout. Snag some spring smelt from Massey Fish Co. in St. Ignace or enjoy a basket of fried whitefish at Brown Fisheries Fish House in Paradise. If you're in Sault Ste. Marie, check out the rotating menu of local foods and brews at Karl's Cuisine, Elliot's family's restaurant. The region's rich fishing history and culture take center stage at sites along the Great Lakes Fisheries Heritage Trail: *greatlakesfisheriestrail.org*

The St. Marys River (yes, that's a correct spelling), which forms the border between Michigan's U.P. and the Canadian province of Ontario, offers plenty of paddling opportunities. Bring a canoe or kayak or rent one from a local business like Bird's Eye Outfitters. Stop off at Sugar Island or one of the other wooded islands for a picnic or hike. Paddle through the majestic Soo Locks or along the massive Cloverland hydroelectric power plant — just be sure to give the 1000-foot freighters a wide berth. Find other paddling routes at *michiganwatertrails.org*. If you don't paddle the Soo Locks, explore them on foot or with an educational boat tour. Come in June for Engineers Day and experience the Locks in a whole new way.

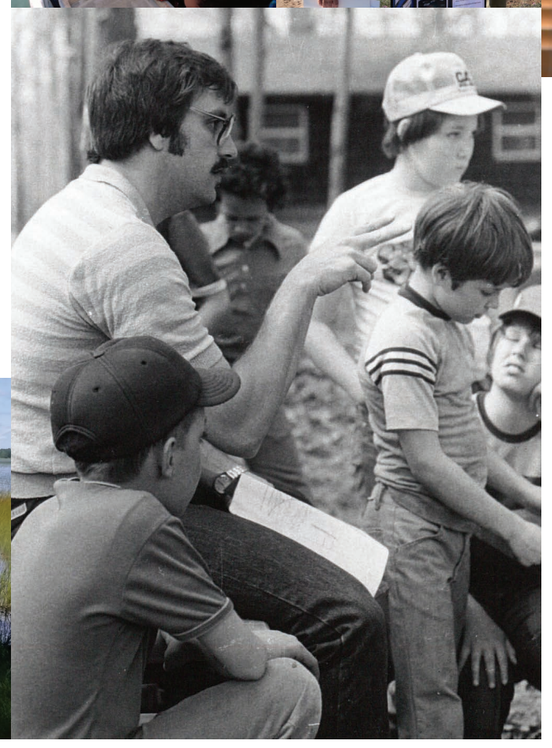
Grab your binoculars and hit one of the region's two designated birding trails. While portions of these trails may be paths you can hike or bike, they're mostly navigational routes designed to help wildlife-watchers identify prime birding locations within a given region. Elliot is working with local partners to develop a third trail, and he can often be spotted out in the woods and meadows, binoculars in hand. Find details about the North Huron Birding Trail and the Superior Birding Trail at *michiganaudubon.org*

The eastern U.P. is home to several vibrant Tribal communities. In early July, the Sault Tribe of Chippewa Indians holds a Jiigtamok, or Powwow. The event is open to the public and includes heart-pounding drumming and dancing competitions.

Winter visitors find plenty to enjoy, too. Weather permitting, ski the Algonquin Cross Country Ski Trail, go snow tubing at the Sault Seal Recreation Area, or strap on your snowshoes and venture out for a hike along the North Country Trail where it crosses Mackinac and Chippewa counties.

In any season, take a day trip along the federally designated scenic roadway that hugs Lake Superior's shoreline between Sault Ste. Marie and Paradise. The road takes several names along the way — Lake Superior Shoreline Road, Curly Lewis Memorial Highway, and Highway M123 — and can ferry you toward Whitefish Point or Tahquamenon Falls State Park. Find plenty of scenic pull-offs and campgrounds in the surrounding Tribal and National Forest Service lands.

If you packed your passport or enhanced driver's license, cross the river into the Canadian community of Sault Ste. Marie, Ontario. Whitefish Island Indian Reserve, managed by the Batchewana First Nation, is full of trails and fly fishing-friendly rapids. In the fall, take a spectacular train ride with the Agawa Canyon Tour Train through blazing forests and sweeping rock formations.



LEAVING A LEGACY

Retiring Extension educators' careers exemplify Sea Grant mission

Michigan Sea Grant is proud of the work our Extension educators provide to communities around the state. This year, we celebrate the careers of two of our longest-serving educators. We wish them a bittersweet farewell as they begin to enjoy their well-earned retirement.

Over the course of their careers, these two Extension educators have impacted thousands of Michigan residents. They have built close relationships, maintained networks of partnerships, and become trusted sources of information.

Steve Stewart and Dr. Ron Kinnunen exemplify what successful careers carrying out the mission of Sea Grant look like. Together, as a part of Michigan Sea Grant, they have served the people of Michigan for 80 years. Their expertise, experiences, and programs they developed also show the diversity of services Michigan Sea Grant provides.

STEVE STEWART

42 Years of Service

RON KINNUNEN

38 Years of Service

PHOTO: ANDREW MUIR

Michigan Sea Grant Extension educator, education co-director, assistant director (1993-96)

Steve has devoted his 42-year career to the greater Detroit area, co-developing the award-winning Great Lakes Education Program (GLEP), which serves to educate and excite schoolchildren about the Great Lakes through classroom and vessel-based experiences. For many of the children in Steve's urban service area, this experience has been the only time they've been on the water in a boat. Through the program, more than 118,000 students are more knowledgeable about and engaged in active stewardship of the Great Lakes. Steve's leadership and program development have made a difference for thousands of students and teachers.

SELECTED AWARDS

- Michigan Science Teachers Association, 2015 Informal Teacher of the Year
- Michigan Alliance for Environmental and Outdoor Education, William B. Stapp Award
- Michigan State University, Distinguished Academic Staff Award
- Great Lakes Sea Grant Network, ESCAPE from Exotics Education Program Award
- Great Lakes Sea Grant Network, Program Leaders' Award for Outstanding Programming
- MSU John A. Hannah Awards for Program Excellence (GLEP and Bottomlands Preserves program)

Michigan Sea Grant Extension educator

Ron's contribution has been 38 years devoted to the Upper Peninsula, working out of Marquette. For the majority of his career, he covered the entire U.P. as his Michigan Sea Grant district. His focus on commercial and Tribal fisheries, aquaculture, and seafood safety has been critical for many businesses and individuals in the U.P. In addition, his work on spreading the word about dangerous currents, as well as organizing safety equipment at beaches, has helped to save lives.

SELECTED AWARDS

- Michigan Fish Producers, Lifetime Achievement Award
- Great Lakes Water Safety Consortium, Lifetime Achievement Award
- Michigan Aquaculture Association, Appreciation Award
- Great Lakes Sea Grant Network, Program Leaders' Award for Outstanding Programming (Bottomland Preserves and Rip Current Awareness)
- MSU John A. Hannah Award for Program Excellence (Bottomland Preserves, Seafood HACCP, and Rip Current Awareness)
- MSU Distinguished Academic Staff Award

Continued...

For both Steve and Ron, these programs are just the tip of the iceberg of all the services they have provided and all that they have accomplished. It is difficult for us to imagine Michigan Sea Grant without them. By their excellent examples, they've shown us that creating a legacy is about having commitment, showing leadership, being honest, and having a passion for serving others. And when you do it right, you can make a difference in thousands of peoples' lives, just like Steve and Ron. Well done!

STEVE STEWART

Steve reflects an amazing commitment to excellence and has provided invaluable leadership in his roles among our Michigan State University Extension, Michigan Sea Grant, regional Sea Grant Center for Great Lakes Literacy, and national Sea Grant Educators Network teams.

— Brandon Schroeder, Michigan Sea Grant

I have heard Steve say many times, "You don't love what you don't know." Getting people out on the water for shipboard programs gives them access and education about the Great Lakes, and surveys show that it leads to a strong affinity for the Great Lakes and leads to better stewardship.

— Justin Selden, Michigan State University Extension

Steve is always willing to go over and above to help teachers. Kids and adults alike appreciate his deep understanding of all things aquatic, coupled with his kindness and terrific sense of humor. My students loved working with him, and Steve was always willing to carve out time to help them in their water quality research.

I envision Steve's impact as ripples in a pond: he supported thousands of educators with rich, innovative professional development; opened up opportunities to students in SE Michigan for careers in the STEM fields; and across communities around the state, he has fostered a commitment to environmental stewardship that will be a lasting legacy protecting our Great Lakes.

— Dr. June Teisan, Belle Isle Conservancy

RON KINNUNEN

Through many years of working closely with commercial fishers and fish farmers, Ron developed partnerships and built trust. He was the go-to fisheries expert to address current and emerging issues.

— Titus Seilheimer, Wisconsin Sea Grant

Dr. Kinnunen has developed the respect and support of tribal governments, tribal commercial fishermen, tribal fish processors, tribal fish hatchery managers, and tribal fishery biologists. Equally important has been his ability to bring parties together from tribal and non-Indian communities to find common ground when needed.

Dr. Kinnunen was honored for his work with tribal governments with the presentation of a blanket [in 2018] by Bucko Teeple, Bay Mills tribal elder and Cultural Program Director, and the Great Lakes Indian Fish and Wildlife Commission.

— Jim Thannum, Great Lakes Indian Fish and Wildlife Commission

What is truly visionary [about his career] has been seeing a need, gaining the training and certification necessary to fill the need, and then bringing those programs to his Upper Peninsula stakeholders.

— Dr. Heather Triezenberg, Michigan Sea Grant

A 22-MILLION-POUND PROBLEM

Don't let the name trick you — marine debris is a freshwater problem, too. Whether we're talking about marine debris, microplastics, or plastic pollution, the fundamental issue is the same: human materials showing up where they shouldn't be. This applies to everything from shredded grocery bags on a riverbank and sunken powerboats at the bottom of Lake Michigan to microscopic plastic particles in our drinking water.

"Marine debris" includes materials made of plastic, metal, rubber, glass, paper, and cloth. Paper and natural cloth fibers can decompose quickly under the right conditions. Plastics may persist in the environment for centuries or even millennia.

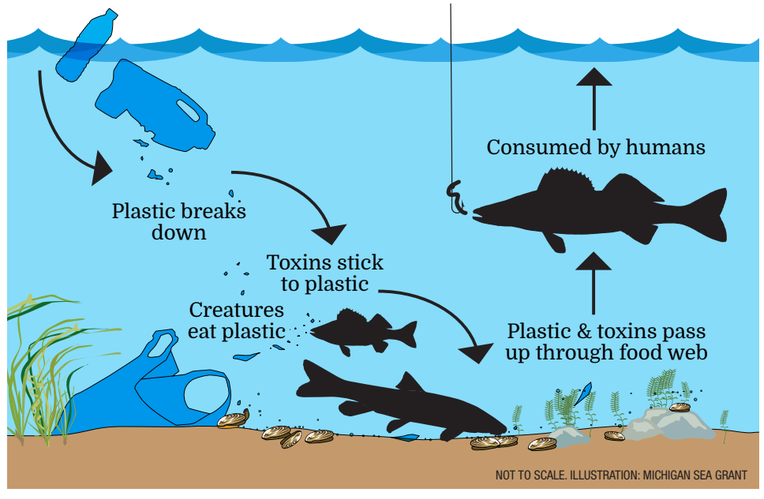
According to a 2016 study by the Rochester Institute of Technology, the United States and Canada dump 22 million pounds of plastic debris into the Great Lakes every year. We're still figuring out what damage plastic pollution can cause, how to get rid of what's already out there, and how to avoid making more.

One of the most important things you can do is shift your attitude toward plastic. Pay attention to the number of plastic items you buy, use, and throw away in a given day. Find small changes or new habits that can help you avoid a few of those items each day. If you can't avoid bringing plastic into your life, pay attention to where it goes when you're finished with it.

Go beyond recycling — find creative ways to reduce, reuse, re-purpose, repair, or re-gift. A little extra time or effort can go a long way toward reducing the daily impact of our waste.

PRACTICAL TIPS

- When fishing, collect all your fishing line (monofilament) and discarded hooks. Some fishing areas have designated monofilament recycling stations. If you can't find one nearby, gather your fishing line into a bundle and drop it into a trash can where it can't blow back out.
- If you smoke, dispose of your cigarette butts properly and don't throw them on the ground or into the water.
- Lend a hand at beach clean-up events — or organize one of your own. Even if there isn't a formal event going on, challenge yourself to grab at least three pieces of litter the next time you visit the beach or riverfront.
- When you're at a breezy beach or taking a boat ride, don't let your lightweight trash blow or wash away. Dispose of it in bins that aren't already full or overflowing.
- Invest in reusable alternatives to single-use plastics like water bottles, silverware, drinking straws, shopping bags, and plastic baggies.
- Avoid toothpastes, body washes, hand soaps, and other products that contain plastic microbeads.
- Instead of balloons, decorate with fresh flowers or recyclable paper products. If you must use balloons, tie them with twine or string made from natural materials that will biodegrade. When you're done, pop them and make sure all the pieces get into the trash.
- Choose clothing made of natural fibers such as cotton or wool. If you have clothing made with synthetic fibers, consider buying a special laundry bag or filter that traps microfibers, which can't be filtered out by conventional wastewater treatment facilities.
- Know your local recycling rules. Learn what needs to be cleaned first, what can be recycled as-is, and what's just wishful thinking.



WOMEN WHO FISH HAVE STORIES TO TELL

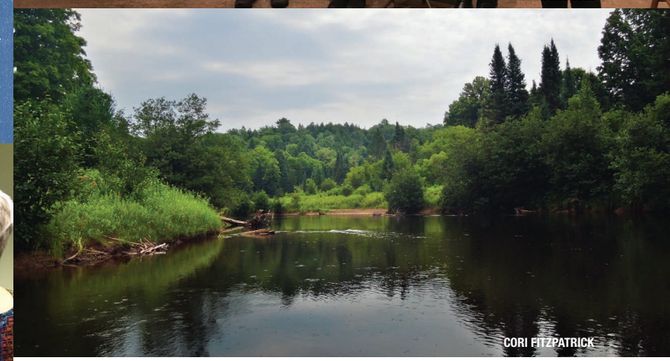
By Erin Burkett

Fishing is a popular outdoor recreation pastime throughout the Great Lakes region, including Michigan, and women's participation in the sport is increasing. About one of every five Michigan anglers are women, but we don't know a lot about why women fish.

JOSH TALLMAN

ABOUT THE AUTHOR:
Erin Burkett is a PhD candidate studying environmental and energy policy in the Department of Social Sciences at Michigan Technological University. She is also the recipient of a 2018-2019 Michigan Sea Grant Graduate Research Fellowship. Her research includes studying demographic trends and changes among recreational anglers throughout the Great Lakes region, collaborating with state natural resource agency staff and recreational fisheries stakeholders, and summarizing the impact of the international *Becoming An Outdoors Woman* program.

HUGH GORMAN



CORI FITZPATRICK

ERIN BURKETT

In the past, women have been largely absent from studies asking who fishes and why. Women are also often missing from a lot of our culture's fishing-related images and stories. Poor representation of women in sportfishing sends the message that women don't belong in the sport. Understanding why women fish is important because it has implications for fisheries management and stakeholder engagement and outreach strategies.

SHAWN RATHBUN

To address this, I used a community-driven, social science research method called photovoice to better understand and highlight women's fishing experiences. Photovoice combines individual photography with group storytelling to highlight a group that hasn't previously been given sufficient attention. Photovoice projects typically follow these general steps: recruitment, documentation, photowalks, and exhibition or action stages.

I started recruiting potential participants by contacting fishing clubs and their members through email, Facebook, and club meetings. I also visited bait and tackle shops and stores that sell fishing licenses to explain my project and distribute informational flyers. Finally, I posted flyers in public spaces and contacted women-specific natural resource organizations. I formed groups in two distinct Michigan regions: the Keweenaw Peninsula in the Upper Peninsula and metro Detroit. The following steps were conducted separately within each region.

Anyone interested in joining the project was invited to an informational meeting where I explained what participating in the project might entail. With a little prompting using open-ended questions, the women started sharing their fishing stories and what topics they might want to highlight in their pictures. In total, 15 women participated in the project from start to finish.

Something that makes this type of community-engaged research unique is that participants have autonomy and control over the project's goals and outcomes throughout the entire project. The role of the researcher is to facilitate and observe the process and collect data in the form of transcribed audio recordings of meetings and the photographs and stories shared by the research participants.

The next phase of the project was the documentation stage. Over the next few months, each group member was asked to take photographs that represented their fishing experiences. For the most part, everyone used a cell phone camera, and everyone incorporated pictures from their past that still had significant meaning to them.

The next series of 2-3 group meetings, called "photowalks," is a key component of any photovoice project. Photowalks give each participant ample time to share their photographs with the group and share the stories behind them.

What happens when you get a group of women anglers together in a room and put their photographs on display? Engaging storytelling, a lot of knowing nods of agreement, and plenty of laughter. Each group discussed their favorite fish to catch and eat, what gear they use, where they fish, who they fish with, how they feel being women in a sport dominated by men, and everything in between.

The exhibit or action stage varied by region. The Keweenaw group created a gallery-style exhibit that was on display at the Carnegie Museum of the Keweenaw in Houghton for several months. The exhibit's title, "Connections: Stories From Women Who Fish," referred to the members' decision to present their experiences as a group, rather than as individuals.

As group member Emila Downes explained, "Everyone has an idea about what fishing means to them, but as a community or group, what does fishing mean? It facilitates the connection to everything around us from people to nature. For some it is a break from the world, and for others it's a connection to the world. Whatever fishing means to you, it is a way to connect everyone across generations, nationalities, lifestyles, and occupations. It's what brings us together!"

The metro Detroit project group shared their experiences in a group presentation at the June meeting of the Metro-West Steelheaders in Livonia. Two of the women's stories were also included in the club's monthly newsletter.

Karen Westphal, a long-standing Metro-West member and formerly the first female club president, shared the experience of fishing with a friend every year to honor their dads' memories: "We'd go out fishing on Father's Day. Both of our dads had passed away and we wanted to do them a little bit of justice for teaching us some fishing, and we wanted to be closer to them. [...] Almost every year, we would limit out on walleye and have such a great time. It was such a great way to be with our dads again."

Now that these events have wrapped up and the project is coming to a close, I am writing up my findings for publication in a scientific journal. One of my findings is that, for these women, fishing isn't about the fish. Well, almost. Catching a beautiful brook trout or their first northern pike was certainly memorable for these women, but fishing provides them with many other benefits and satisfying experiences. For some, connecting to water, nature, and "getting away from it all" was important. For others, it is the empowerment and sense of accomplishment that fishing brings that drives them to fish.

AMBER VOGHT

APRIL TANG

Many of the women expressed being the "token woman" in their circle of fishing buddies, and this certainly created social obstacles to fishing that we discussed quite a bit. But this wasn't always the case. A few learned all they know about fishing from a strong female role model like a grandmother or mother, and by participating in the project the participants made new, fishing-related connections with each other and other women in their social circles.

Finding other women to fish with was particularly important to April Tang, project participant and member of the Flygirls of Michigan: "I joined the Flygirls of Michigan group and the women there have helped me build my skills and opened up more fishing opportunities. On this guided trip, I caught my biggest steelhead so far. It was a brutally cold day, like most days when steelhead run the rivers. My boatmate and I persisted and she ended up catching an even bigger beast! The Flygirls have really been a wonderful, supportive community for me."

Community-engaged research projects like these are unique because they emphasize relationship-building among the participants and their communities. The women weren't only swapping fishing stories. They were inviting each other to go fishing, encouraging each other to take on leadership roles in fishing clubs, and making new connections with other women even outside the project. One participant learned that her great aunt was an avid angler in her younger days; being a part of this project made that discovery possible because it sparked a conversation about women in fishing.

Uncovering and highlighting stories of women fishing is important because this doesn't often happen in the public eye. It can also help us to overcome what are sometimes very deeply-rooted beliefs about women in the context of outdoor recreation. It reminds us that women cannot all be lumped into a single group, because they are individuals with varying identities and personal reasons for fishing. Seeing these connections build has made this project fun and rewarding, and it highlights the benefits of community-level engagement in a fisheries management context.

GRADUATE RESEARCH FELLOWSHIPS

Michigan Sea Grant offers one- or two-year fellowships for graduate students enrolled full-time at Michigan universities who are interested in research relevant to current Great Lakes issues. These fellowships support student research and enhance academic and professional development opportunities. The next application cycle will be announced in the early winter of 2021. Learn more in the "Student Opportunities" section of the Michigan Sea Grant website.

Graduate Research Fellowships can open new doors for Michigan students. As Erin Burkett says, "Michigan Sea Grant's funding allowed me to hold numerous research meetings, provide refreshments for research participants, and cover printing costs for the Carnegie Museum photography exhibit. In addition, the fellowship gave me the opportunity to attend professional conferences and network with other researchers and professionals. During my fellowship year, I attended a Michigan Department of Natural Resources training event for creel clerks to learn more about their interactions with recreational anglers and presented my dissertation research at the 2018 State of Lake Superior Conference and the 2019 Midwest Fish and Wildlife Conference. The fellowship also allowed me to work with an agency mentor, Tracy Claramunt, at the Department of Natural Resources."

KATIE STEIGER-MEISTER/USFWS

Graduate research fellow publishes Asian carp study

For 20 years, Great Lakes residents and managers have worried about potential invasion by Asian carp species. Bighead and silver carp (sometimes collectively called "bigheaded carp") pose a particular threat to the Great Lakes, given their appetite for plankton, the microscopic creatures that sustain complex food webs. If established in the Great Lakes, bigheaded carp could endanger a multi-billion-dollar recreational fishing industry and further destabilize ecosystems already shifting due to climate change and prior species invasions.

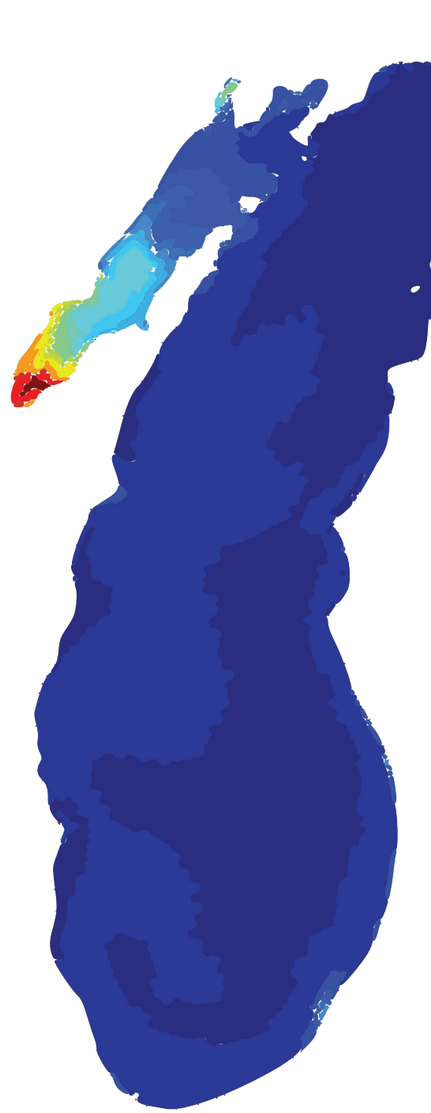
Some computer models have predicted that, even if bigheaded carp reached Lake Michigan, planktonic food is too scarce in much of the lake to support their growth, which would limit their ability to survive and spread. However, new research indicates that might not be true.

Peter Alsip, a 2018-2019 Michigan Sea Grant Graduate Research Fellow, worked with NOAA scientists to develop a model of potential bigheaded carp invasion that accounts for their flexible diet and ability to find food throughout the Lake Michigan water column.

The model suggests that nutrient-rich feces from invasive zebra and quagga mussels might fill in the dietary gaps for bigheaded carp when and where plankton is less abundant. This and other factors could enable bigheaded carp to thrive in nearshore areas and survive in open waters previously thought safe from the voracious invaders.

Alsip is lead author on a new study in *Freshwater Biology*, published in August 2019. Catherine Riseng, Michigan Sea Grant research program manager and interim director, is also a co-author on the paper. The study has received substantial press coverage, including articles in *The Chicago Tribune*, *The Washington Post*, and the University of Michigan's *Michigan News*.

Alsip conducted the research for his master's thesis at the University of Michigan School for Environment and Sustainability, with Graduate Fellowship support from Michigan Sea Grant. "Michigan Sea Grant's fellowship aided in my development as a freshwater scientist and ecological modeler," said Alsip. "As a fellow, I learned to design and conduct research in a way that addresses knowledge gaps and connects the scientific enterprise of Sea Grant, NOAA, and the University of Michigan to stakeholders in the region. Sea Grant's investment in myself and my research has provided a strong foundation for a career working on the Great Lakes and aquatic resource management."



Alsip is now working as an ecological modeling data analyst at the Cooperative Institute for Great Lakes Research, a NOAA-funded research hub at the University of Michigan.

Once a thriving species in the Great Lakes region, lake sturgeon were almost entirely depleted by human mismanagement and exploitation. Now, restoration efforts in the Saginaw Bay watershed and elsewhere in the Great Lakes basin seek to undo this damage and forge a new relationship between sturgeon and people — one that emphasizes the role humans can play in preserving the ecosystems around them.

For many, efforts to restore and protect sturgeon are urgent, due in part to the fish's long and unique history.

"Sturgeon are a very unique species — the fact that they have evolved over 200 million years and are still around today is amazing," said Mike Kelly, who directs the Saginaw Bay Watershed Initiative Network's Great Lakes office. "However, we have done incredible damage to the population over time. The work that we are doing now to rehabilitate the sturgeon population, I feel, is part of our responsibility to make amends for the damage that we have done."

Kelly specifically cited past and current projects such as dam removals and river channel restoration. Michigan Sea Grant has been involved in efforts to rebuild rocky spawning reefs for sturgeon and other native fish in Saginaw Bay and the St. Clair-Detroit River corridor. These reefs replace structures destroyed by dredging or sediment and provide necessary habitat for sturgeon to lay their eggs.

The Michigan Department of Natural Resources and Michigan Sea Grant are also working with local partners and Tribal communities to stock juvenile sturgeon in Saginaw Bay-area rivers. The young fish are raised in hatcheries and released with the hope that they'll eventually establish new self-sustaining populations in their ancestral waters.

Some of Michigan Sea Grant's recent efforts have focused on getting local residents directly involved in sturgeon restoration — including a pilot Adopt-A-Sturgeon program in Saginaw Bay that will raise funds to support a variety of initiatives, including Sturgeon in the Classroom and sturgeon release events.

ABOUT THE AUTHOR: Nathan Carpenter is a senior at Oberlin College, where he studies environmental justice. Nathan spent several months in 2019 working in the Michigan Sea Grant Ann Arbor office as a Doris Duke Conservation Scholar. The Doris Duke Conservation Scholar Program at the University of Michigan provides summer fellowships for undergraduate students aiming for conservation careers who are traditionally underrepresented in the field. Nathan's primary project while working with Michigan Sea Grant was developing a pilot Adopt-a-Sturgeon program that could raise money for sturgeon restoration efforts.

The adoption program — which will be piloted on the Saginaw Bay Sturgeon Restoration website — is an opportunity for interested individuals to contribute to ongoing restoration efforts and stay connected to them over time. Modeled after comparable programs in the region, the pilot program allows sponsors to buy one of several adoption packages. The packages vary depending on the level of the contribution, but they all contain a unique PIT tag number that is associated with a specific sturgeon released into the Saginaw Bay watershed. When an "adopted" fish is captured and then released by researchers as part of an assessment program, sponsors can use their unique tag number to view the data collected from their fish.

The efforts to recover those populations back to their glory days is something that's going to take many generations to accomplish.

Michigan Sea Grant worked with a variety of partners to design the program, which will likely launch in Fall 2019. While the ultimate goal is for the program to become statewide, Michigan Sea Grant Extension Educator Meaghan Gass says starting in the southwestern corner of Lake Huron with Saginaw Bay is, in many ways, symbolic of the success of the ecological restoration work that made the adoption program possible.

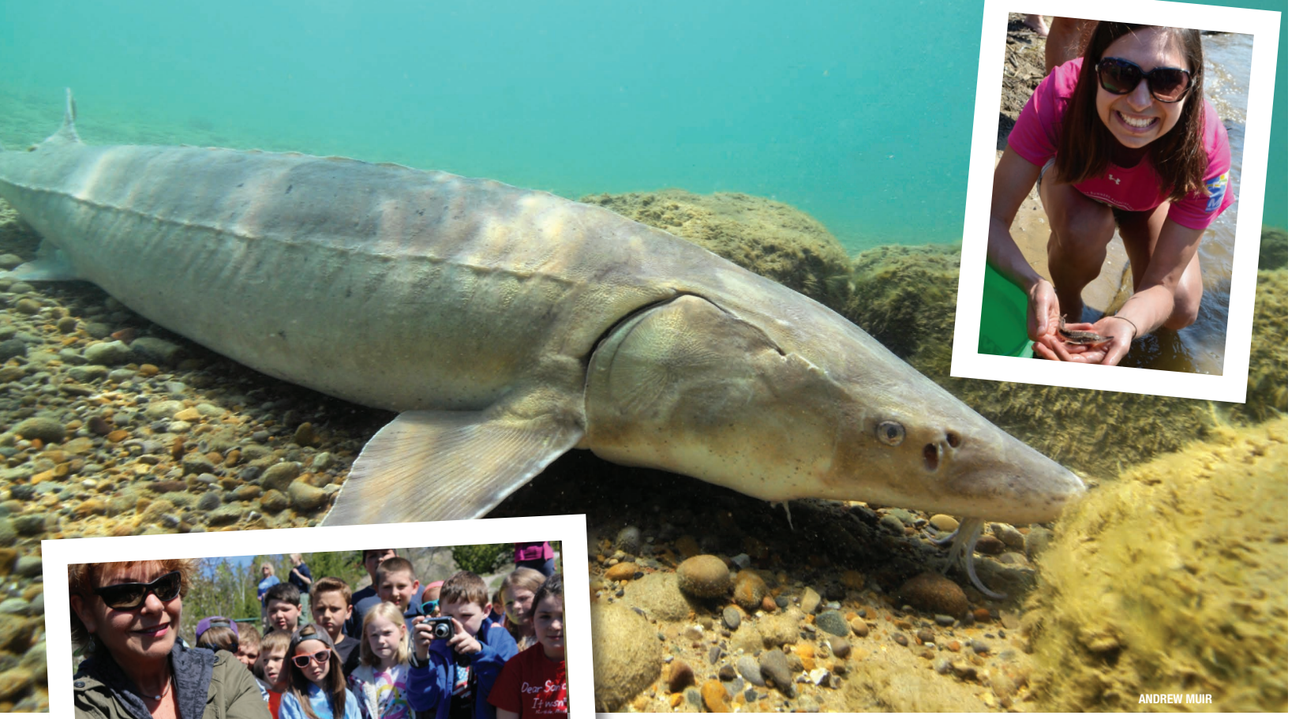
"The Saginaw River and Bay is an area of concern," Gass said. "These areas of concern were established following environmental degradation that occurred across the Great Lakes. The restoration of lake sturgeon signals that we are restoring the habitat and the ecosystem in the Saginaw Bay watershed."

The adoption program seeks to capitalize on this progress by restocking the watershed with sturgeon raised in nearby hatcheries. Many fish will be released by residents at events that take place throughout the year. For many Michigan natives, these events are their first opportunity to actually see a sturgeon, despite the fish's one-time prevalence in the region. Kris Dey, hatchery manager for the Little Traverse Bay Bands of Odawa Indians, hopes that such outreach events will help residents develop a sense of connection with this ancient fish.

"The reason we have more outreach and involvement for sturgeon is because this species needs the public to be more aware and care for the future of this species," he said. "Because sturgeon were decimated nearly 100 years ago, there are a limited number of people in the state of Michigan who can identify one, let alone have seen or held one in the wild. This disconnect from the fish causes us to devalue the relationship and lose our connection with the sturgeon."

However, this disconnect has not always existed. Dey added that the lake sturgeon, or Nmé, has long been a culturally significant species to the Odawa people and other Native American communities in the region.

"Traditionally, we look to the Nmé clan members for wis-



dom and guidance," he said. "In the clan system, your clan animal holds a very special and close relationship to you. The Nmé becomes viewed as a relative or family member... Nmé were a celebrated part of the lake and culture."

For some Great Lakes Tribes, August's lunar cycle is known as Sturgeon Moon, marking the best season for harvesting the fish.

For Dey, Kelly, and others, developing a sense of connection and personal investment in sturgeon restoration work is vital — and one of the primary reasons that programming like sturgeon release events, which the adoption program will help support, is so high-impact.

"Watching kids handle small sturgeon and release them is an incredible experience," Kelly said. "Giving people in the community the opportunity to play a role in the sturgeon rehabilitation events builds a greater sense of conservation and appreciation of sturgeon, our rivers, and our natural resources in general."

Brenda Archambo, president of Sturgeon for Tomorrow's Black Lake chapter, agrees. Archambo coordinates the Sturgeon in the Classroom program, which gives students the opportunity to spend a school year learning about and raising a sturgeon before releasing it into their local watershed. She described the moment at which students say goodbye to the fish they've spent months caring for.

"It's a magical moment," Archambo said. "It's spiritual in a way...some of the students have really galvanized around the project and specifically the sturgeon — it's quite bittersweet. Some of them cry because they're emotional, whereas others are very happy that they've been able to contribute to the overarching program and bring the fish back to where it was born."

Dey emphasized that the youth of today will be the conservation leaders of tomorrow, and that developing a sense of connection between students and sturgeon will help ensure the long-term sustainability of restoration efforts.

"There is a teaching in the Native American community that tells us to not guide our decisions by thinking about tomorrow, but to think about the effect for the next seven generations," he said. "I think sturgeon are an excellent example of this teaching. Any work we do today will need to be carried on by our children and their children's children."

Dey and Kelly both mentioned that any sturgeon stocked today are not expected to return for about two decades, meaning that restoration efforts are truly playing the long game. Still, Archambo says, the reward will be worth the wait.

"The efforts to recover those populations back to their glory days is something that's going to take many generations to accomplish," she said. "They're a keystone species. They are an indicator of ecosystem health. And having those in your community and then being able to actually view them in the wild is really quite something."

For the Tribes, the return of the Nmé to the rivers and lakes is like having a family member return home.

For Dey, this long-term outlook only increases the importance of engaging the public.

"In this system we are not anticipating our stocked fish to return for another 20 years," Dey said. "Which would make the full effect of stocking not realized for double that amount of time, because we need decades of stocking to give a range of ages and genetic diversity. Having public outreach and giving people a reason to care about, and care for, the sturgeon is just as important as the stocking efforts any of our agencies are conducting."

Kelly says that, so far, these public outreach efforts have found success. He hopes that the adoption program will build upon that trend.

"We've built a great appreciation for this prehistoric species," he said. "I think that people understand sturgeon and love that they are coming back. People continue to work to protect them and learn about them."

Dey added that the cultural significance of a sturgeon resurgence would be enormous, particularly for Native American communities that have long valued the fish.

"Traditionally, there were celebrations along the rivers to welcome the Nmé back each spring, and hopefully our stocking celebrations will one day become Nmé run celebrations," he said. "For the Tribes, the return of the Nmé to the rivers and lakes is like having a family member return home."

For her part, Gass is optimistic that sturgeon restoration efforts in Saginaw Bay — including the adoption program — will be fruitful and will have a snowball effect that ultimately improves the overall health of the watershed.

"There are many partnerships and years of restoration work preceding the lake sturgeon reintroduction effort in Saginaw Bay," Gass said. "I think, moving forward, the opportunities to collaborate — like how partners and community members are doing with the lake sturgeon — are available for other projects in the watershed. So I definitely feel optimistic about the future health of the Saginaw Bay watershed."

Readers wishing to become involved in the sturgeon adoption program or to learn about upcoming release events can visit *saginawbaysturgeon.org*.

Lake sturgeon exhibit in Ann Arbor

After humans nearly erased it from the Great Lakes, the mighty lake sturgeon is finally splashing toward a comeback. This ancient species is benefitting from dam removals, riverbed restoration projects, and long-term restocking initiatives by state and Tribal agencies. All this attention might leave people wondering: *What's the fuss all about?*

Starting in November 2019, a new lake sturgeon exhibit at the University of Michigan Natural History Museum will give visitors a sense of the ecological and cultural significance of this native fish. The exhibit will showcase humanity's complicated and ongoing relationship with the lake sturgeon, unpack its decades-long life cycle, highlight current restoration efforts, and more.

The Natural History Museum is located in the brand-new Biological Sciences Building on the northeast corner of the University of Michigan's downtown Ann Arbor campus, near the university hospital complex. The museum re-opened in April 2019 after moving from the nearby Ruthven Building. After exploring the sturgeon exhibit, visitors can catch a show in the planetarium, peek into the fossil preparation lab, and explore the museum's vast specimen collections. Admission to the museum is free; see the museum's website for hours: *lsa.umich.edu/ummnh*

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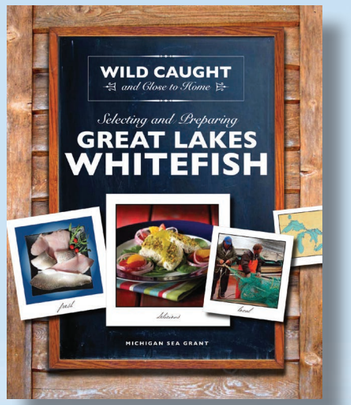

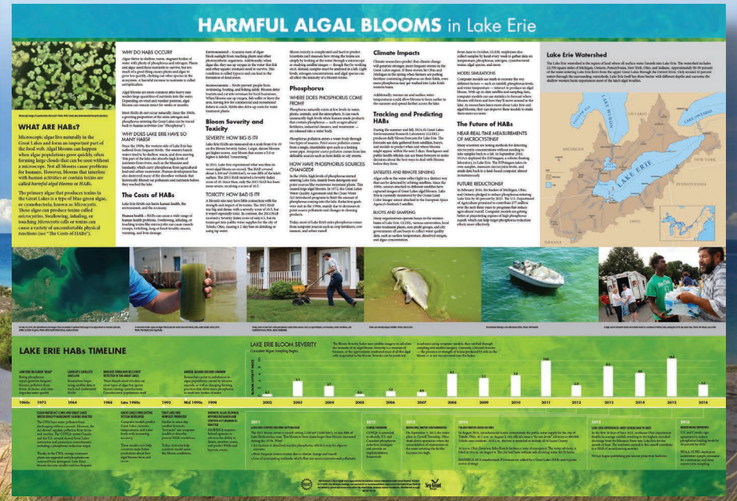

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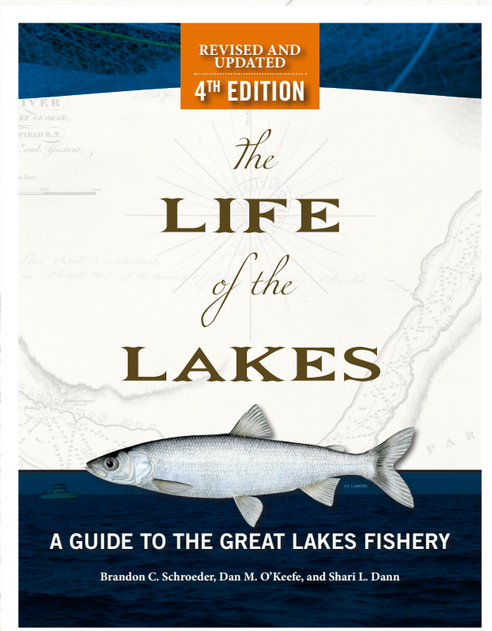

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