



Sea Grant
Michigan

Upwellings

MARCH 2019



Discovering New Trails

**Benefitting Michigan's
Communities and Visitors**

Notes from the Director



Catherine Riseng
Interim Director, Research Program Manager

It is with great honor that I have been serving Michigan Sea Grant (MSG) as interim director since July 2018 when Jim Diana retired as both MSG director and University of Michigan School for Environment and Sustainability (SEAS) professor. Jim left the program in excellent shape. I hope to use this opportunity to continue to build on the important work that MSG does to grow and accomplish great things for the state.

The MSG team is currently preparing for our four-year site review conducted by the National Sea Grant office. The site review provides an opportunity for our program to share the innovative research that we fund, our work with coastal communities, and our effective communications program, both with the review team and with partners. The review team will evaluate our accomplishments and progress toward attaining the goals and objectives we set in our 2014-2017 strategic plan. The site review will occur on April 2-4 in Ann Arbor and is open to the public. Please email me at criseng@umich.edu if you are interested in attending and providing input to the review team about how MSG has contributed to your community.

Additionally, I want to thank everyone who voiced support to Congress for continued funding of Michigan Sea Grant and the National Sea Grant College Program after it was zeroed out in the 2018 presidential budget. The dozens of letters from our diverse stakeholders impressed our congressional delegation and reminded them of Sea Grant's value to Michigan coastal communities and economies. Unfortunately, we expect to see a similar 2019 proposed budget so we may need to call on our stakeholders again for support.

Besides serving as the interim director, I also manage the research program. MSG is currently running the 2019 research request for proposals for projects funded from 2020 to 2022. Qualified researchers at Michigan universities and colleges are eligible. We targeted several research topics that our partners and Extension educators noted as important. These include: strategies for community engagement around coastal resilience; analysis of multispecies salmonine management in Lake Michigan; evaluation of whitefish decline in Lake Michigan and Lake Huron; analysis of the economic impact of aquatic invasive species; and mechanisms to advance tribal knowledge to inform community resilience planning. MSG will also fund a new cohort of graduate fellows. And we are excited to initiate an internship program for undergraduates to conduct a summer project focused on addressing environmental and sustainability challenges in their communities.

Finally, Michigan Sea Grant is hosting three Knauss Fellows that are currently getting settled in Washington, D.C., despite the early winter government shutdown. They will be working in legislative offices and the NOAA Sustainable Fisheries Office. It is very exciting to have Michigan's young professional talent in Washington sharing and expanding their knowledge and experiences to better link science and good public policy. The fellows are committed to sharing their experiences in MSG blog posts, so look for them in the next months at: msgfellowship.blogspot.com

This issue of *Upwellings* focuses on creative ways to link recreation with environmental stewardship and economic development in coastal communities. I hope that as you read it you will be encouraged to explore the coastal communities and ecosystems that make Michigan such a great place to live and work. 📧

THINK GREEN

Boating Season with the Michigan Clean Marina Program



Marinas are more than just garages and gas stations for the millions of boats that ply the Great Lakes. In some communities, marinas are the only place with public access to the water. Public and private marinas contribute to vibrant coastal economies, providing recreational hubs for residents and visitors alike.

Perched on the shore, marinas and harbors are also among the first to experience shifts in water quality or levels. However, it's not uncommon for marina facilities themselves to inadvertently contribute to water pollution through fuel spills, exhaust, litter, and chemical runoff.

The Michigan Clean Marina Program (MCMP) knows that marinas can be strong allies in the quest to keep the state's inland and Great Lakes waters clean. This voluntary program helps facilities follow environmentally sound marina maintenance and boating practices to reduce pollution, enhance fish and wildlife habitat, and protect Great Lakes water quality. The program is jointly administered by Michigan Sea Grant and the Michigan Boating Industries Association.

Michigan Clean Marinas act to reduce and eliminate releases and discharges of harmful pollutants, sediments, nutrients, trash, and anything else that can damage aquatic environments. Participating marinas go through a guided certification process, learning about best management practices in an online classroom. With the help of a MCMP consultant, they choose and implement practices that fit their facility, such as installing rain gardens or training staff to avoid spilling fuel at the pump.

Certified Clean Marinas can renew their status every three years by revisiting the online classroom and keeping up with the recommended best management practices.



The result is a community of close to 80 certified marinas around the state that follow policies to ensure cleaner, safer, and more environmentally friendly operations.

“Belonging to an ever-growing group of certified Clean Marinas has many advantages for a marina owner and marina staff,” says Erin De Vries, Michigan Sea Grant program coordinator. She points to potential financial benefits that marinas can anticipate when they join the program. “Certified marinas receive personalized best practices recommendations from certification experts that improve the aesthetics and operations of their facility, which increases slip rentals and boater return rates year after year.”

Participating in the MCMP conveys other industry perks. As Erin notes, “Another benefit to flying the Clean Marina flag is the discounts marinas can receive on liability insurance, marine equipment, and marine trade associations.”

Marinas who join the MCMP are in good company; Clean Marina certification programs are popular around the country. Michigan was one of the first Great Lakes states to implement a Clean Marina program. Now, certification-based programs in Michigan, Illinois, Indiana, Minnesota, Ohio, and Wisconsin work together through the Great Lakes Clean Marina Network to refine their certification criteria and better collaborate on innovative solutions to shared challenges. The network was formed in 2008 and is co-led by Michigan and Ohio Sea Grants.

A BANNER YEAR

Last year marked an exciting period of growth for the Michigan Clean Marina Program. In 2018, 16 new marinas became certified, along with 13 who renewed their certification. This was up from seven new marinas in 2017 and three in 2016.

2018 also saw the launch of a new series of Clean Marina Classroom Live workshops. The in-person workshops allow staff from new and recertifying marinas to walk

through the online classroom in a single afternoon, swapping tips and getting personalized advice from Clean Marina consultants and Michigan Sea Grant staff. By the time they leave, workshop attendees are ready for a one-on-one facility visit from Clean Marina staff, one of the last big steps before certification.

MCMP staff will host additional workshops around the state in 2019. Watch the Michigan Sea Grant events calendar for upcoming dates: www.michiganseagrant.org/events

STORMWATER SOLUTIONS

In 2019, a team from Michigan, Ohio, and Wisconsin Sea Grants are embarking on a three-year venture to help marinas make their facilities more environmentally sustainable by harnessing the power of green infrastructure.

Michigan Sea Grant leads the three-state Sea Grant team that was granted \$839,000 in 2018 by the Great Lakes Protection Fund, an endowment established by seven states in 1989 to support projects that restore or enhance Great Lakes ecosystem health.

The project, titled “Advancing Stormwater Management at Marinas in the Great Lakes,” will support creation of a tool to help marinas make wise decisions about managing water as it flows across their facilities.

Stormwater runoff — including rainwater and snowmelt — can carry sediments, chemicals, pathogens, and litter straight into the nearest water body. Marinas that can’t manage stormwater efficiently are at higher risk of flooding, erosion, water contamination, and sewage problems. As coastal storms become more frequent and severe, and as water levels continue to fluctuate, it’s more vital than ever for marinas to make smart choices about how to handle stormwater.

Increasingly, marinas are turning to green infrastructure systems to slow, capture, and filter rainwater and



JOIN THE CLEAN MARINA MOVEMENT

Learn more about the Michigan Clean Marina Program at: www.michigancleanmarina.org

Find the Great Lakes Clean Marina Network at: www.glcleanmarina.org



snowmelt before it enters nearby water bodies like the coastal waters of the Great Lakes. Green infrastructure installations like rain gardens, porous pavement, and green roofs can boost property values, add aesthetic appeal, reduce operational costs, enhance water quality, and decrease flooding.

Adding green infrastructure to marinas can be as simple as choosing alternative types of plants. Michigan Sea Grant's Erin De Vries is partial to rain gardens, groupings of native plants installed where water typically drains or collects. "I like seeing rain gardens surrounding bathroom facilities or planted in place of grass between the boathouse walls and a sidewalk or parking area," she says.

However, there are barriers to implementation of green infrastructure at Great Lakes marinas. Green infrastructure projects are sometimes perceived as difficult and expensive to install and maintain. And not every installation will be appropriate or effective at every facility.

That's where the Clean Marina project team comes in. With support from the grant, staff from the three states will spend six months developing a decision-support tool to help owners and operators choose the best infrastructure projects for their marinas.

The team will test the tool by using it to choose a green infrastructure practice for one or two private marinas in the states of Michigan, Ohio, and Wisconsin. During the final two and a half years of the grant, the team will help the marinas design and install the selected green



infrastructure practice, including signs and resources to educate curious marina patrons. Researchers from the Ohio State University will monitor the sites before and after the installations to record changes in water quality.

This project has the potential to meet many needs in the Great Lakes region. The decision-support tool will make it easier for marinas to choose feasible and effective stormwater management strategies that fit their facility. Educational resources will teach boaters about the power and potential of green infrastructure. By sharing their tool and insights with the broader Great Lakes Clean Marina Network, the team will help Clean Marina programs throughout the Great Lakes states implement green infrastructure to manage stormwater at coastal marinas.

"We are very grateful that the Great Lakes Protection Fund recognized the importance of improving stormwater management at Great Lakes coastal marinas," says Catherine Riseng, Michigan Sea Grant's interim director and research program manager. "We feel that this project furthers the Fund's mission to change the world through improved use of water and Sea Grant's dedication to the protection and sustainable use of Great Lakes and coastal resources." 📌

Taking on invasive species, *paddle in hand*

As soon as the weather warms, Michigan's lakes and rivers will once again teem with paddlers. Kayaks, canoes, and stand-up paddleboards continue to be popular ways for residents and visitors to traverse the state's many waterways in search of tranquility or adventure.

This year, Michigan Sea Grant will start enlisting those paddlers in a fight to protect the waters they love through the newly created MI Paddle Stewards program.

HITTING THE WATER TRAIL

Paddling offers a number of advantages for folks aiming to get out on the water. Canoes, kayaks, and paddleboards tend to be small enough to navigate shallow or obstructed areas, allowing access to routes typically off-limits to motorized boats. Compared to vessels with motors, paddling crafts tend to be less expensive to buy and store, easy to rent, simple to learn, and quiet enough not to disturb residents and wildlife.

With growing numbers of paddlers hungry for aquatic excursions, more communities are promoting the use of designated water trails.

Not just any river or stream can earn the "water trail" label. The term typically describes routes along lakes, rivers, canals, or bays that carry travelers past notable historical, natural, or cultural hotspots. Water trails must be open to non-motorized watercrafts such as kayaks,

canoes, rowboats, paddleboards, or sailboats.

Trails are also characterized by well-established access and launch points and are actively maintained by a local community or organization. The popularity of trail networks allows communities and land managers to promote and use existing infrastructure — such as launches and parking areas — in a different way, expanding economic development opportunities.



These parameters come from the Michigan Great Lakes Water Trails Working Group, a crew of volunteers from Michigan Sea Grant, Land Information Access Association, and a variety of state agencies, universities, local governments, planning commissions, paddlers, and more. The group hosts a Michigan Water Trails website (www.michiganwatertrails.org), where users can find trail maps, safety information, and plenty of other paddling resources.

"Before the Michigan Water Trails website, there was no single source for trail managers and users to find statewide information," says Mary Bohling, a Michigan Sea Grant Extension educator. "This website provides a critical link between all of our water trails."

Mary is no stranger to the water trails movement; she helped establish the Lake St. Clair Coastal Water Trail and Detroit Heritage River Water Trail, both located in the Metro Detroit area.





ANITA TWARDESKY, RIVERSIDE KAYAK CONNECTION

The Michigan Water Trails site catalogs more than 3,000 miles of trails across the state, from a loop around Isle Royale in northern Lake Superior to a Lake Erie trail that crosses the border into Ohio. Many trails move along or toward a lakeshore, while others are fully inland.

In December 2018, the Michigan Department of Natural Resources and Office of the Great Lakes announced the first eight state-designated water trails, which together span more than 540 miles. Nearly all of the trails are in southeast Michigan, in addition to an 80-mile route winding through the Chain of Lakes near Grand Traverse Bay. The state-designated trails range in length and difficulty, from a 10-mile loop in St. Clair County to the 104-mile Huron River Water Trail in Livingston, Oakland, Washtenaw, and Wayne counties.

UNWANTED TRAVELERS

Unfortunately, paddlers and local economies aren't the only ones benefiting from Michigan's growing network of water trails. Every canoe, kayak, or paddleboard pulled out of the water could be harboring hitchhikers: aquatic invasive species.

Aquatic invasive species are plants, fish, snails, viruses, and other organisms that move into and colonize ecosystems where they don't belong, usually damaging native species and water quality in the process.

More often than not, the aquatic invaders reach new territories with the help of unwitting humans. They get transported as live bait, planted in flower gardens, imported for fish ponds, carried in the bellies of shipping freighters — or snagged on kayak rudders and stranded in puddles at the bottom of poorly drained canoes. If a

non-native stowaway is still alive when the boat splashes into the next water body, the invader could find itself in fresh territory.

A single plant fragment or virus probably can't spark a full-blown invasion. But enough paddle crafts carrying aquatic invaders — especially into water bodies that are only recently open to public use — could change an ecosystem forever.

Natural resource managers have worked hard to help motorized boaters avoid transporting invasive species. Season after season, volunteers have camped out at boat launches and installed informational signs encouraging boaters to clean, drain, dry, and inspect their vessels before heading to another dock.



Until now, similar efforts in Michigan haven't really targeted paddlers, who may not use the same boat launches as motorized boaters. Thanks to a new program from Michigan Sea Grant and Michigan State University Extension, that's about to change.

MI Paddle Stewards launches this year with a series of training workshops to help paddlers become allies in the fight against aquatic invasive species. They'll learn how to detect and report any invasive species they spot while paddling a water trail.

They will also learn how to clean their crafts to avoid giving invaders a free ride. These new ecosystem ambassadors will be encouraged to pass their knowledge to other paddlers.

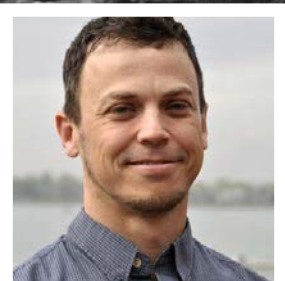
The program will also create a series of videos to demonstrate proper boat cleaning techniques, which will be available on the Michigan Water Trails website.

Michigan Sea Grant Educator Mary Bohling is one of the program's leaders. "Because of this program," she says, "at least 300 extra sets of trained eyes and ears will be out there searching for new invaders, aiding the state's efforts toward early detection and rapid response."

With help from a \$200,000 grant from the state, MI Paddle Stewards will host workshops targeting 12 water trails in June through November 2019. Watch Michigan Sea

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Reviewing Howard Tanner's *Something Spectacular: My Great Lakes Salmon Story*

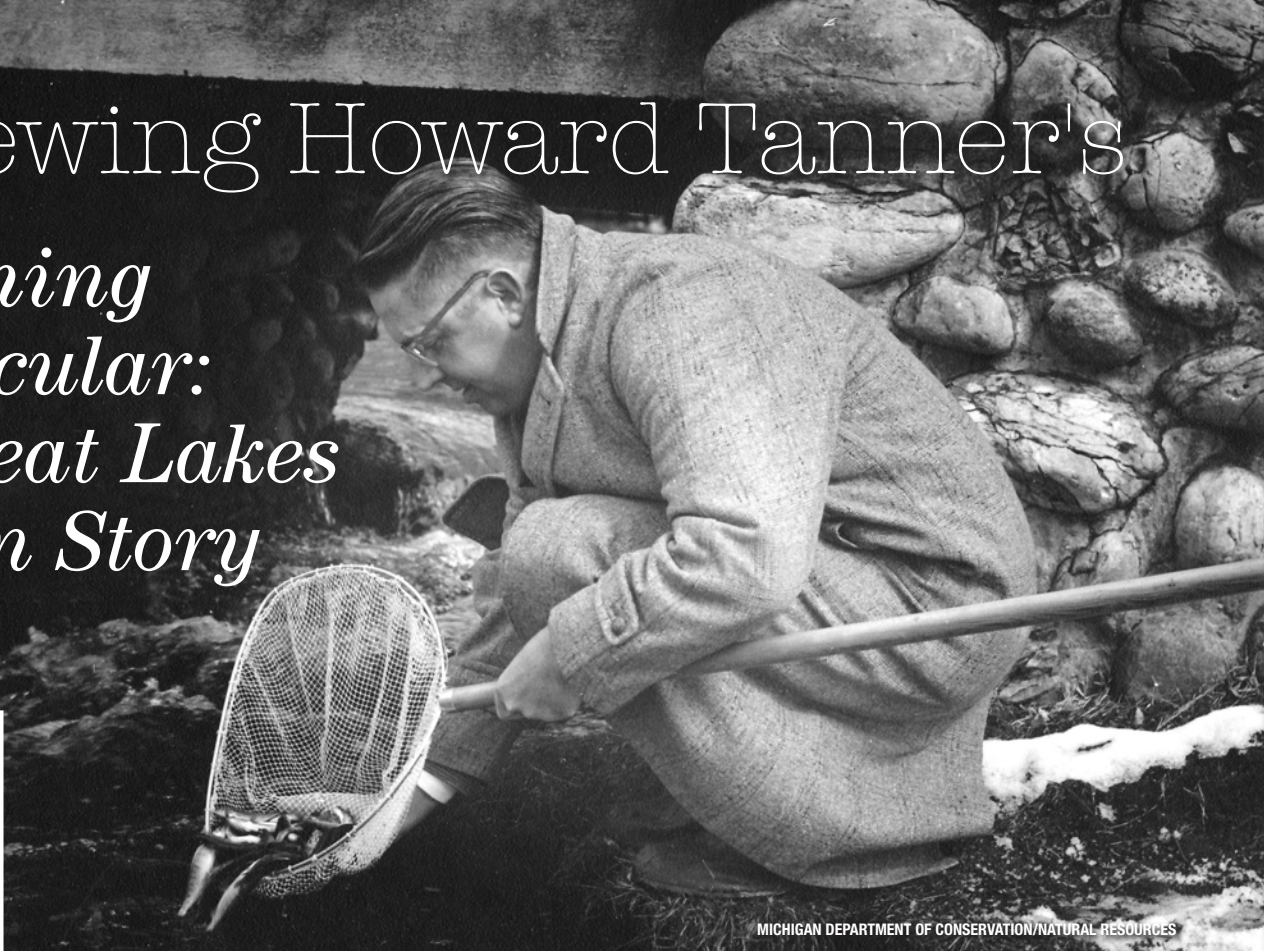


By Dan O'Keefe

REVIEWER'S NOTE: Looking back at my own life and career, Dr. Howard Tanner's influence looms large.

My decision to study Fisheries and Wildlife at Michigan State University was based on two things: they offered a course in ichthyology (the study of fish — at the time I did not understand exactly what fisheries management entailed), and the fact that the Red Cedar River flowed through campus and supported a run of coho salmon. When I was a student at MSU, Dr. Tanner gave a guest lecture in a course on Great Lakes issues, and I began to use the example of his decision to explain to family and friends what the field of fisheries management is all about, and how it can relate to people who don't necessarily care about fishing.

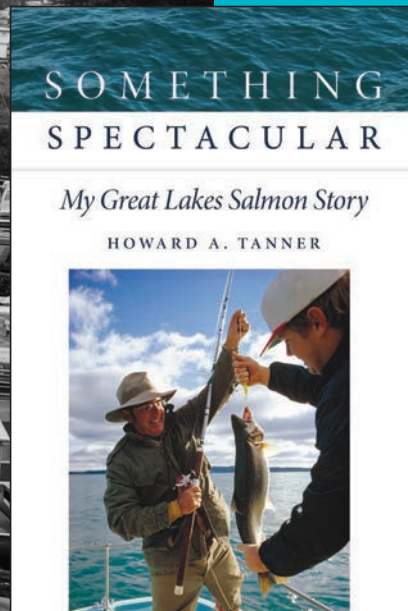
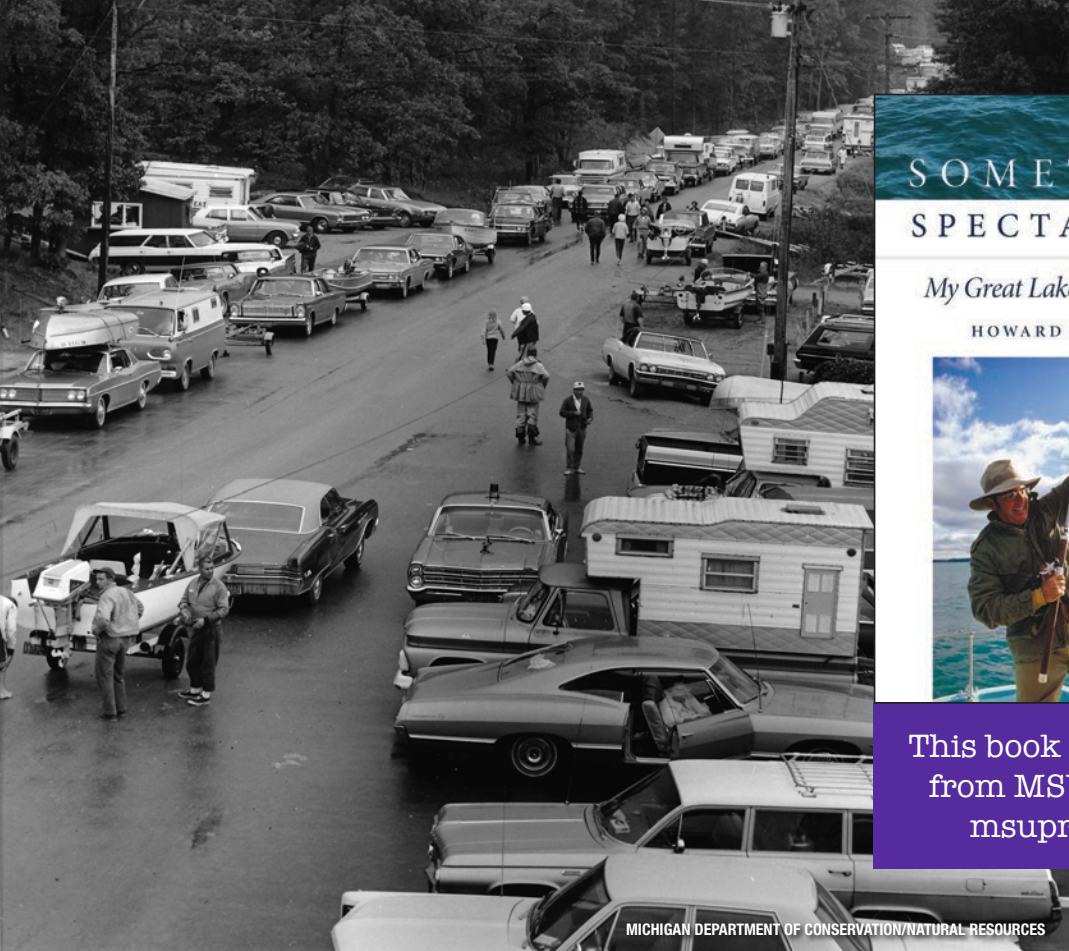
Now, as an Extension professional working with Great Lakes charter captains and recreational salmon anglers, I can attest to the fact that Dr. Tanner's legacy is very much appreciated by people who launched their own businesses, organized their social life, and invested their savings on the promise of salmon in the Great Lakes. After half a century of salmon and the appearance of quagga mussels, spiny water fleas, round gobies, and other invaders, we are now grappling with the question of how to best balance the mix of salmon and trout species with shrinking (or at least changing) food resources.



It would be hard to understate the impact that Dr. Howard A. Tanner had on the Great Lakes region. Tanner was at the helm of the Michigan Department of Conservation's Fish Division from 1964 until 1966. During this brief moment in time, Tanner set the course for massive change. Ultimately, his decisions were largely responsible for not only the introduction of coho and chinook salmon, but also the shift in emphasis from commercial to recreational fisheries management on the lakes, the rise of state authority and decline of federal authority to manage these fisheries, massive changes to state hatchery systems, and the beginning of state involvement in Great Lakes fishery research.

In the court of public opinion, Tanner's actions were heralded as a great success. Coastal tourism boomed, tackle companies flourished, and property values soared as "coho madness" drew unprecedented numbers of anglers from Michigan and surrounding states. Beaches that had been littered with the decaying bodies of invasive alewives now bore witness to the birth of a world-class fishery. The small silvery alewives were nearly worthless to commercial fishermen, but their booming population provided ample food for salmon.

This 30-second story is common knowledge around Lake Michigan. It is one of those rare moments in fisheries history that transcends the community of anglers, commercial fishers, and fisheries professionals. The oft-paraphrased



This book is available
from MSU Press at
msupress.org

Opposite page:
Howard Tanner
stocks a smolt.

Left: Anglers
fishing for coho
first had to find
a place to park.

Below: This
rainbow trout was
Tanner's largest
catch as a child.

"line of dead fish 300 miles long" that littered popular public beaches and prime waterfront real estate was undoubtedly a key to public interest, but the booming salmon fishery that followed also enjoyed broad appreciation due to its obvious economic impacts.

It would have been tempting for Tanner to focus only on the positive in this autobiography. Indeed, he is certainly cast as the hero of the story, but there is also a great deal of reflection on the salient criticism he received. By his own admission, he was well aware of the "firm dogma against introducing non-native species" that was based on the hard lessons and failures of the past.

Tanner's rebuttal to his critics sometimes reads as realpolitik justification or contention that the ends justified the means. After all, we now have more resilience and stability in predator-prey balance thanks to the increased number of predatory species found in open water. However,

Tanner is also very honest about his primary motivation to "do something ... spectacular" and create a new recreational fishery.

It is fortunate that Dr. Tanner elected to write this book late in life (he is 95 at the time of publishing) because he was able to write with unvarnished honesty without risk to his professional position or the careers of colleagues. Of course, Tanner often references his membership in the "Greatest Generation" of WWII veterans and this context is very important to understanding the attitudes and cultural norms that enabled these decisions. Even so, some of Tanner's stories might be judged more critically by today's standards.

Originally, his plan to do something spectacular for Michigan's sport fishery involved three non-native fish. From a historical perspective, the discussion of all three fish species that were considered was particularly

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HOWARD A. TANNER COLLECTION

THE GREAT LAKES FISHERIES HERITAGE TRAIL

Stories of people, fish, and fishing

You don't need hiking boots or a bicycle to explore the Great Lakes Fisheries Heritage Trail — just a map and a healthy sense of curiosity.

The Great Lakes Fisheries Heritage Trail (GLFHT) is more than a route from Point A to Point B. After all, Great Lakes fisheries aren't confined to specific physical locations. They are intricate webs of fish populations and their aquatic environments, as well as the people who fish for fun, food, or profit. Great Lakes fisheries are constantly changing, reflecting and driving broader shifts in aquatic ecosystems, biodiversity, water quality, and local economies.

So how can a trail on a map capture this rich vein of history and science?

A NEW KIND OF TRAIL

People often associate trail networks with hiking in national parks. However, the phrase has grown to encompass a wider variety of recreational activities.

Trail networks offer series of stops that connect users with unique regional resources, such as prime birding locations or urban kayak launches. A growing tourism trend, trail networks allow communities to showcase their natural and cultural attractions in new ways. Residents and visitors alike can follow trail networks to discover new adventures or find hidden depths in their own communities.

Each stop along the Great Lakes Fisheries Heritage Trail offers tourists and residents experiences and opportunities to explore the dynamic social, technological, and environmental changes that have shaped today's fisheries.

For history buffs, boaters, anglers, seafood lovers, and science nerds, the GLFHT offers an ever-growing network of museum exhibits, coastal fishing communities, fish markets, and research and science centers around the Great Lakes. Trail explorers can feast at fish festivals, visit commercial fishing docks, tour state hatcheries, and discover personal stories from families that have been landing catches for generations.

"I've most enjoyed visiting our maritime museums around the state," says Michigan Sea Grant Extension Educator Brandon Schroeder. "These museums bring our rich Great Lakes fisheries history and heritage to life, and they have provided the inspiration and leadership for this partnership and trail project."

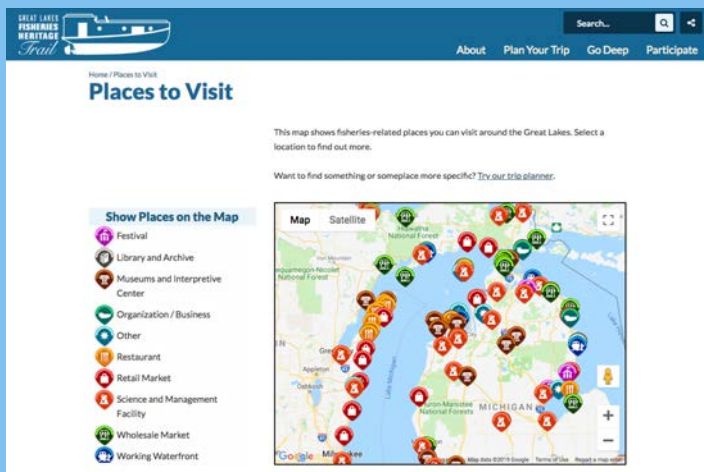
Hailing from the Alpena area, Brandon is one of the major driving forces behind the Great Lakes Fisheries Heritage Consortium, a network of organizations working to bring fisheries heritage to life as a means of advancing coastal tourism, community development, and Great Lakes literacy and stewardship.

"The Michigan Maritime Museum in South Haven and the Besser Museum for Northeast Michigan in Alpena provided the initial spark for this network," he says. "Both now showcase newly restored commercial fishing tugs at the center of their local fisheries heritage exhibits."

GREAT LAKES FISHERIES HERITAGE



TRAVERSE AREA DISTRICT LIBRARY LOCAL HISTORY COLLECTION



TOOLS FOR EXPLORATION

A newly launched website gathers GLFHT attractions in one place, connecting users with fisheries sites and experiences for their next summer road trip — or helping them discover a fisheries heritage gem in their own town. Currently, website users can find a wealth of trail sites across Michigan and Wisconsin, along with a few sites in other states, using an interactive map.

The website offers a searchable database of sites and activities, as well as suggested stops organized by interest area, such as places where visitors might access environmental research or simply find a place to buy or eat fish. Users can select sites to arrange their own trail tour, find places to visit that have organized their own collections of fisheries sites and experiences, or explore the Great Lakes through a variety of trail stories.

“This is a community-driven website designed for networking and sharing,” says Brandon. “Everyone benefits in connecting and learning with each other.”

Brandon says he’s most excited about the website’s collection of trail stories, features that “thread together fisheries heritage stories across communities and the region.” Through these stories, users can explore the life of a commercial fishermen, the legendary lake whitefish, the

“turtle back” gill net tug, and more. Users can also learn more through a self-guided section including educational resources (of interest to teachers), information about Great Lakes fish, photo libraries, and archives.

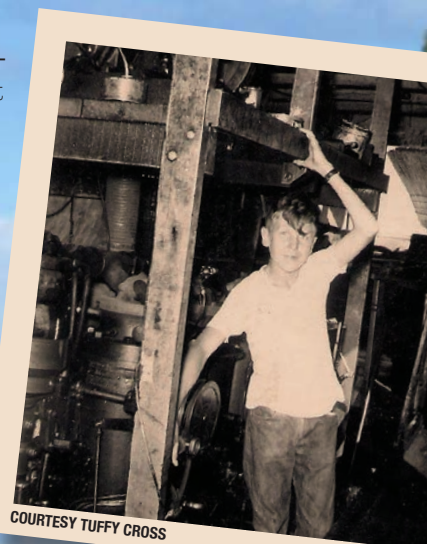
Visit the website at:
www.greatlakesfisheriestrail.org

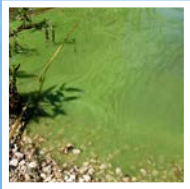
A TEAM EFFORT

In addition to the website and educational events, the Great Lakes Fisheries Heritage Consortium also hosts an annual fisheries heritage conference. The fall event is an excellent networking opportunity for anyone interested in promoting maritime heritage tourism and Great Lakes stewardship.

Both the network and the trail system continue to expand. “Our vision is that this project grows into a truly regional Great Lakes trail,” Brandon says. “It has been fantastic exploring fisheries heritage connections across Michigan with Wisconsin Sea Grant, and we have plenty of room to grow! I am looking forward to exploring and expanding through new fisheries heritage sites, experiences, and stories with our Sea Grant colleagues in neighboring Great Lakes states.”

Michigan Sea Grant is a leadership partner for the Great Lakes Fisheries Heritage Consortium. Funding for this project was provided, in part, by the Michigan Coastal Zone Management Program, a program of the Department of Natural Resources and the National Oceanic and Atmospheric Administration. Visit the GLFHT website to explore and learn more about the trail network and partnerships. ✓





“Farmers want to prove that we are sustainable and good stewards of the land. The Michigan EnviroImpact tool helps us, along with the other tools we have, with nutrient management.”

Brent Wilson

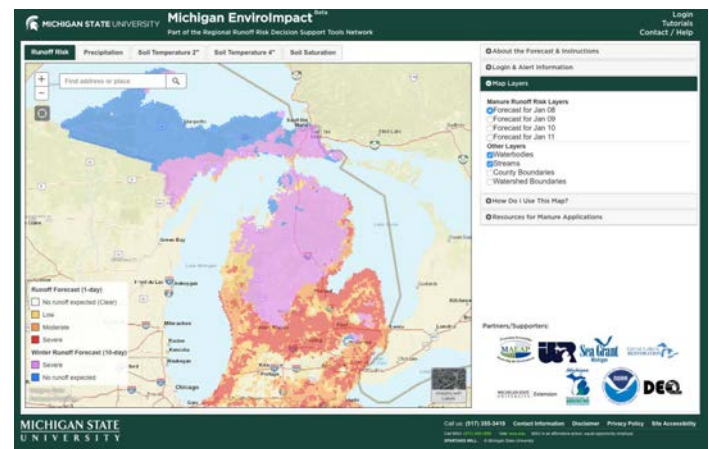
Wilson Centennial Farm (established in 1851)

MANURE APPLICATION WITH THE MICHIGAN ENVIROIMPACT TOOL

Manure application is an alternative way to add nutrients to crops. Livestock operations can be a large source of manure nutrients. That's why it's important to focus on ways to reuse these nutrients for crop production and not just dispose of them. With the Michigan EnviroImpact tool and effective manure nutrient application, farmers can reduce their use of commercial fertilizers and save money.

WHAT IS THE MICHIGAN ENVIROIMPACT TOOL?

The Michigan EnviroImpact tool shows daily runoff risk across Michigan using National Weather Service information about precipitation, soil moisture and temperature, and landscape characteristics. Farmers can use this information as a decision support tool to effectively plan short-term manure application.



Create a free account, watch tutorials, and learn more at:
www.enviroimpact.iwr.msu.edu



Extension



This project was prepared by MSU under award NA14OAR4170070 from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce through the Regents of the University of Michigan. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration, the Department of Commerce, or the Regents of the University of Michigan. This project was also supported by the Great Lakes Restoration Initiative. MSU is an affirmative-action, equal-opportunity employer, committed to achieving excellence through a diverse workforce and inclusive culture that encourages all people to reach their full potential. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status. Michigan Sea Grant helps to foster economic growth and protect Michigan's coastal, Great Lakes resources through education, research, and outreach. A collaborative effort of the University of Michigan and Michigan State University, Michigan Sea Grant is part of the NOAA-National Sea Grant network of 33 university-based programs.

Michigan Sea Grant supports innovative researchers and passionate students



TIFFANY SCHRIEVER

Much of Michigan Sea Grant's work happens in public spaces: workshops, camps, lectures, webinars, display tables, cruises, social media, and more. But what about the work that fewer people get to see?

In addition to education and outreach, Michigan Sea Grant is dedicated to advancing robust research into issues that affect the Great Lakes ecosystem and Michigan's coastal communities.

THE CYCLE OF RESEARCH

Every two years, Michigan Sea Grant funds a fresh crop of grant proposals from researchers around the state. These projects bring together innovative teams from Michigan universities who tackle challenging issues facing coastal communities and Great Lakes ecosystems. Projects submitted through our request for proposals (RFP) undergo a competitive, peer-reviewed process. The next round of successful proposals will be announced in the fall of 2019, with funding in 2020-2022.

Our research program provides science-based information that is useful to decision makers, advances the state of Great Lakes knowledge, and is leveraged by a wide variety of partners, including state and federal agencies, non-profits, educators, and other research institutions. We regularly work with researchers to spread the word about their projects through journal articles, blog posts, news media, and social media.

Learn more at:

www.michiganseagrant.org/research

SUPPORTING THE NEXT GENERATION

Michigan Sea Grant also helps students access fellowships and internships that could inform their future careers in science or policy. We offer funding to graduate students at Michigan universities and colleges whose thesis or

dissertation research addresses questions facing Great Lakes ecosystems and communities. These graduate research fellows explore an extra dimension of their work by partnering with a local, state, or federal agency doing complementary work. Interested students apply through our regular two-year RFP.

New in 2019, undergraduate students from around Michigan can apply to us for summer internship funding. This internship will support several students to work with an agency, non-profit, business, or academic department on a project related to Great Lakes stewardship. The support will empower students to create their own internship from scratch or accept a position that might otherwise be unpaid. The funding is particularly aimed toward students from low-income and underrepresented backgrounds. We plan to continue offering this funding in coming years to encourage a new generation of scientists and decision makers.

We also coordinate applications for several national fellowships through the National Sea Grant Program and National Oceanic and Atmospheric Administration (NOAA). The popular Knauss Fellowship places graduate students or recent graduates in federal and legislative host offices, where they work at the cutting edge of ocean, coastal, and Great Lakes science and policy. ✓

Learn more about fellowship and internship opportunities at:

www.michiganseagrant.org/student-opportunities

Read posts from fellows on our Fellowship Blog:
msgfellowship.blogspot.com



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Grant's online events calendar for upcoming workshop dates at: www.michiganseagrant.org/events

Look for MI Paddle Stewards at events like the Quiet Water Symposium, an annual gathering held in early March in East Lansing to celebrate all types of non-motorized outdoor recreation.

Mary envisions the program taking on a life of its own, even after the grant support wraps up in 2021. "At least three local water trail groups have committed to offering future workshops beyond the 12 happening in 2019," she says. Local partners will be able to rely on the Michigan Water Trails Manual, created by the Land Information Access Association and available on the Michigan Water Trails website. The manual will soon include an addendum on how to create a volunteer stewardship committee to support a new or existing water trail. 📌

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interesting. Kokanee salmon (a landlocked form of sock-eye salmon) were introduced to inland lakes in Michigan before coho salmon were stocked in the Great Lakes, based in part on Tanner's knowledge of fisheries for stocked kokanee in reservoirs from his time in Colorado. In short, the kokanee program was a failure despite early predictions for their success. Striped bass stocking in certain Great Lakes waters was considered in addition to salmon, and Tanner details the difficult decision to destroy striped bass broodstock after they were brought to a hatchery in Michigan from South Carolina.

At the end of the day, Tanner maintains his belief that the salmon introduction was "the right decision at the right time." A great many anglers, coastal residents, and small business owners along the Great Lakes' shores would agree with this wholeheartedly. Among fisheries biologists and Great Lakes ecologists, I think it is fair to say that opinions are more nuanced, while state-licensed and tribal commercial fishers have more negative views (which are explored along with sport fishing views in the book *Fish for All* by Michael J. Chiarappa and Kristin M. Szylvian).

In addition to providing an insider's perspective on the birth of the Great Lakes salmon fishery, Tanner provides readers with a look at his early life spent fishing for trout, deployment in the South Pacific, and his graduate research on lake fertilization. Along with providing context for his

later work, these early chapters serve to remind us just how much things have changed since the early days of fisheries management.

For example, Tanner initially hypothesized that fertilizing lakes would increase trout production. After adding nutrients to a lake, Tanner observed that trout growth increased over the first summer, but there was a large fish die-off that winter due to oxygen depletion below the ice. Today we take it for granted that fertilizing glacial lakes in the upper Midwest is a terrible idea because excess nutrients lead to increased decomposition and decreases in dissolved oxygen. Early research projects like Tanner's provided the science that led to our current paradigm of seeking to reduce nutrient inputs to lakes, as opposed to increasing them.

Mindsets change slowly, but Dr. Tanner's tell-all autobiography paints us a vivid picture of that moment in time where everything changed dramatically and almost overnight. Those times still factor into the psyche of today's anglers. The mix of seemingly unlimited forage, the overnight sensation of a booming fishery in response to stocking, and the equation of "more fish stocked = more fish caught" that held true for decades left a deep imprint. Now, as we collectively look toward the future, Tanner's book provides crucial historical context for our present situation and a thoughtful exploration of the critical factors that led to his decision. 📌

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