SURROUNDED BY GREATNESS

Michigan Sea Grant works with partners for a sustainable future
Notes from the Director…

As Michiganders, we proudly describe our origin in the Great Lakes state. It is hard to envision Michigan without including the Great Lakes’ role in our quality of life, recreation, tourism, economy, industry, and transportation.

Jim Diana
Michigan Sea Grant Director

Sea Grant is a program of the National Oceanic and Atmospheric Administration in the U.S. Department of Commerce. As such, we focus not only on the application of science to the environment, but also to the economy. According to a 2009 Sea Grant study, approximately 862 billion in wages came from jobs related to the Great Lakes, which produced about 15 percent of all jobs and 23 percent of all payroll in Michigan. Clearly, the Great Lakes are an economic engine to be cherished by all of our citizens. This economy must continue in a sustainable manner so future generations can also benefit from the value we find in the Great Lakes.

Michigan Sea Grant has always looked at economic aspects of the coastal environment. There has been a long-standing effort to improve commercial fisheries and aquaculture through programs such as the Seafood HACCP — a program certifying the quality of seafood — as well as through fisheries workshops and other activities that promote knowledge of the Great Lakes and their role in commercial fishing and aquaculture. Sea Grant has helped encourage tourism through sport fishing, fishing tournaments, charter fishing, and expansion of water and birding trails. We have helped coastal communities thrive and become more financially sustainable through their harbors, working waterfronts, and historical heritage sites. All of these have helped local communities understand and use their unique resources for a sustainable economy and a high quality of life.

This issue of Upwellings focuses on the economic impacts of some of Michigan Sea Grant’s projects. All of these efforts rely on a large number of people who do research and outreach from local to state to national levels to further understanding and development of coastal resources.

I am proud of the fact that Michigan Sea Grant works today as one family in making this happen, not only involving combined efforts from our staff at the University of Michigan and Michigan State University, but scientists from other universities and agencies, as well as stakeholders in local communities and governments.

In Michigan, we are exceedingly fortunate to be surrounded by 20 percent of the world’s surface freshwater, which is still in excellent condition and contributes not only to our economy, but to our quality of life and the future of our children. It is through programs that link youth education, stakeholder involvement, and science that these resources can be sustained into the future. I encourage you to look at the following projects as ways Sea Grant has functioned to make those connections and help shape the Great Lakes environment of the future.

The Heart of Michigan Sea Grant

At Michigan Sea Grant, we love to brag about the Great Lakes. These astonishing lakes and their connecting rivers make up the planet’s largest body of fresh water. They provide drinking water for millions of people, span an international border, sustain billions of dollars of economic activity every year — and they are stunningly beautiful.

That’s why we have been working diligently since 1969 to help people around Michigan understand and love the Great Lakes. We leverage our broad network of partner organizations to:

- Support and coordinate research projects at Michigan universities to help answer pressing questions about issues affecting coastal ecosystems and communities.
- Act as honest brokers of information, putting research findings into the hands of regulators, scientists, policy makers, and community members who can use the data to make informed decisions about their interactions with the Great Lakes.
- Host classroom activities, workshops, lectures, camps, and field trips that connect students and adults with our state’s marvelous freshwater seas.

Interested in joining us? Get in touch with your regional Michigan Sea Grant Extension educator (see map on back cover) for volunteer opportunities or events near you.

Michigan Sea Grant Extension educator (see map on back cover)

Updates via Facebook and Twitter #MiSeafood
michiganseagrant.org/seafoodsummit

May 16, 2017
Cobo Center & The Atheneum, Detroit, MI

Hosted by MICHIGAN SEA GRANT
this annual event:
- Highlights commercial fisheries, aquaculture, and local seafood.
- Brings together fisheries professionals, chefs, and the public for a day to talk about and taste Michigan seafood.
- Features a Michigan seafood banquet created by renowned chefs.
Michigan is home to more than 80 public marinas and harbors, managed by state, county, or local governments. They are part of a boating culture that draws $2.4 billion in economic activity to the state each year. Even so, with increasingly scarce state and federal funding, public facilities face plenty of challenges.

A new state mandate also requires state-funded boating facilities to develop five-year management plans, so the time is ripe for managers to think carefully about the long-term future of their harbors.

The Sustainable Small Harbors project, funded by Michigan Sea Grant and a host of partners, aims to assist coastal communities in their planning efforts. The project has enabled several coastal communities with public harbors to do in-depth self-assessments, uncovering strengths and weaknesses related to their waterfront assets. Participants brainstormed what they want their town’s twenty-year future to look like and developed concrete ideas for projects that could help that future become a reality. In the past year, some towns involved in the project have already parlayed these insights into dollars and cents.

This co-funding model effectively leverages public dollars to benefit Michigan communities in an unprecedented level of partnership among Michigan Sea Grant and its state and university partners.

The Rogers City Marina was a focal point of the community’s discussion about the future of its waterfront.

The Sustainable Small Harbors project was launched in 2014 as an integrated assessment — a type of research venture designed to draw together existing data into an overarching analysis of a given issue. The goal is to identify the barriers preventing small harbors from becoming economically, socially, and environmentally sustainable.

The project has been spearheaded by Don Carpenter of Lawrence Technological University. Funding came primarily from Michigan Sea Grant and multiple state agencies (see box for full list of project partners). An additional grant from the State of Michigan helped expand the project beyond its initial two-year run.

ELEVATING COMMUNITY VOICES

To complement the integrated assessment, the project team developed a series of case studies featuring small harbor towns from around the state. In 2015 and 2016, the project team visited the six case-study communities (see map) and facilitated in-depth visioning sessions to help community members develop and prioritize meaningful ways to make their waterfronts more environmentally, financially, and socially sustainable. The team was able to provide these highly interactive, public input-driven workshops, or “charrettes” — typically valued at tens of thousands of dollars — at no direct cost to the communities.

Michigan’s harbor towns have weathered many storms in the last few decades. Factors such as fluctuating water levels and seismic shifts in the state’s economy have left some harbor communities struggling to adjust. But that’s not the end of the story. Tourist dollars are returning to Michigan after the financial recession, and there is a growing interest in dining and outdoor recreation opportunities in towns along the state’s coasts. Public harbors typically occupy prime waterfront real estate and could function as vital drivers for flagging local economies if bolstered with the right amenities.
What happens during a charrette?

The Sustainable Small Harbors project team visits a community three times: a one-day orientation visit, the main three-day design charrette, and a final one-day visit a month or two later. During the charrette, the project team sets up a design studio where designers and architects illustrate and electronically render images for visions identified by the community. The community provides a public space to welcome participants in an iterative series of public input events. Attendees engage with fellow community members to sketch on large-scale maps, use color-coded stickers to vote on options, and participate in several feedback loops to ensure the project team is accurately reflecting a consensus vision.

“Our project team and state agency partners facilitated community conversations about the waterfront and enjoyed the opportunity to get to know more about these communities and their concerns and aspirations for the future,” says Amy Samples, Michigan Sea Grant coastal resilience specialist.

These brainstorming sessions typically involved three separate visits from the project team, which consisted of project lead Don Carpenter and representatives from Michigan Sea Grant and state agencies.

Before the team arrived in town, they already had worked with community leaders to gather information about the area’s demographics, city planning documents, and waterfront set-up. The initial one-day visit included a preliminary visioning meeting that introduced community members to the Sustainable Small Harbors project and guided participants through a self-assessment of the factors that made their waterfronts more or less attractive to residents and visitors alike.

The second visit, a three-day design charrette, invited the public to refine concepts from the original meeting. The concepts were developed into three alternative designs reflecting unique futures for the waterfront. Through a “dot voting” process (see example on right), participants were encouraged to weigh in on potential development options gleaned during the first visit.

Participants reflected on improving access to public harbors or potential avenues for transforming underperforming facilities. They weighed designs featuring combinations of street redesigns, new bike trails, pocket parks, kayak rentals, boat ramps, wheelchair-accessible restrooms, and other potential upgrades that could boost the community’s waterfront appeal. Upgrades that earned the highest participant support were compiled into a final series of design sketches and conceptual images, which the team presented at the end of the charrette.

At the Ontonagon Village Marina site, community members prioritized access to the Ontonagon Lighthouse and enhancement of marina facilities and amenities.
During the final one-day visit a few months later, the team presented a report to the city or village council. The report included potential funding sources, such as federal or state grants, foundations, and local champions, which the community and council could draw upon to launch the phased projects proposed in the final designs.

**TURNING VISION INTO ACTION**

In several cases, the charrettes galvanized community leaders to seek funding opportunities to support the designs prioritized by charrette participants. Community leaders have now leveraged the charrette designs to seek more than $3 million in grant funds to support proposed harbor projects. In 2015, the city of New Baltimore used the charrette designs to become finalists for a $2.85 million grant from the Michigan Natural Resources Trust Fund. The funds are intended for the purchase of the private Schmid Marina on Lake St. Clair, which would be opened for public use. The city will use additional funds from a different grant to upgrade the marina facilities for handicap use. The Michigan Natural Resources Trust Fund has called the project “a rare opportunity for the city to obtain a site to optimize their waterfront and downtown connections to the water for local businesses, residents, and tourists,” says Mark Breederland, Michigan Sea Grant Extension educator based in Traverse City.

Findings from the integrated assessment — along with the case studies and takeaways from an economic analysis of the multiple ways small harbors add economic value to communities — have been captured in the Sustainable Small Harbors Tools and Tactics Guidebook. The guidebook identifies the various stages of developing a strategy for harbor sustainability and serves as a tool for managers or officials seeking to do this kind of planning in their own communities.

**SPREADING THE WORD TO NEW COMMUNITIES**

The Sustainable Small Harbors team hopes other communities can benefit from these examples. “This project compiled best practices for coastal communities in regard to place-making strategies, smart waterfront growth, and tools that will allow communities to optimize their waterfronts and downtown connections to the water for local businesses, residents, and tourists,” says Mark Breederland, Michigan Sea Grant Extension educator based in Traverse City.

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“The guidebook is a resource to assist communities with harbor-specific planning,” she explains. It describes the importance of carefully planning for the long-term future of small public harbors, conveys best practices gleaned from the case-study communities, and provides resources for communities that want to walk through their own visioning process.

— Geneva Langeland

**Five research projects launch with Michigan Sea Grant’s support**

1. Mary Michigan communities are interested in using plant-centric green infrastructure to supplement traditional stormwater management components, such as storm drains, sewer pipes, and wastewater treatment plants. Don Carpenter, a professor of civil engineering at Lawrence Tech University, is spearheading efforts to assess barriers to large-scale green infrastructure implementation and offer strategies for overcoming them.

2. New opportunities are rising to restore Lake Michigan ciscoes, once a dominant food and prey fish in the lake. Sara Adlerstein, a University of Michigan associate research scientist, is leading an interdisciplinary team in helping cisco restoration stakeholders identify a path forward.

3. Michael Moore, a professor of environmental economics at University of Michigan, is assessing the potential ways that restoring environmentally degraded water bodies might affect the composition and economic well-being of surrounding neighborhoods.

4. Acoustic cameras that capture images using sound waves have been deployed in several northern Michigan rivers to detect migrating fish. Erin McCann, a graduate student fellow at Central Michigan University, is developing a computer program that can process these images and distinguish between invasive sea lamprey and native rainbow trout.

5. Angela Yu, a graduate student fellow at Michigan Technological University, is using satellite imagery, buoys, field data, weather conditions, and river flow patterns to characterize the effects of the Detroit River on algal bloom formation in western Lake Erie.

For more information about these projects or the upcoming 2018-2020 funding cycle, visit michiganseagrant.org/research.

— Geneva Langeland
Brandon doesn’t reserve his enthusiasm for just students. He currently serves on the Great Lakes Sea Grant Network’s Center for Great Lakes Literacy team, which fosters connections between Great Lakes scientists and the educational community. Brandon co-coordinates two intensive opportunities for Michigan educators — a shoreside Lake Huron Place-Based Education Summer Teacher Institute and a shipboard Lake Huron Science Exploration with teachers aboard the EPA R/V Lake Guardian research vessel.

According to MSTA, Brandon was chosen for his “unique and extraordinary accomplishments, active leadership, scholarly contributions, and direct and substantial contributions to the improvement of non-school-based science education over a significant period of time.”

— Cindy Hudson

Awards are formally presented during the annual MSTA conference, held this year in March. “It’s a great honor to be recognized by MSTA,” Brandon says. “It is an honor that also recognizes our great partnerships with communities, schools, educators, and youth.”

In 2015, Michigan Sea Grant’s Steve Stewart, senior Extension educator in Southeast Michigan, also received MSTA’s Informal Science Educator of the Year award. The recognition of their peers illustrates how Michigan Sea Grant Extension educators are held in high regard.

Joining Brandon on stage this year will be another award winner with ties to Michigan Sea Grant. Alpena elementary schoolteacher Bob Thomson (above), who works with Brandon on many projects, has been named MSTA’s Elementary Science Teacher of the Year.

Bob Thomson’s class has been a long-term partner with Michigan State University Extension and Michigan Sea Grant through the NEMIGLSI network and the Center for Great Lakes Literacy. Locally, Bob’s class has been instrumental in establishing the Thunder Bay Watershed Project — where students engage in watershed science and studies. Through their projects, his students are collaborating with Michigan Sea Grant and other partners to address significant issues in the region, such as water quality, invasive species, biodiversity conservation, and marine debris in the Great Lakes.

A leader beyond his school walls, Bob Thomson’s place-based stewardship education model has inspired school administrators and other area educators. He and Brandon have both been instrumental in helping Michigan Sea Grant foster a growing network of partners committed to connecting youth with the Great Lakes and natural resources.
Elliot Nelson brings enthusiasm to the Eastern Upper Peninsula.

Elliot Nelson wears many hats. He is a new dad, a dedicated birder, an Extension educator, and — without a doubt — an Upper Peninsula cheerleader.

“No matter what season it is, you find something fun to do up here. Whether it’s skiing, snowmobiling, fly fishing in our streams, salmon fishing, or birding — there is always a new adventure to pursue,” says Elliot. And since joining Michigan Sea Grant in May 2016, he hasn’t wasted any time jumping into those adventures.

Elliot has been working to build connections with stakeholders throughout the community. He sees a strong role for Michigan Sea Grant in continuing to engage people with local natural resources and help them connect with the world around them.

Sharing His Love of Birds

Elliot has already been hard at work and was key in helping create an interactive online winter birding trail map that highlights opportunities in the eastern Upper Peninsula to enjoy great birding, even in winter (see “Michigan’s trail movement keeps growing” on page 15). Interesting winter birds include a number of finch species, but many birders — beginners and the experienced alike — come in search of a snowy owl sighting. Visitors from Canada, surrounding states, and all over Michigan head to this popular area and help generate tourism dollars for the local economy.

Elliot has lent his expertise to several birding tour groups and has also worked with Michgan Audubon and other organizations to host a bird trail networking conference. He hopes the conference will encourage Michigan groups to coordinate activities and develop a statewide plan to promote Michigan birding.

Getting Students Outside

A former high school science teacher, Elliot also plans to work with partners to offer public programs that introduce upper elementary and middle school students to paddling, fishing, water quality, and watershed restoration activities. In addition, he plans to encourage place-based K-12 stewardship education in the St. Marys watershed. Through these projects, he will support teachers in their efforts to get students outside and engaged in hands-on stewardship and science learning opportunities.

Aquaculture Initiatives

“There is a large and growing sector interested in aquaponics and recirculating systems for food production,” Elliot says. He believes hosting community workshops and supporting research and development surrounding sound operations and effective business models will allow communities to determine how they want to harness these possibilities for food security and economic growth.

Elliot has been involved in organizing the Aquaculture Challenge Program for high school classes from around Michigan. The one-day workshop at Lake Superior State University (LSSU) in Sault Ste. Marie explores the potential, as well as the impact, of aquaculture on the food system. The integrative learning curriculum, which meets Michigan science standards, includes building an aquaponics system that functions biologically and cycles efficiently, developing a water quality monitoring protocol, programming water sensors, and creating a business plan.

Elliot is working with LSSU and area community colleges to develop and implement an aquaculture technician certification program. The two-year certification program is slated for fall 2017, allowing a new generation to explore low-impact, sustainable aquaculture opportunities.

In a complementary effort, Elliot is working with the Michigan Department of Agriculture and Rural Development and the Michigan Aquaculture Association to develop a GAAMP, or Generally Accepted Agricultural Management Practice, for siting aquaculture operations. GAAMPs are written by the state to provide guidance and standards based on sound science for effective agricultural practices with low environmental impacts. This new GAAMP will provide guidance and standards for appropriate locations of aquaculture operations, taking into account environmental, social, and economic factors.

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Sharing the Latest Research

One of Michigan Sea Grant’s signature event series is the Great Lakes Fisheries Workshops, held throughout the state each year. The workshops bring communities together with fisheries research and management partners to discuss research findings, management updates, and fishing trends. Attendees have an opportunity to weigh in on important management issues. The Lake Superior Fishery Workshop, which Elliot is helping organize, is planned for May 2017, in Marquette, and will provide updates on the state of the local fishery, as well as batfish monitoring and invasive species control measures.

Adventures can be found in any of the Upper Peninsula’s roughly 30 major watersheds, but Elliot notes that “few watersheds have a management plan in place, and even fewer have watershed councils to guide and promote conservation and management.” Operating on a widespread basis allows for the consideration of all activities and all land areas that affect the health and function of a particular river or lake as a whole. Elliot is taking an active role in helping these councils get up and running.

“Developing partnerships and working together for the good of our communities and our natural resources is one of my main goals,” says Elliot. “I think the Upper Peninsula is one of the most beautiful places in the world, and I am very passionate about helping the communities in this area thrive economically, but at the same time ensuring we are being good stewards of this wonderful resource.”

— Kate Bailey, Cindy Hudson
Sturgeon need rocky crevices in cold, fast-flowing water in which to lay their eggs. The St. Clair and Detroit rivers used to have this perfect combination and were spawning locations for sturgeon from throughout Lake Huron and Lake Erie. Efforts to make the rivers more suitable for shipping around the turn of the last century removed much of the rocky river bottom, piling it into islands and dumping it onto the shoreline.

Consequently, populations of sturgeon and many other fish species that rely on that rocky habitat suffered. Current sturgeon populations are estimated to be one percent of historical levels.

Habitat loss was not the only pressure put on sturgeon. They were intensively fished and the waters they swam in polluted. But fishing for sturgeon has been heavily curtailed and water quality improved by legislative mandate. Studies suggest that high-quality habitat is the remaining limiting factor to the rebound of these iconic fish.

The spawning reef restoration group, still made up of many of the members that initiated it, hopes this newest reef will adequately mimic historical habitat and be irresistible to sturgeon, walleye, and other native species looking for a place to lay their eggs.

They have reason to be optimistic. Since 2004, six reef projects have been constructed at three locations in the Detroit River and three in the St. Clair River. Comparison of fish-capture and egg data from before and after reef restoration found spawning by 16 native fish species, including lake sturgeon, on 5 of the 6 reefs. At least 14 other native species, including northern madtom that is listed as endangered in Michigan, are using the reefs in other ways.

This new Belle Isle reef will augment with limestone one of the first reefs created by the restoration team. That reef was made in part from coal cinders provided by DTE Energy. The new reef will expand the original from 0.28 to 4 acres. DTE is an active partner in the projects. The energy group recently loaned its dive team to survey proposed reef sites for endangered native mussels and has made available shorefront property to house the limestone used for constructing the reefs. This partnership is representative of the restoration team’s ethos, where partners have distinct roles and decisions are shared even though no formal agreement has been signed.

**ADAPT OR PERISH**

Central to the group’s success is adaptive management, a philosophy that seeks to learn from previous experiences — mistakes as well as successes — and achieve consensus among experts and stakeholders.

“The adaptive management strategy emerged organically,” says Read, who started with the team when she was assistant director at Michigan Sea Grant in 2001. “We wanted to understand and monitor conditions prior to and during construction, and improve as we go.”

Construction was completed last fall on the newest fish-spawning reef in the Detroit River. The reef — actually a complex of 3 small reefs — is situated in about 20 feet of water off Belle Isle near downtown Detroit.

These deceptively simple piles of limestone rock are in fact the result of intensive study, input from a broad range of experts and stakeholders, and more than 10 years of reef-building trial and error.

In 2001, a small group of natural resource managers and scientists from multiple agencies and organizations, facilitated by Michigan Sea Grant, joined forces with the goal of restoring spawning habitat for lake sturgeon in the Detroit-St. Clair River System. It took three years of planning and searching for funding, but in 2004, the first reef, also off of Belle Isle, went into the river.

“Native fishes, and especially sturgeon, were our target from the beginning,” says Jennifer Read, director of the University of Michigan Water Center and principal investigator on the project. “Sturgeon are charismatic, and there was thought that lack of spawning habitat was hindering their recovery.”
after restoration. We also wanted to apply what we learned from one reef to the next. Why start from zero every time?"

The group recently published an overview of some of the hard-won lessons about reef construction and adaptive management. They hope the report, entitled Science in Action: Lessons Learned from Fish Spawning Habitat Restoration in the St. Clair and Detroit Rivers, will be of use by others embarking upon reef spawning restoration activities.

Some of those lessons involve how reefs should be monitored and assessed. Partners at the U.S. Geological Survey had to work out the best way to place egg mats — sticky "welcome-mat" shaped squares that eggs adhere to — and larval nets in order to determine if reefs are being used for spawning and by what species.

"Over the years, we began developing better and better tools for monitoring lake sturgeon and other fish that spawn in similar ways," says Greg Kennedy, supervisory fishery biologist with USGS. Kennedy describes how his team's standardizing techniques evolved from a system where divers manually placed egg collection devices on and near reefs to — and larval nets in order to determine if reefs are being used for spawning by what species.

"There is no single approach that can be deployed and recovered by researchers who do not have diver support."

Michigan Sea Grant remains heavily involved as a partner. Mary Bohling, a Michigan Sea Grant Extension educator, has been an outreach contact for the effort since it began. Jim Diana, Michigan Sea Grant director, works with his students at the University of Michigan to better understand what happens to sturgeon larvae once they leave the reef.

"Since 2010, we have worked on locating where sturgeon larvae go after leaving the restored reefs," Diana says. "We thought it might be wetlands, but after extensive sampling, we were surprised to find that the juveniles prefer deep portions of the river — preferably with mucky bottom, moderate current, and the presence of a lot of benthic invertebrates."

"Our knowledge of sturgeon movements and habitats has exploded ... thanks to this telemetry work," says Jim Boase, fish biologist with USFWS. "We now have a better understanding of how these fish move, where they spend their time, where they spend their winters."

POWER OF PARTNERSHIP

Other lessons speak to team creation and collaboration. Both Kennedy and Boase agree that working with the group toward a common goal, rather than working independently, has helped them move the state of their science forward.

"Our collective impact has been much larger and has brought positive end results for each individual agency," says Boase, "rather than one agency taking full credit and trying to 'go it alone.'"

Power of Partnership

"Reef restoration was identified as a priority project to address these impairments," says Bohling, who is also chair of the public advisory council for the Detroit River Area of Concern. "In the Detroit River, they were 1 of 10 projects that address those. Once those 10 are done, hopefully those 2 impairments can be removed and the area will be that much closer to being removed from the AOC list."

NEXT STEPS

Looking to the future, the restoration group has plans to build at least one more reef. A small test reef in the Detroit River near Fort Wayne has shown promise, with eggs found at the site and minimal infilling by sand since it was constructed in 2015. In addition, the group will continue monitoring reefs over the next few years to get a better idea of their impacts.

The group will also focus on sharing lessons they learned with others who are doing this kind of ecosystem restoration work. Team members are already working with other restoration projects in this system and elsewhere in the Great Lakes.

"We are excited about the way these projects have developed and the positive effects they seem to have on native fish species in these two rivers," Read says. "It’s thrilling to be part of a growing revitalization of the region."

In 1987, the St. Clair and Detroit rivers were listed as AOCs under the U.S.-Canada Great Lakes Water Quality Agreement. According to the U.S. Environmental Protection Agency, AOCs are regions that have experienced environmental degradation that impair beneficial uses of that system. By helping restore native fish populations and habitat, reef restoration directly addresses beneficial use impairments, such as "degradation of fish and wildlife populations" and "loss of fish and wildlife habitat," that are listed as top concerns by both the U.S. and Canada.
Great Lakes Fishery Workshops put anglers in the know

Fishing, whether for recreation or profit, makes an important contribution to Michigan’s economy. According to the Michigan Department of Natural Resources (MDNR), there are 1.2 million recreational anglers who fish in the state’s more than 11,000 lakes, 3,000 miles of Great Lakes shoreline, and 20,000 miles of trout and salmon streams. The MDNR estimates that fishing generates 18,000 direct jobs and produces $2.5 billion annually for the state’s economy.

But fishing today is not the same as it was 10 or 15 years ago. Changes have occurred in the Great Lakes, and many favorite species do not exist in the numbers they once did. The Michigan Sea Grant estimates that fishing generates 38,989 direct jobs and contributes to Michigan’s economy. According to the Michigan Department of Natural Resources (MDNR), there are 1.2 million recreational anglers who fish in the state’s more than 11,000 lakes, 3,000 miles of Great Lakes shoreline, and 20,000 miles of trout and salmon streams. The MDNR estimates that fishing generates 18,000 direct jobs and produces $2.5 billion annually for the state’s economy.

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Outdoor recreation has always been a major part of the Michigan experience. Deer camp, ice fishing at Houghton Lake’s Tip-Up Town, snowmobiling and skiing “up north” and in the Upper Peninsula. But changing climate patterns can make snowfall a little unpredictable for snowmobilers and skiers, and decreasing numbers of hunters and anglers mean fewer people in the woods or on the lakes. Many communities that have traditionally catered to these outdoor enthusiasts are also looking for ways to attract new visitors by taking advantage of their areas’ other natural resources.

Trail networks offer a series of stops that connect users with unique regional resources, such as prime birding locations or fishing festivals. People engaging with these trails may boost local economies by spending additional money on food, lodging, or transportation in the area. Hunters, anglers, birders, paddlers, and history buffs will all find something to enjoy in Michigan’s growing trail systems.

The four-day conference, to be held in Grand Rapids, will be national in scope, while featuring presentations that emphasize the Great Lakes.

This year, the fifth annual National Working Waterfronts and Waterways Symposium will be held in Grand Rapids on May 14-17, 2018, at the Amway Grand Plaza Hotel. The symposium is organized by the Great Lakes Sea Grant Network and is jointly hosted by Michigan State University and the University of Michigan.

The symposium will feature presentations by experts from across the Great Lakes region and beyond, covering topics such as water connectivity, economic development, and ecosystem management. The symposium is open to anyone interested in the issues related to working waterfronts and waterways, and there is a registration fee for attendance.

The symposium is supported by a variety of partners, including the Great Lakes Biodiversity Partnership, the Great Lakes Fishery Trust, and the Great Lakes Commission. It is also co-organized by the University of Michigan’s Water Resources Research Institute and the Great Lakes Environmental Research Laboratory.

For more information or to register for the symposium, please visit the event website at www.grandplaza.com/symposium.

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