Sea Grant Michigan

BY THE NUMBERS

FIGURES FROM 2021

$1,363,481
Economic benefits derived from Michigan Sea Grant activities.

170
Michigan businesses created or sustained as a direct result of Michigan Sea Grant activities.

438
K-12 educators who participated in Michigan Sea Grant education programs.

23
Michigan communities that implemented hazard resiliency practices as a result of Michigan Sea Grant activities.

2,822
K-12 students reached through Michigan Sea Grant-trained educators or MISG education programs.

135
Fishermen, seafood processing, and aquaculture industry personnel who modified their practices using information about fisheries sustainability and seafood safety gained through Michigan Sea Grant activities.

10,070
People engaged in Michigan Sea Grant informal education programs.

35
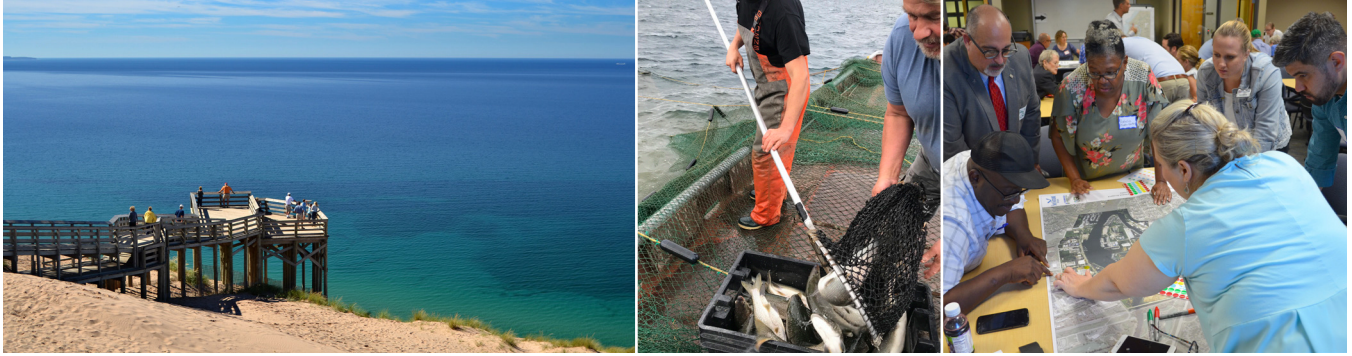Michigan marinas certified or recertified in the Michigan Clean Marina Program.

55
Number of acres of coastal habitat protected, enhanced, or restored as a result of Michigan Sea Grant activities.

michiganseagrant.org

What is Michigan Sea Grant?

Michigan Sea Grant uses research, outreach, and education to protect the Great Lakes and ensure sustainable use of these critical resources. We fund research projects and graduate fellowships that investigate pressing challenges affecting coastal ecosystems and communities. We bring together regulators, scientists, policymakers, and community members to develop science-based solutions to environmental issues. We also help K-12 students and their educators connect with the Great Lakes through classroom activities, workshops, lectures, camps, and field trips.

The Great Lakes — Superior, Michigan, Huron, Erie, and Ontario, along with their connecting channels — form the largest surface freshwater system on earth. Michigan sits at the heart of that system, surrounded by four of the five lakes.

Michigan Sea Grant is a cooperative program of the University of Michigan, Michigan State University, and the National Oceanic and Atmospheric Administration (NOAA), with offices in Lansing, Ann Arbor, and coastal communities around the state. We work with a network of partners at federal, state, local, and individual levels to achieve our goals.

MAKING A DIFFERENCE
Here are a few of the ways we're making a difference for the Great Lakes:

REGIONAL FISHERY WORKSHOPS
Annual fishery workshops provide recreational anglers and commercial fisheries with regionally tailored information and community science opportunities.

SEAFOOD SAFETY TRAINING
Seafood safety training workshops help fish processors learn best practices for handling and preparing seafood products.

MI PADDLE STEWARDS
The MI Paddle Stewards program trains people who paddle through Michigan's inland and coastal waterways to identify, report, and manage aquatic invasive species.

MICHIGAN CLEAN MARINA
The Michigan Clean Marina certification program helps marinas and boaters choose Great Lakes-friendly boating facilities and practices.

STUDENT RESEARCH
Internships and fellowships support undergraduate and graduate students pursuing research and hands-on projects about the Great Lakes.

SUMMER TEACHER INSTITUTE
Summer teacher trainings help educators engage K-12 students in place-based stewardship in their classrooms and communities.

2022-2024 Research Projects

HELPING MICHIGAN COMMUNITIES MEET THEIR WATER USE NEEDS THROUGH COLLABORATIVE WATER RESOURCE MANAGEMENT

Even in a state where water feels abundant, having adaptive and collaborative processes for allocating water resources can help ensure sustainable use while minimizing conflicts. In Michigan, the Department of Environment, Great Lakes, and Energy (EGLE) monitors and manages large withdrawals from water bodies or groundwater sources. A 2008 law authorized local water users to create Water User Committees (WUCs) to work with EGLE. Michigan Sea Grant and EGLE are supporting a research team that will create a WUC guide that incorporates the diverse perspectives of state water users and paves the way toward local collaborative governance of water resources.

Lead principal investigator: *Adam Zwickle, Michigan State University (joint project with EGLE's Office of the Great Lakes)*

UNDERSTANDING WHERE WALLEYE SPAWN IN SAGINAW BAY TO ENSURE BETTER MANAGEMENT AND HABITAT PROTECTION

Invasive species, habitat degradation, and declining water quality led to a collapse of walleye (*Sander vitreus*) populations in Saginaw Bay in the mid-1990s. Fortunately, these populations have since recovered, and management goals have shifted to ensuring a sustainable harvest. Chris Vandergoot, Director of the Great Lakes Acoustic Telemetry Observation System (GLATOS) at Michigan State University, will lead a team using acoustic tags and receivers to identify walleye spawning sites and their relative importance in Saginaw Bay. Ultimately, this project could provide one of the last key missing pieces of information in understanding and helping to manage this newly recovered population and fishery.

Lead principal investigator: *Chris Vandergoot, Michigan State University*

MEASURING THE ROLE OF INVASIVE MUSSEL LARVAE IN LOWER TROPHIC LEVELS OF LAKE HURON'S FOOD WEB

Invasive zebra and quagga mussels have massively altered the flow of energy and nutrients through Great Lakes food webs. Gordon Paterson, an assistant professor at Michigan Technological University, will lead a project to investigate the role of juvenile zebra and quagga mussels (called veligers) in Lake Huron's food web. Paterson and his team will analyze veliger samples from Saginaw Bay to determine their nutritional value and how much energy they make available to predators. Results will provide important insights into invasive species' roles in shifting food webs around the Great Lakes.

Lead principal investigator: *Gordon Paterson, Michigan Technological University*

MAPPING GENETIC VARIATION IN MICROCYSTIS TO IMPROVE GREAT LAKES HARMFUL ALGAL BLOOM MODELS

Lake Erie, Saginaw Bay, and other areas of the Great Lakes regularly experience harmful algal blooms (HABs), population explosions of microscopic organisms which can generate toxins that threaten recreation, ecosystem health, and drinking water supplies. Microcystis is a genetically diverse bacteria species commonly found in HABs. Vincent Denef and Melissa Duhaime, professors at the University of Michigan, are leading a project that will link Microcystis genetic variation with its ability to defend against predators and viruses. Incorporating these insights into decision-making models could help improve HABs predictions and tracking, as well as illuminating the effects of Microcystis on Great Lakes food webs.

Lead Principal Investigator: *Vincent Denef, University of Michigan*

USING AUDIO PLAYBACK TO ATTRACT DESIRED MIGRATORY BIRD SPECIES TO RESTORED COASTAL WETLANDS

Coastal wetlands provide critical habitat for birds, fish, and other wildlife and can help improve water quality. In Michigan, groups working to restore degraded coastal wetlands have realized that some important species may fail to recognize restored wetlands as suitable habitat. This is especially true in wetlands where a species does not encounter conspecifics, or individuals of the same species, already living in the habitat. Dustin Brewer, a PhD candidate at Central Michigan University, will work with U.S. Fish and Wildlife Service biologists to play audio recordings of rails, a migratory wetland bird, at multiple potential habitat sites in central Michigan. This study will improve understanding of how audio playback might help attract rails and other migratory marshbird species to restored habitats, and more generally improve our understanding of how conspecific cues might be used to help conserve populations of focal species.

Graduate student fellow: *Dustin Brewer, Central Michigan University*

UNDERSTANDING THE EFFECTS OF INVASIVE MUSSELS ON FRESHWATER BACTERIAL COMMUNITIES IN THE GREAT LAKES

In the Great Lakes, invasive dreissenid mussels – commonly known as zebra and quagga mussels – are threatening the health of coastal ecosystems. These invasive mussels alter food webs and have been linked to occurrences of harmful cyanobacterial blooms and avian botulism outbreaks. Nikesh Dahal, PhD candidate at the University of Michigan, will investigate how predation by invasive mussels alters the structure and function of freshwater bacterial communities in Lake Erie and Lake Huron. Dahal will use genomic sequencing to analyze distribution of traits that allow species to survive and thrive under changing ecosystem conditions. Results from this work can build a deeper understanding of how invasive species affect these crucial freshwater ecosystems and inform future management strategies.

Graduate student fellow: *Nikesh Dahal, University of Michigan*

VARIATION AMONG WALLEYE POPULATIONS MAY AFFECT HOW THEY RESPOND TO CLIMATE CHANGE

Walleye have long been stocked in Michigan's inland lakes. Juvenile survival rates and adult population sizes are declining, partly because of changing water temperatures due to climate change. However, some populations may be more resilient than others because of differences in the way they store and use energy. Scott Jackson, a PhD candidate at the University of Michigan, will work with the Michigan Department of Natural Resources to test the impacts of increasing temperatures on walleye from two populations that serve as the source for all stocked walleye in Michigan. This information will help the Michigan DNR better understand differences in walleye stocking success and its causes, so that they can make any necessary changes to rearing and stocking strategies to maintain and improve Michigan's walleye populations.

Graduate student fellow: *Scott Jackson, University of Michigan*

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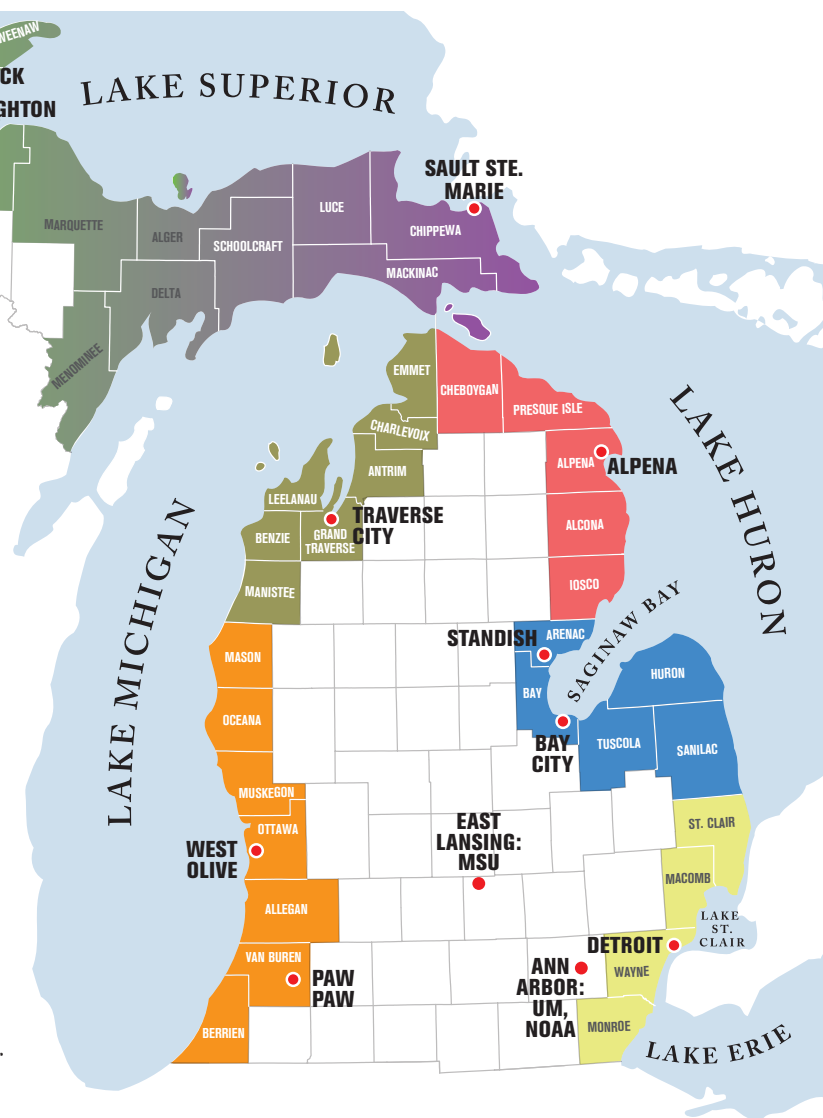
Michigan Sea Grant, a collaborative effort of the University of Michigan and Michigan State University and part of the NOAA-National Sea Grant network of 34 university-based programs. Michigan Sea Grant helps to foster economic growth and protect Michigan's coastal, Great Lakes resources through education,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

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Michigan Sea Grant is funded by the National Oceanic and Atmospheric Administration and the State of Michigan. Michigan State University and the University of Michigan are equal opportunity/affirmative action institutions.

REVISED 2-2023