Sea Grant
Michigan

MICHIGAN SEA GRANT

UNIVERSITY OF MICHIGAN + MICHIGAN STATE UNIVERSITY

ANNUAL REPORT

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Michigan Sea Grant 2019 Annual Report

2/1/2019-1/31/2020

Impact and Accomplishment Statements

Michigan Sea Grant Annual Report (FY 2019-2020)

FOCUS AREA: Healthy Coastal Ecosystems

Goal 3: Ecosystems and their habitats are protected, enhanced, or restored.

IMPACT: White paper and presentations help contextualize river dredging decision for local officials

Recap: When a developer proposed dredging a portion of the Grand River for powerboat traffic, MISG Educator Dan O'Keefe published a paper summarizing research related to the potential impacts of the project on water quality and river habitats. His analysis helped state, county, and local governments decide not to support the project, which was placed on indefinite hold.

Relevance: The Grand River flows through some of Southwest Michigan's largest cities on its way to Lake Michigan. Recently, a developer proposed removing 50 acres of shallow river habitat along a 22-mile stretch between metropolitan Grand Rapids and Lake Michigan. This channelization was intended to expand powerboat access and economic opportunities in the region. However, environmental groups raised concerns about detrimental impacts to water quality and sensitive river habitats.

Response: MISG Extension Educator Dan O'Keefe published a white paper to help local governments weigh the possible economic benefits of new marinas and resulting tourism against the potential physical and biological impacts of dredging to channelize the Grand River. His analysis provided a respected, science-based viewpoint on an issue that had divided opinion among local decision makers. He also delivered presentations on the subject to communities near the river.

Results: Dan O'Keefe's presentations and white paper were instrumental in informing the opinions of local decision makers, and several resolutions regarding the proposal were adopted following his presentations. State, county, and local government officials ultimately decided that economic benefits were not enough to justify the cost of dredging, maintenance, and potential ecological damage to the river habitat. The project was eventually put on indefinite hold.

Partners: Michigan State University Extension

Project Number Index: A/AS-25

Goal 3: Ecosystems and their habitats are protected, enhanced, or restored.

ACCOMPLISHMENT: MI Paddle Stewards workshops train 162 paddlers to fight aquatic invasive species

Recap: By hosting workshops in ten Michigan counties, the MI Paddle Stewards program trained 162 adult paddlers to identify, report, and avoid transporting aquatic invasive species in their favorite waterways.

Relevance: Whether they use a kayak, canoe, or paddleboard, paddlers are a vector for transporting aquatic invasive plant species between waterbodies. They are also well positioned to detect and report signs of new or increasingly established invasive species along their favorite waterways. With increasing numbers of people using Michigan's designated water trails and informal waterways, educational programs that target paddlers can play a vital role in minimizing the spread of invasive species.

Response: MISG launched the MI Paddle Stewards program in 2019 to target outreach and education about aquatic invasive species toward paddlers around the state. During its first year, the program held ten workshops in ten Michigan counties. Participants learned to identify common aquatic invasive species, report sightings through a mobile app, and properly clean their paddling equipment to avoid transporting species between water bodies.

Results: During the program's first year, MI Paddle Stewards workshops attracted 162 adult paddlers interested in fighting aquatic invasive species. In post-workshop surveys, more than 90 percent of respondents said they agree or strongly agree with statements expressing greater understanding, personal responsibility, and action orientation toward fighting aquatic invasive species. As Michigan's water trails movement grows, the MI Paddle Stewards program is poised to become an important tool in the fight against invasive species.

Partners: MSU Extension; Michigan Invasive Species Grant program; Land Information Access Association; Michigan Clean Boats, Clean Waters; Huron Pines; St. Clair County; Eastern Upper Peninsula Regional Planning & Development Council; Paddle Antrim; Southwest MI Planning Commission; Friends of the St. Clair; Clinton River Watershed Council; Downriver Linked Greenways; Upper Peninsula Resource Conservation & Development Council; Jackson County Drain Commission; Oakland County CISMA; Blueways of St. Clair; Lake to Lake CISMA; CAKE CISMA; Wild Rivers Invasive Species Coalition; Lake St. Clair CISMA; Three Shores CISMA; Jackson Lenawee and Washtenaw CISMA; SW x SW Corner CISMA

Project Number Index: A/AS-25

FOCUS AREA: Sustainable Fisheries and Aquaculture

Goal 4: Seafood supply meets public demand and is safe, secure, and sustainable.

ACCOMPLISHMENT: Community science programs engage anglers in collecting important fishery data

Recap: MISG funded and continued driving interest and participation in several community science programs that target data collected by anglers.

Relevance: Federal and state monitoring initiatives can only gather so much data about Great Lakes fish populations. Community science programs that target anglers can bring in a wealth of additional data about Great Lakes fisheries, as well as empowering community members to participate in the fishery management process.

Response: In 2019, MISG continued to facilitate and support multi-state community science programs that engage anglers in collecting and submitting data to increase overall knowledge about Great Lakes fisheries. Some programs, like the Great Lakes Angler Diary and Salmon Ambassadors, recruit anglers to record numerical and geographical data about the fish they catch. Others, such as the Huron-Michigan Predator Diet Study, also encourage anglers to submit fish stomachs for analysis of gut contents.

Results: In 2019, 23 Salmon Ambassadors and Great Lakes Angler Diary volunteers provided data about their catches. MISG staff raised the profile of these community science programs through meetings and presentations. Also in 2019, 26 people registered to participate in the pilot version of a new steelhead journal program. MISG provided $9,500 in program development funds to launch the steelhead journal program and provide a use fee for data collection apps to support continued programming.

Partners: Wisconsin Sea Grant; US Fish and Wildlife Service; Grand Traverse Band of Ottawa and Chippewa Indians; Little Traverse Bay Bands of Odawa Indians; US Geological Survey; MSU Department of Fisheries and Wildlife; Michigan, Wisconsin, Indiana, and Illinois Departments of Natural Resources; Michigan Charter Boat Association; Detroit Area Steelheaders; Michigan Steelhead and Salmon Fishermen's Association; Great Lakes Salmon Initiative; Pentwater Sportfishing Association

Project Number Index: R/PM-63, A/AS-25, C/CC-19, M/PM-64

Goal 4: Seafood supply meets public demand and is safe, secure, and sustainable.

ACCOMPLISHMENT: MISG provides Seafood and AIS HACCP training to strengthen tribal fish producers

Recap: MISG provided Seafood and AIS HACCP training and certification to 32 participants in 2019, most of whom were members of tribal nations, enabling them to expand their product offerings and increase revenue.

Relevance: Commercial fishing operators and fish processors must follow strict guidelines to meet state and federal requirements for health and safety. Seafood Hazard Analysis and Critical Control Point (HACCP) training and certification courses are a federal management system for ensuring that businesses handling seafood products stay up-to-date on requirements and best practices. A similar AIS HACCP course conveys strategies for reducing the spread of aquatic invasive species through fish production and processing operations.

Response: MISG regularly offers Seafood and AIS HACCP courses to train and certify employees at commercial fishing and fish processing enterprises. Holding these courses in Michigan gives a leg up to local hatcheries and seafood businesses, though the courses also draw participants from other states and countries.

Results: In 2019, MISG staff held two HACCP courses at fish hatcheries and processing facilities owned and operated by Michigan tribal nations. The courses enabled 32 participants to earn certificates, 27 of whom identified as tribal members. Fish processors who complete this course are at a competitive advantage as they can meet state and federal requirements while making value-added seafood products to help increase their revenues.

Partners: Great Lakes Indian Fish and Wildlife Commission; Michigan Department of Environment, Great Lakes, and Energy; Michigan Department of Natural Resources; Michigan Department of Agriculture & Rural Development; MSU Extension; US Fish & Wildlife; Keweenaw Bay Indian Community; Michigan Wholesale Baitfish Association

Project Number Index: A/AS-25

FOCUS AREA: Resilient Communities and Economies

Goal 9: Resilient coastal communities adapt to the impacts of coastal hazards and climate change.

ACCOMPLISHMENT: High water level presentations provide up-to-date information to concerned coastal residents

Recap: During a year with headline-making high water levels in the Great Lakes, MISG staff held talks in coastal communities to explain the science behind the levels, provide forecasts for coming trends, and discuss resources available to concerned shoreline residents.

Relevance: In 2019, all of the Great Lakes experienced high water levels that neared, broke or set all-time records. Shoreline communities were eager for reliable sources of information about what they could expect during the coming months and how they could access resources for coping with the erosion and damage caused by the high water.

Response: MISG Extension educators organized presentations in four shoreline communities to share up-to-date information and forecasts about Great Lakes water levels. The presentations featured experts from the U.S. Army Corps of Engineers and the National Weather Service and discussed hydrological patterns driving the high water, effects of erosion from coastal storms, and forecasts for the coming months.

Results: Water level presentations were held in St. Ignace, Ludington, Traverse City, and Port Huron, with 321 people attending events in person. Most of the presentations were streamed over Facebook Live to online audiences, and the recordings have continued to garner from hundreds to thousands of views each. Several of the recordings were also edited, closed-captioned, and posted to YouTube, where they have been viewed more than 300 (Traverse City) and 1200 (Port Huron) times.

Partners: US Army Corps of Engineers – Detroit District; University of Michigan; Michigan Department of Environment, Great Lakes, and Energy Coastal Zone Management Program; NOAA National Weather Service Weather Forecast Offices Grand Rapids; Manistee Conservation District; Benzie County Office of Emergency Management

Project Number Index: A/AS-25

Goal 1: Coastal economies are vibrant and resilient.

IMPACT: MISG helps secure $2.4 million grant for trail access and improvements in underserved Detroit neighborhoods

Recap: MISG assisted a Detroit-area partner in securing $2.4 million to expand and improve recreational trail access for underserved neighborhoods in Southeast Michigan.

Relevance: For decades, leaders in and around Detroit have sought ways to increase safe access to green spaces and trails for their communities. While much progress has been made, the existing trail networks still have gaps and poor conditions that prevent users from being able to access the whole network safely. This is true in Wayne County's "Downriver" area, where not all communities have benefited equally from downtown Detroit's urban revitalization movement.

Response: MISG assisted the Friends of the Detroit River in securing $2.4 million for the Downriver Linked Greenways Iron Belle Trail Continuation project from the Ralph C. Wilson, Jr., Foundation and the MI Iron Belle Trail Grant Fund. The funds, awarded in 2019, will help fill gaps in Michigan's Iron Belle Trail, which links Ironwood in the western Upper Peninsula with Belle Isle in the eastern Lower Peninsula.

Results: The funding will help fill gaps in the state-spanning Iron Belle Trail where it passes through underserved neighborhoods in the Downriver region of metropolitan Detroit. The funding will support increased directional and interpretive signs, a safety assessment, improved intersection crossings, and design and engineering for over three miles of gaps through eleven communities. These additions and improvements will make it easier for residents and visitors in these areas to safely recreate on the trail network.

Partners: State of Michigan Department of Natural Resources Iron Belle Trail, Southeast Michigan Council of Governments, Community Foundation for Southeast Michigan, Ralph C. Wilson Jr. Design and Access Funds, Friends of the Detroit River, Riverside Kayak Connection, Wayne County Parks, City of Flat Rock, City of Trenton, Healthy Trenton, Beaumont

Project Number Index: A/AS-25

Goal 6: Coastal economies are vibrant and resilient

ACCOMPLISHMENT: MISG hosts fisheries heritage conference for people looking to leverage maritime history, culture to boost local tourism

Recap: MISG, a key facilitator for the Great Lakes Fisheries Heritage Trail network, hosted the network's annual conference for participants interested in leveraging maritime history and culture to boost local tourism opportunities.

Relevance: The Great Lakes have a rich history of commercial fishing. Tapping into this history, science, and culture can create tourism opportunities, especially for smaller coastal communities looking to draw new visitors. Since 2012, MISG has facilitated a regional Great Lakes Fisheries Heritage Trail (GLFHT) network. The partnership has made strides in building statewide relationships, exploring historic documentation and restoration opportunities, forming coastal tourism trail connections among fisheries heritage sites, and advancing Great Lakes literacy.

Response: In 2019, MISG organized the annual GLFHT conference in Bay City. The conference attracts attendees who are interested or involved in fisheries or maritime heritage, local tourism and economic development, museums and historical sites, history education, and more. The 2019 event focused on networking, fisheries heritage of Saginaw Bay, and the new public-facing GLFHT website. In addition to the conference, MISG staff also delivered presentations about the network to three groups.

Results: The GLFHT conference brought together 43 attendees for two days of networking and collaboration. The presentations and interactions at the conference have enhanced planning and programming opportunities for the growing statewide GLFHT network. The additional presentations reached another 130 participants with the network's message of bolstering local economies by embracing fisheries heritage.

Partners: Beaver Island Historical Society, Besser Museum for Northeast Michigan – Alpena, Fishtown Preservation, Great Lakes Fishery Commission, Land Information Access Association, Maine Sea Grant, Michigan Department of Natural Resources, Michigan Historical Center, Michigan Maritime Museum – South Haven, MSU Extension, MSU Department of Community Sustainability, National Park Service Sleeping Bear Dunes, NOAA Thunder Bay National Marine Sanctuary, Northeast Michigan Council of Governments, West Shore Fishing Museum – Menominee, National Working Waterfronts and Waterways Network

Project Number Index: A/AS-25, C/CC-19, M/PM-64

Goal 7: Communities and water-dependent businesses use comprehensive planning to make informed strategic decisions.

IMPACT: MISG helps City of Au Gres secure grant funding for improvements to new public waterfront park

Recap: In 2015, a MISG-supported community visioning process in Au Gres identified potential improvements for public waterfront access. In 2019, MISG assisted the City of Au Gres in writing a successful grant proposal for state funding to support improvements at a newly acquired public waterfront park.

Relevance: The Michigan Sustainable Small Harbors project, which emerged from a MISG-funded research project, helps coastal residents develop visions for the sustainability of their communities' waterfronts. Au Gres, located near the shores of Lake Huron's Saginaw Bay, undertook this visioning process in 2015. Community leaders identified a suite of potential public waterfront improvements that could expand tourism and recreation opportunities, including a publicly accessible fishing pier and the acquisition and development of a then-closed, state-owned marina.

Response: After the visioning meetings, the state deeded the public harbor to the City of Au Gres for development into a public waterfront park. The site needed various infrastructure and development improvements to support public access and recreation. In 2019, MISG assisted city officials in writing a successful grant proposal to the Michigan Department of Environment, Great Lakes, and Energy's Coastal Zone Management Program to support these improvements.

Results: The $44,546 in state grant funding will support the installation of fishing piers, dark sky-friendly lighting, safety handrails, and informational signs. These improvements will help Au Gres residents and tourists safely enjoy public waterfront access for recreation, fishing, and other pursuits. Au Gres officials hope increased waterfront recreation opportunities will bring more tourist dollars to the local economy.

Partners: City of Au Gres, Michigan Office of the Great Lakes: Coastal Zone Management Program, Huron Pines, Au Gres-Sims School District, NEMIGLSI network

Project Number Index: A/AS-25

Goal 7: Communities and water-dependent businesses use comprehensive planning to make informed strategic decisions.

ACCOMPLISHMENT: MISG brings well-received Sustainable Small Harbors visioning process to coastal Arcadia

Recap: MISG helped promote and facilitate a community visioning process to help 110 residents of coastal Arcadia develop a cohesive vision for the long-term sustainability of their community's waterfront.

Relevance: The Michigan Sustainable Small Harbors (SSH) project helps coastal residents develop visions for the sustainability of their communities' waterfronts. SSH team members facilitate brainstorming workshops, then hone the results into a report that local leaders can use to apply for grants, loans, and state or federal funding. SSH grew from a MISG-funded research project, and MISG continues to play a major supporting role in holding these visioning workshops around the state.

Response: With grant funds from the Waterways Commission, MISG helped bring the SSH team to Arcadia, a community of 600 on the Lake Michigan shoreline. Arcadia had weathered economic hardship and damage from high lake levels but was poised to capitalize on fresh planning momentum. MISG provided website and outreach support, and MISG staff helped facilitate the series of public workshops in October that empowered participants to develop their own vision for their community's future.

Results: 110 people -- about one-sixth of Arcadia's population -- participated in the public workshops. Arcadia leaders paused the process of updating their five-year master plan to incorporate input from the SSH report. Community leaders can use the results of the visioning process to assist in future grant requests for funds that add longevity to existing waterfront facilities or recruit new businesses, such as a gas station or coffee shop, to the community.

Partners: Michigan State University; Michigan Department of Environmental Quality Office of the Great Lakes; Michigan Department of Environment, Great Lakes, and Energy; Michigan Great Lakes Protection Fund

Project Number Index: C/CCD-42, C/CCD-43, R/CCD-33, C/CC-19, M/PM-64

Goal 7: Communities and water-depended businesses use comprehensive planning to make informed strategic decisions

ACCOMPLISHMENT: Water School workshops empower officials to make important decisions about shared water resources

Recap: Michigan Water School workshops presented 57 participants with relevant, policy-neutral information about water resources to support informed decision-making.

Relevance: Elected and appointed officials at city, county, state, and tribal levels often need to make important decisions regarding the future of shared water resources. They need access to relevant, policy-neutral background information about water quality, quantity, economics, and policy in order to wisely manage the water Michigan residents use to drink, bathe, and recreate.

Response: In 2019, MISG and Michigan State University Extension hosted three Water School workshops, designed to present elected and appointed officials and their staff with up-to-date, meaningful information about Michigan's water resources. Each workshop was presented in partnership with a local watershed stewardship organization.

Results: The three 2019 Water School workshops attracted 57 participants. Post-workshop survey results indicate that the program was valuable, especially to small locales that lack the financial resources to send their officials to paid training programs. As a result of the workshops, one planning commissioner was able to reopen the commission's master plan to include more green infrastructure, an important best practice for managing stormwater.

Partners: Erb Family Foundation, Friends of the Rogue, Huron River Watershed Council, Lawrence Technological University – Southfield, MSU Extension, St. Clair County Health Department, Pure Oakland Water, Clinton River Watershed Council, Rouge River Watershed Council, Great Lakes Water Authority, Macomb Community College, MSU Department of Community Sustainability

Project Number Index: A/AS-25

FOCUS AREA: Environmental Literacy and Workforce Development

Goal 11: A diverse workforce that is skilled in science, technology, engineering, mathematics, and other disciplines critical to local, regional, and national needs.

ACCOMPLISHMENT: New undergraduate internships provide opportunities for more inclusive participation in environmental science

Recap: MISG designed an internship program to support undergraduate students working on Great Lakes stewardship projects. The inaugural cohort of four interns included two students from ethnic minority backgrounds and set the stage for successful future programs.

Relevance: In the U.S., workers in environmental science and related conservation fields are predominately white. Undergraduate degree programs are just one of the sources of structural inequality and institutional racism that maintain this status quo. In order to foster a more equitable and diverse Great Lakes stewardship workforce, undergraduate students from minority backgrounds must have access to meaningful funding and mentorship opportunities.

Response: In 2019, MISG launched a new internship program as part of the National Sea Grant Community Engaged Research initiative to fund undergraduate students who pursue a summer project related to Great Lakes stewardship. The internship pairs each student with a business, non-profit, government agency, or academic institution that can help support the project. Recruitment strategies target programs at Michigan universities and colleges, including community colleges and tribal colleges, to attract students underrepresented in environmental fields.

Results: MISG supported four interns from three Michigan colleges and universities in 2019. Two interns came from ethnic minority backgrounds. Their projects included installing rain gardens, studying salmon and trout dietary habits, and more. The interns were showcased on the National Sea Grant Community Engaged Internship for Undergraduate Students website and presented about their work during a dedicated symposium at the University of Michigan. The successful first year poised the internship program to expand in 2020.

Partners: Calvin College, UM-School for Environment & Sustainability, Superior Watershed Partnership, Great Lakes Conservation Corps (GLCC), Climate Conservation Corps (CCC), Northern Michigan University

Project Number Index: R/ERA-1, M/PM-64, C/CC-19

Goal 10: An environmentally literate public that is supported and informed by a continuum of lifelong formal and informal engagement opportunities.

ACCOMPLISHMENT: MISG hosts crude oil transport webinars for Great Lakes Sea Grant-led network

Recap: MISG hosted four webinars about crude oil transport, spill prevention, and clean-up strategies for an audience that included professionals from the United States and Canada, located around the Great Lakes basin.

Relevance: The Great Lakes region is criss-crossed by transport routes for crude oil products and other hazardous materials. These commodities are carried by railcar, tanker truck, ship, and pipeline, often passing near or through heavily populated areas and sensitive ecosystems. Material transportation networks require a careful balance of economic efficiency against the risks and consequences surrounding spill detection, prevention, and clean-up.

Response: MISG is part of the Great Lakes Sea Grant Crude Oil Transport Group, which includes representatives from the Great Lakes Sea Grant network, government agencies, and research institutions. The group focuses on subjects related to crude oil transport, disaster response, and spill remediation. In June-September 2019, MISG hosted four crude oil transport webinars to provide the latest research and resources about hazardous material transport, spill prevention, response, and clean-up.

Results: The webinars attracted 141 attendees around the U.S. and Canadian sides of the Great Lakes. Attendees represented many sectors, including nonprofits; state, provincial, federal, and tribal governments; industry; and academia. Speakers included a spill remediation professional and the chief of contingency planning for the U.S. Coast Guard in Sault Ste. Marie, MI. The webinars were recorded, captioned, and uploaded to YouTube, where they've received an average of over 130 views each.

Partners: International Joint Commission, Great Lakes Commission, Wisconsin Sea Grant, Minnesota Sea Grant, Illinois-Indiana Sea Grant, Ohio Sea Grant, New York Sea Grant, Lake Champlain Sea Grant, U.S. Coast Guard Sector Sault Ste. Marie, U.S. Coast Guard Great Lakes District, Marine Pollution Control, Michigan Technological University Great Lakes Research Center

Project Number Index: A/AS-25, C/CC-19

Goal 10: An environmentally literate public that is supported and informed by a continuum of lifelong formal and informal engagement opportunities.

ACCOMPLISHMENT: MISG provides place-based stewardship education, professional development to students and teachers

Recap: Through statewide partnerships, MISG helped foster place-based stewardship education for more than 4,000 students in northeast Michigan. MISG also extended place-based stewardship professional development opportunities to educators around Michigan by organizing, facilitating, or supporting various camps, conferences, workshops, and training programs.

Relevance: MISG provides leadership for NEMIGLSI, the northeast Michigan branch of the statewide Great Lakes Stewardship Initiative (GLSI). GLSI and its regional hubs support place-based stewardship education in schools and communities around Michigan. MISG also provides pathways for formal and informal educators to seek out place-based stewardship professional development to expand their knowledge, network with peers, and find innovative ways to connect their students with their communities and environments.

Response: In 2019, MISG and NEMIGLSI provided or helped facilitate a variety of educational and professional development opportunities for students and educators. Programs included a teacher mentoring initiative, Shoreside Science Workshop, Lake Sturgeon Science and Stewardship training, and more. MISG also sponsored the 2019 Place-Based Education Conference. MISG provided additional professional development opportunities for teachers from southeast Michigan schools -- primarily from Detroit -- through the Southeast Michigan Stewardship Coalition.

Results: Thanks to MISG's efforts and support, more than 4,000 students from 9 counties engaged in hands-on, place-based stewardship learning through the NEMIGLSI program in 2019. The Place-Based Education Conference provided training and networking opportunities for 338 teachers, and dozens of additional educators benefited from the camps, workshops, and training programs that MISG organized, facilitated, or supported in 2019.

Partners: NOAA Thunder Bay National Marine Sanctuary, Northeast Michigan Council of Governments, Alpena-Montmorency-Alcona Education Service, AMA/Iosco Math Science Center, Cheboygan-Otsego-Presque Isle Education Service, Community Foundation of Northeast Michigan, Huron Pines, MSU Extension, 4-H Youth Programs, US Fish and Wildlife Service, Michigan STEM network, Great Lakes Stewardship Initiative, Michigan Department of Natural Resources, Au Sable Valley Audubon Chapter, Friends of Thunder Bay National Marine Sanctuary, Land Information Access Association, Michigan Natural Features Inventory, Saginaw Chippewa Indian Tribe, Sturgeon for Tomorrow, Great Lakes Fishery Trust, EPA Great Lakes National Program Office, Illinois-Indiana Sea Grant, Macomb Intermediate School District, Minnesota Sea Grant, MSU Department of Community Sustainability, New York Sea Grant, Ohio Sea Grant, Pennsylvania Sea Grant, US Geological Survey, University of Michigan School for Environment and Sustainability, University of Wisconsin-Milwaukee, Wisconsin Sea Grant, Michigan Science Teachers Association, Purdue University, Great Lakes Stewardship Initiative,

Grand Valley State University, Michigan Department of Education, Michigan Technological University, Eastern Michigan University, MSU Department of Fisheries and Wildlife

Project Number Index: A/AS-25

Goal 11: A diverse workforce that is skilled in science, technology, engineering, mathematics, and other disciplines critical to local, regional, and national needs.

IMPACT: MISG fellowships help graduate students win research positions, publish acclaimed journal articles

Recap: Thanks to work conducted during their MISG graduate fellowships in 2016-2018, recent graduates Peter Alsip, Erin Burkett, and Corey Krabbenhoft accepted positions in their fields in 2019. In the same year, Alsip also published a widely publicized paper about scenarios for Asian carp invasion in Lake Michigan.

Relevance: Since 2016, MISG has offered one- or two-year fellowships for graduate students at Michigan colleges and universities who are pursuing research relevant to current Great Lakes issues. Graduate research fellows work with an agency sponsor and a faculty member to conduct projects that support ongoing research at state, federal, or tribal agencies. In addition to providing financial support, the fellowships enhance students' academic and professional development opportunities.

Response: During the 2016-2018 research funding cycle, MISG supported four graduate student research fellows at three Michigan universities. Corey Krabbenhoft at Wayne State University investigated invasive round goby in Michigan's Great Lakes tributaries. University of Michigan student Peter Alsip modeled scenarios for Asian carp invasion of Lake Michigan. Nicole Olsen, also at University of Michigan, researched airborne toxins from harmful algal blooms. Erin Burkett of Michigan Technological University studied the experiences of female anglers.

Results: In 2019, three fellows accepted positions in their fields. Krabbenhoft began a postdoctoral position at the University of Buffalo. Burkett is an outreach specialist for University of Wisconsin Extension. Alsip is a data analyst for the Cooperative Institute for Great Lakes Research. In 2019, he published a paper on carp invasion models that garnered widespread media coverage and provides context for Great Lakes managers and policymakers weighing strategies for preventing Asian carp spread.

Partners: Cooperative Institute for Great Lakes Research, National Oceanic and Atmospheric Administration – Great Lakes Environmental Research Laboratory, Michigan Department of Natural Resources – Institute for Fisheries Research, University of Michigan School for Environment and Sustainability, Wayne State University, Friends of the Rouge, Erb Family Foundation, Michigan Department of Environment Quality (MI DEQ), Michigan Department of Health and Human Services, University of Michigan-Chemistry Department

Project Number Index: R/CGLH-6, RCGLH-8, R/CBD-2, R/WQ-7

Goal 10: An environmentally literate public that is supported and informed by a continuum of lifelong formal and informal engagement opportunities.

IMPACT: MISG advances education about native wild rice alongside tribal partners

Recap: MISG is part of a grant effort to work alongside tribal nations to honor, restore, and educate about native wild rice, an important food source and cultural touchpoint for Great Lakes tribes. MISG's photographer participated in a 2019 wild rice harvesting event, and his photographs are an important outreach tool for the tribes and their grant partners.

Relevance: Wild rice, known to Michigan's tribal nations as manoomin, is a native plant found in shallow portions of Michigan's waterways. Manoomin is more than just a food source for the state's indigenous communities; it's also a sacred entity with ceremonial significance. Since European colonization, most of the state's wild rice stands have been wiped out. Tribal nations are now leading many initiatives to honor, restore, and educate about this important native species.

Response: MISG is collaborating with tribes and Minnesota and Wisconsin Sea Grants to develop a Lake Superior manoomin education toolkit. In 2019, MISG compiled existing manoomin resources, created a logo for a Michigan manoomin collaborative, and delivered presentations about the project. MISG's photographer also attended a northern Michigan wild rice camp hosted by the Keweenaw Bay Indian Community. This annual event marks manoomin harvest season and teaches traditional harvesting tools and techniques to younger tribal members.

Results: MISG's efforts propelled the toolkit toward its estimated completion date in 2020. MISG's presence at wild rice camp helped foster important relationships with tribal partners, and photographs documenting the event are freely available online for tribes and Sea Grant programs to use in outreach materials. The images also became the basis for a photobook distributed by NOAA. The product is highly valued by tribal participants and includes translations of key terms in the Ojibwe language.

Partners: Minnesota Sea Grant, Wisconsin Sea Grant, 1854 Treaty Authority, Keweenaw Bay Indian Community, Bay Mills Chippewa Indian Community, Little River Band of Ottawa Indians, Sault Ste. Marie Tribe of Chippewa Indians, Great Lakes Indian Fish and Wildlife Commission

Project Number Index: R/EU-18, C/CC-19

Goal 10: An environmentally literate public that is supported and informed by a continuum of lifelong formal and informal engagement opportunities.

ACCOMPLISHMENT: Successful regional network meeting strengthens partnerships, collaborations

Recap: MISG strengthened partnerships and collaborations among the Great Lakes Sea Grant programs by hosting a regional meeting for 100 attendees.

Relevance: The Great Lakes Sea Grant (GLSGN) network includes programs in Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, New York, and Vermont (Lake Champlain). United around a shared set of water bodies, the Great Lakes Sea Grant programs often work collaboratively on research, outreach, and education initiatives. Biannual network meetings are a crucial way to build and reinforce relationships, spark new collaborations, and celebrate successes.

Response: MISG hosted the 2019 GLSGN regional meeting in Sault Ste. Marie in the Upper Peninsula. More than 100 colleagues from the network gathered for 3 days of programming, with representation from every Great Lakes Sea Grant program and the National Sea Grant Office, including Director Jon Pennock. The event included educational sessions, work group meetings, and field trips. The conference modeled a variety of facilitation processes and included a zero-waste theme.

Results: 65 attendees filled out a post-conference survey. When asked whether the conference met their expectations, more than 90 percent of respondents said the meeting met (50 percent) or exceeded (45 percent) their expectations. More than 80 percent said they expected to implement knowledge, skills, or practices learned at the meeting in the next 6-12 months. Many reflected positively on the zero-waste efforts and were grateful for the opportunity to network and collaborate with colleagues.
Partners: Minnesota Sea Grant, Wisconsin Sea Grant, Illinois-Indiana Sea Grant, Ohio Sea Grant, Pennsylvania Sea Grant, New York Sea Grant, Lake Champlain Sea Grant, National Sea Grant Office, Bay Mills Indian Community, Chippewa Ottawa Resource Authority Inter Tribal, Sault Tribe of the Chippewa Indians

Project Number Index: A/AS-25, R/AS-26, M/PM-64, C/CC-19

National Performance Measures

Focus Area	Performance Measures		MISG Targets 2018-2021	MISG 2019 Actual 2/1/19-1/31/20
ALL	Economic (market and non-market) benefits derived from Sea Grant Activities	Economic Benefit	$24,600,960	$3,047,107
		Businesses Created	2	0
		Businesses Supported	386	17
		Jobs Created	0	0
		Jobs Supported	292	132
		Patents/Licenses	0	0
SFA	Number of fishermen, seafood processing and aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities		756	216
RCE	Number of communities that implemented sustainable economic and environmental development practices and policies as a result of Sea Grant activities		86	32
HCE	Number of acres of coastal habitat protected, enhanced, or restored as a result of Sea Grant activities		220	792
ELWD	Number of people engaged in Sea Grant-supported informal education programs		14,180	7,133
ELWD	Number of Sea Grant-supported graduates who become employed in a job related to their degree within two years of graduation		26	7
HCE	Number of resource managers who use ecosystem-based approaches in the management of land, water, and living resources in ocean, coastal and Great Lakes areas as a result of Sea Grant activities		640	103
Cross-Cutting	Number of communities that implemented hazard resiliency practices to prepare for, respond to, or minimize coastal hazardous events as a result of Sea Grant activities		88	17
Cross-Cutting	Number of Sea Grant products (i.e., tools technologies, and information services) that are used by our partners/customers to improve ecosystem-based management		70	2
Cross-Cutting	Number of Sea Grant products that are used to advance environmental literacy and workforce development		38	9

Economic Impacts and Benefits

The economic impacts and benefits – including market and non-market valuations and jobs and business created or sustained – derived from Sea Grant activities.

Economic Benefit of MISG	Economic Impact	Businesses Created	Businesses Supported	Jobs Created	Jobs Supported	Patents/ Licenses
The Seafood Hazard Analysis and Critical Control Points (HACCP) training, facilitated by Michigan Sea Grant Extension educators, supported 31 jobs in 2019. As of May 2019, the mean annual wage for the position being trained is $57,580 per job in the state of Michigan (source: Bureau of Labor Statistics, First-Line Supervisors of Fishing Workers, https://www.bls.gov/oes/current/oes451011.htm#st). This training provides the skills necessary to execute the most efficient methods of seafood production while abiding by food safety standards. It also gives fish processors the opportunity to add value-added products to their operations. A HACCP certification is required for seafood processing. **31 jobs x $57,580 mean annual salary per job = approximately $1,784,980**	$1,784,980.00	0	0	0	31	0
MISG is heavily involved with outreach, education, and research efforts that are focused on stopping the spread of aquatic invasive species (AIS) throughout the Great Lakes. AIS are incredibly detrimental to both the biological and ecological health of the Great Lakes ecosystem, and have major economic impacts for Michigan as a whole. As a result of this growing problem, MISG has developed and implemented numerous programs focused on addressing the rise of AIS in the Great Lakes. Some of those programs include the following: (1) The Paddle Stewards programs teaches kayakers and boaters in the Great Lakes and its connecting rivers and tributaries how to identify and stop "aquatic hitchhikers." (2) MISG Extension, in collaboration with partners at the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) and Keweenaw Bay Fish Hatchery, have modified and adapted HACCP training into an AIS-HACCP course for the baitfish and aquaculture industries, the sole purpose of which is to increase proactive efforts to prevent the spread of AIS in these industries that have several large vulnerabilities when considering invasive species. (3) MISG also manages the Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS; https://www.glerl.noaa.gov/glansis/). The primary objective of GLANSIS is to prevent the introduction of new invasive species into the Great Lakes, and provides a catalog of resources including species profiles, threat assessments, and AIS maps on their website that is openly available to the public and all interested stakeholders. The purpose of providing this wealth of information is to inform the management decisions that lead to the prevention and control of AIS in the Great Lakes. GLANSIS is currently in the process of expanding the database to include Canadian data, which increases our reach and expands our collaborative partnerships in this area. A study published by Rosaen et al. in 2016 (https://www.andersoneconomicgroup.com/Portals/0/upload/AEG%20-%20AIS%20Impact_%209-20-2016%20Public%20new.pdf) estimates that the aggregate cost of AIS to the Great Lakes region is significantly over $100 million annually. Given that Michigan has a coastline on four of the five great lakes, and a total of 1.7 million jobs are considered coastal employment, resulting in an economic impact of almost $86 billion annually (https://coast.noaa.gov/states/michigan.html), the state is massively impacted by the rise of AIS. As a result of the successful outreach, education, communication, and	$1,000,000.00	0	0	0	0	0

research efforts that MISG has undertaken with regard to AIS, we are confident that we have had an impact on thwarting the spread. While these have been major efforts, we are nonetheless conservative in our estimated impact with regard to cost savings for the state. We can comfortably state that MISG's efforts have resulted in a 1% cost savings for the state of Michigan in the fight against AIS. **$100,000,000 in costs of AIS to the Great Lakes x 1% cost savings as a result of MISG outreach, education, and research efforts = $1,000,000 in cost savings**						
MISG facilitates the certification and re-certification of Clean Marina facilities. MISG staff serve on the Michigan Clean Marina Foundation Board and Operations Committee. Some certified Clean Marina facilities have received an annual insurance discount of up to $1,500 as a result of obtaining the Clean Marina certification. Of the 6 new certifications completed in 2019, 1 marina confirmed that is has seen insurance savings as a result. This results in $1,500 in insurance savings. **1 Clean Marina reporting insurance savings x $1,500 in estimated insurance savings/marina = $1,500**	$1,500.00	0	17	0	0	0
MISG co-facilitated the development of the "Michigan Catch and Cook" program in 2012 and had 5 new charter businesses register in 2019. The program brings together charter fishermen and local restaurants to allow anglers the opportunity to serve their own fresh-caught fish at participating restaurants. MISG Extension Educator Dan O'Keefe continues to play a critical role in promoting this program, managing the user database, and growing participation along the shores of the Great Lakes. With the additional 5 charter businesses, program involvement is now at a total of 101 charter businesses and 66 restaurants. The total number of charters was found on each lake using the advanced search feature found on the Catch and Cook Website (http://www.michigancatchandcook.com/charter-boats/?wpbdp_view=search&kw=). The following guide was used to estimate the impact of the Catch and Cook program (using the data collected for 2019-2020): https://www.michiganseagrant.org/wp-content/blogs.dir/1/files/2018/05/Calculating-Economic-Impact-from-Catch-and-Cook-Program.pdf. Using the Charter Economic Impact Calculator developed by a Michigan Sea Grant Extension educator, the economic impact in 2009 dollars was determined for each lake. These values were summed to yield a total economic impact in 2009 dollars of $67,936. This amount was then entered into an inflation calculator (https://data.bls.gov/cgi-bin/cpicalc.pl?cost1=67%2C936.00&year1=200901&year2=202001) to determine the total economic impact in 2020 dollars. The increase in charter trips each year as a result of the Catch and Cook program yielded a total economic impact of $83,003 in 2020. This program also supports the 101 captains of the charter fishing vessels that participate in Catch and Cook, as they have seen an increase in charters each year as a result of their participation. Based on data collected from participating charter captains, it is estimated that they see an increase of 1.4 charters each year as a result of participating in the program. Across the 4 Great Lakes and Lake St. Clair this amounts to a total of 141.4 additional charters each year. Using data found from the Bureau of Labor Statistics (First-Line Supervisor of Fishing Workers, https://www.bls.gov/oes/current/oes451011.htm#st), the closest salary for which data is provided is estimated at $57,580 in the state of Michigan, with an average hourly wage of $27.68. Using the same Charter Economic Impact Calculator detailed above, the total employment hours were found for each lake and summed to yield the total employment hours across the lakes (factoring in the increase in charters): 401 hours (Lake Erie/St. Clair) + 1,093 hours (Lake Huron) + 2,331 hours (Lake Michigan) + 197 hours (Lake Superior) = 4,022 total employment	$194,331.96	0	0	0	101	0

hours. Those hours multiplied by the average hourly rate of $27.68 yields a total economic impact of $111,328.96. This is a conservative estimate of the impact the Catch and Cook Program has with regard to supporting the captains of these charter vessels. **$111,328.96 (conservative estimate of jobs supported) + 83,003 (conservative estimate of the increase in charter trips per year) = $194,331.96 economic benefit of the Catch and Cook program**						
The Celeron Island restoration completed construction on 4,000 linear feet of rock shoals, which created hibernacula for snakes, turtle nesting beaches, and common tern nesting areas. This area has become a habitat nursery for many local fauna. Brander and Schuyt (2004) published a study that estimates the value of wetlands by function; according to the study, habitat nursery has an economic value of $201/hectare in 2000 dollars (https://www.researchgate.net/publication/288267725_The_economic_values_of_the_world's_wetlands). Unfortunately, much of the research that has been produced focuses on marine wetlands as opposed to freshwater wetlands. However, given that this study separated the economic value of wetlands by function, habitat restoration is likely similar across marine and freshwater ecosystems. As a result, we feel the study is applicable to the Celeron Island restoration. 150 acres were restored on Celeron Island, which would equal 60.70 hectares. The total value of this restoration project in terms of habitat nursery functions is $12,200.70 in 2000 dollars, or $18,165.65 in 2020 dollars (Inflation Calculator used: https://www.usinflationcalculator.com/). MISG's effort on this project is conservatively estimated to be 10%, as the program was involved with promotion of the project, played an advisory role, and assisted with securing the initial funding. In addition, a MISG Extension educator serves as the chair for the Detroit River Public Advisory Council, and assisted in all aspects of the planning, funding, and implementation related to all Detroit River habitat restoration projects. As a result, $1,816.57 of the economic value of this habitat restoration is attributable to MISG efforts. **$18,165.65 in habitat restoration value x 10% of MISG effort = $1,816.57 conservative estimate of MISG impact related to habitat restoration on Celeron Island**	$1,816.57	0	0	0	0	0
MISG awarded two graduate research fellowships to two master's candidates. This fellowship provided recipients with the chance to conduct research projects on topics of their choice. The first fellow has since received her degree and is now employed with the Pacific Northwest Laboratory in Washington state as a Data Analyst, and the second fellow has received her degree and is employed at the Western Upper Peninsula Planning and Development Region (WUPPDR) as an Assistant Regional Planner. Based on Koropeckyj et al.'s conservative estimate showing a 6.1% increase in earning differential for advanced degrees compared to college degrees, we assume that the MISG Graduate Research Fellowship resulted in a $5,503 earning differential for life scientists (Life Scientists, Washington: https://www.bls.gov/oes/current/oes191029.htm) and a $4,076 earning differential for regional planners (Urban and Regional Planners, Michigan: https://www.bls.gov/oes/current/oes193051.htm) based on the 6.1% markup on the base salaries of $90,220 and $66,820, respectively. We conservatively estimate the increased earnings for these two MISG Graduate Research Fellows over two years as follows: **Life Scientist: ($5,503 increased differential earning per year of work) x (2 years of salary) x (200% for two-year program) x (1 Fellow) = $22,012** **Regional Planner: ($4,076 increased differential earning per year of work) x (2 years of salary) x (200% for two-year program) x (1 Fellow) = $16,304** **$22,012 + $16,304 = $38,316 total increased earnings for MISG Graduate Research Fellows**	$38,316	0	0	0	0	0

MISG supported three Knauss Fellows who obtained jobs as a contractor (Fisheries Management Specialist) with the Office of Sustainable Fisheries at NOAA, a contractor (Program Analyst) with NOAA's National Environmental Satellite, Data, and Information Service, and as a Program Associate with the Udall Foundation's National Center for Environmental Conflict Resolution. The Knauss Marine Policy Fellowship was a one-year commitment that allowed these individuals to connect with a variety of organizations and personnel, which ultimately led to full time employment. Based on a conservative estimate showing a 6.1% increase in earning differential for advanced degrees compared to undergraduate degrees, we assume that the Knauss Marine Policy Fellowship resulted in a $4,190 earning differential for government employees based on a 6.1% markup on base earnings of $68,036, and in a $4,781 earning differential for life scientists based on a 6.1% markup on base earnings of $78,370 (data gathered from FederalPay.org and OES Statistics). We conservatively estimate the increased earning for these three Knauss fellows over the first two years of work as follows: **[($4,150 increased earning differential per year of work) x (2 Knauss Fellows)] + [($4,781 increased earning differential per year of work) x (1 Knauss Fellows] x 2 years of salary = $26,162**	$26,162.00	0	0	0	0	0
Total	**$3,047,106.53**	**0**	**17**	**0**	**132**	**0**

Fish and Seafood Professionals

The number of fishermen, seafood processing, and aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities.

Program/Initiative	# of People	Notes
Statewide Fisheries Workshops	162	Voluntary surveys were distributed to those who participated in these workshops. 152 of the 219 that returned surveys agreed with this survey question: as a result of participating in this workshop, I plan to modify practices using knowledge gained in fisheries sustainability as a result of participating in Sea Grant activities. An additional 10 respondents agreed with the following survey question: as a result of participating, I plan to modify practices using knowledge gained in seafood safety as a result of participating in Sea Grant activities
Seafood HACCP Courses	31	Fish processors who complete the Seafood HACCP course are at a competitive advantage as they can now make value added products to help increase their revenues
AIS/HACCP Biosecurity Workshop	23	Natural resources agencies and the baitfish and aquaculture industries have been proactive in using the HACCP approach to prevent the spread of AIS by participating in training programs and implementing HACCP plans that are specific to their operations
Total	**216**	

Sustainable Coastal Development

The number of communities that implemented sustainable economic environmental development practices and policies as a result of Sea Grant activities.

Program/Initiative	Community Name	# of Communities	Notes Regarding Changes Observed
Water School	Northville	1	After attending Water School program/workshop, the Northville manager reopened the town's master plan and incorporated additional green stormwater infrastructure
Sustainable Small Harbors	Arcadia Township, Benton Harbor, St. Joseph, Lexington	4	Led and participated in community visioning efforts to begin the process of modernizing the harbors in these communities
Green Infrastructure Community Engagement Sessions	Elk Rapids, Holland, Royal Oak	3	These three communities participated in community visioning sessions that identified feasible green stormwater infrastructure (GSI) locations and rendered those practices for community municipal input. All three communities were able to leverage this knowledge and received grants to implement GSI and institute additional stormwater improvements
Saginaw Bay Reef Restoration	Bay County, Frankenmuth	2	Participated in the restoration of the Saginaw Bay Reef, which will increase the habitat area for local species and the threatened as lake sturgeon
Detroit River Reef Restoration	Detroit	1	Participated in the restoration of the Detroit River Reef, which will increase the habitat area for local species and the threatened lake sturgeon
Grand River Dredging Project	Ottawa, Kent, Muskegon, Kalamazoo Counties	4	MISG Extension educator Dan O'Keefe presented on the dredging proposal and wrote a white paper using an unbiased review of the science that details the impacts of dredging and the effect it would have on the impacted area. DNR did not to pursue the project
Ecorse Creek Redevelopment	Ecorse	1	
Clean Marinas	Mayea Marina (Fair Haven); Elba Mar Boat Club (Grosse Ille); Indian River Marina (Indian River); Ottawa Beach Marina (West Olive); Pine Lake Marina (West Bloomfield); Sommerset Pointe Yacht Club (Boyne City)	6	New Clean Marina certifications
	Bay Harbor Lake Marina, Bay Harbor Yacht Docks (Bay Harbor); Eldean Shipyard (Macatawa); Rogers City Marina (Rogers City); Saugatuck Yacht Services (Saugatuck); St. Clair Boat Harbor (St. Clair); East Jordan City Marina (East Jordan); Irish Boat Shop (Charlevoix); Irish Boat Shop (Harbor Springs); Keans Detroit Yacht Harbor (Detroit); MacRay Harbor (Harrison Township)	10	Clean Marina recertifications
Total		**32**	

Acres Restored

The number of acres of coastal habitat protected, enhanced, or restored as a result of Sea Grant activities.

Locations	Project Description	# of Acres
Saginaw Bay	Reef restoration completed in Fall 2019, restoring 2 acres of reef habitat in Saginaw Bay	2
Celeron Island	150 acres of habitat restored/enhanced/protected on the island	150
Grand River	A proposed Grand River dredging project would have removed 50 acres of shallow habitat, including riffles used by state-threatened mussels and spawning state-threatened river redhorse. The project also had the potential to further impact roughly 590 acres of river (177 in Kent, 413 in Ottawa) due to the indirect effects of altered patterns of erosion and deposition, decreased water level in off-channel areas, removal of food-producing large woody debris, and increased traffic from dredging equipment and large boats. MISG Extension educator Dan O'Keefe held 17 presentations and public forums on the proposed project, reaching a total of 789 people. He also published a white paper that presented an unbiased review of the science that details the impacts of dredging and the effect it would have on the impacted area. MISG efforts constitute acres protected	640
Total		**792**

Informal Education Programming

The number of people engaged in Sea Grant-supported informal education programs.

Presenter Name	Event Name	# of Teachers	# of Students	# of Community Members	Total # Engaged
Jennifer Hunnell	4H Exploration Days	0	23	0	23
Cindy Hudson, Jennifer Hunnell	MSU Kids' Day at Work	0	12	5	17
Cindy Hudson, Jennifer Hunnell	BWL Adopt-a-River Event	0	65	60	125
Ron Kinnunen	Aquaculture Workshop for Teachers	6	0	0	6
Mary Bohling	AIS Paddle Stewards	0	0	162	162
Mary Bohling	Rouge River Water Festival	0	182	0	182
Mary Bohling	Detroit Water Festival	19	528	0	547
Mary Bohling	Lake St. Clair Fisheries Workshop	0	0	32	32
Mary Bohling	Shiver on the River: Belle Island	0	0	28	28
Mark Breederland	Magoon Creek Day with Nature	26	190	0	216
Mark Breederland, Elliot Nelson	Great Lakes Water Levels Public Meetings	0	0	321	321
Brandon Schroeder, Meaghan Gass	Jr Science and Humanities Symposium	0	6	0	6
Meaghan Gass	Saginaw Bay Reef Restoration	4	159	0	163
Meaghan Gass	Bay City Rowing Club	0	21	0	21
Meaghan Gass	Standish Sterling Schools Freshwater Ecology	1	99	0	100
Brandon Schroeder, Meaghan Gass	PBE Conference	338	0	0	338
Brandon Schroeder, Meaghan Gass	4H Great Lakes Natural Resources Camp	21	67	0	88
Meaghan Gass	Saginaw Bay 4H Fish Camp	16	47	0	63
Meaghan Gass	Cloverbud Day Camp	0	6	0	6
Meaghan Gass	Winter Interpretive Workshop	40	0	0	40
Meaghan Gass	Microplastics Research	0	1	0	1
Meaghan Gass	Wayne State Junior Science Symposium	0	2	0	2
Brandon Schroeder	Great Lakes Day	52	0	0	52
Brandon Schroeder, Elliot Nelson	Life of the Straits	41	53	0	94
Brandon Schroeder	Science Workshop	0	168	0	168
Brandon Schroeder, Meaghan Gass, Elliot Nelson	Lake Huron Fisheries Workshops	0	0	327	327
Elliot Nelson	Friends of Les Cheneaux Area Trails	13	28	0	41

Elliot Nelson	Pickford Library - Aquaculture Reading and Activity	0	22	0	22
Elliot Nelson	Friends of Les Cheneaux Area Trails	4	15	0	19
Elliot Nelson	Michigan Science Teachers Association Conference	14	0	0	14
Elliot Nelson	Lake Superior Fisheries Workshop	0	0	26	26
Elliot Nelson	Les Cheneaux Lake Level Workshop/GLOW	0	0	85	85
Elliot Nelson	Cedarville Christmas Bird Count	0	0	7	7
Elliot Nelson	Moonlit Snowshoe Hike	0	0	12	12
Elliot Nelson	Sunrise Birding Hike	0	0	3	3
Elliot Nelson	Ice and Forest Hike	0	0	29	29
Elliot Nelson	Bird Trails Development Workshop	0	0	19	19
Dan O'Keefe	Ludington Regional Fisheries Workshop	0	0	80	80
Dan O'Keefe	Southern Lake Michigan Regional Fisheries Workshop	0	0	42	42
Steve Stewart, Justin Selden, Gary Williams	Great Lakes Education Program (GLEP)	88	2174	0	2262
Justin Selden	Summer Discovery Cruises (SDC)	0	66	963	1029
Geneva Langeland, Mark Breederland, Dr. Guy Meadows	Collaborative efforts to model potential oil spills in the Great Lakes	0	0	41	41
Geneva Langeland, Mark Breederland, Steven Keck	Oil spill response exercises and planning	0	0	41	41
Geneva Langeland, Mark Breederland, Bill Hazel	Oil spill response capabilities for heavy oil products	0	0	33	33
Geneva Langeland, Mark Breederland, Lt. Michael Doig	NOAA scientific support for oil spills	0	0	28	28
SEMIS	CMA Community Forum	0	0	40	40
SEMIS	SEMIS Community Forum	0	0	100	100
Dr. Maria Lemos	NOSB - How to Make Science Useful	32	0	0	32
Total		**715**	**3934**	**2484**	**7133**

Resource Managers

The number of resource managers who use ecosystem-based approaches in the management of land, water, and living resources as a result of Sea Grant activities.

Program/Initiative	People/Groups Participating	# of Resource Managers
Water School	Public officials, both elected and appointed	52
Green Infrastructure for Coastal Resilience	Private sector, local/state/tribal government officials, non-profits	15
Birding Trails Development	Bay Mills and Sault tribal natural resources, MI DNR, USFS, EUP Regional Planning and Development, Sault Ste Marie CV, local birders	19
Clean Marinas	Mayea Marina (Fair Haven); Elba Mar Boat Club (Grosse Ille); Indian River Marina (Indian River); Ottawa Beach Marina (West Olive); Pine Lake Marina (West Bloomfield); Sommerset Pointe Yacht Club (Boyne City)	17
	Bay Harbor Lake Marina, Bay Harbor Yacht Docks (Bay Harbor); Eldean Shipyard (Macatawa); Rogers City Marina (Rogers City); Saugatuck Yacht Services (Saugatuck); St. Clair Boat Harbor (St. Clair); East Jordan City Marina (East Jordan); Irish Boat Shop (Charlevoix); Irish Boat Shop (Harbor Springs); Keans Detroit Yacht Harbor (Detroit); MacRay Harbor (Harrison Township)	
Total		103

Hazard Resiliency Training

The number of coastal communities that have adopted or implemented hazard resiliency practices to prepare for, respond to, or minimize coastal hazardous events.

County of Coastal Community	Name of Coastal Community	Number of Resiliency Trainings Provided	Was Community Hazard Resiliency Improved?
Emmet	Bay Harbor	2	Yes
Charlevoix	Boyne City	1	Yes
Charlevoix	Charlevoix	1	Yes
Wayne	Detroit	1	Yes
Charlevoix	East Jordan	1	Yes
Wayne	Fair Haven	1	Yes
Wayne	Grosse Isle	1	Yes
Emmet	Harbor Springs	1	Yes
Macomb	Harrison Township	1	Yes
Cheboygan	Indian River	1	Yes
Ottawa	Macatawa	1	Yes
Presque Isle	Rogers City	1	Yes
Allegan	Saugatuck	1	Yes
St. Clair	St. Clair	1	Yes
Oakland	West Bloomfield	1	Yes
Ottawa	West Olive	1	Yes
Total		**17**	

Sea Grant Products Developed or Used

Tools, technologies, or informational services developed by Sea Grant staff that are used by partners and customers to improve ecosystem-based management.

Name of Product	Developed (Yes/No)	Used (Yes/No)
A Survey of Barriers and Opportunities to Adopting Green Stormwater Infrastructure in Michigan: this document presents the findings of a survey that was carried out in relation to MISG funded research on Green Stormwater Infrastructure implementation. This summary document details potential opportunities and barriers that local communities might face as they implement green infrastructure (GI) projects, in addition to a number of maps that are specific to the town's waterfront district. This document was used by one of the communities that participated in the project to draft a proposal and secure funding for a green infrastructure project in their town. They were able to utilize the information collected from the survey to strengthen their proposal and ultimately the GI plan. End users: community managers interested in green infrastructure projects	Yes	Yes
Summary of Research Related to the Potential Physical and Biological Impacts of Dredging to Channelize the Grand River: The Grand River Waterway proposal was not a typical harbor dredging project, as it was a river channelization project that would have removed roughly 50 acres of shallow habitat through dredging portions of the Grand River in Kent and Ottawa Counties. This project was under intense debate, and an MISG extension educator wrote a white paper entitled "Summary of Research Related to the Potential Physical and Biological Impacts of Dredging to Channelize the Grand River" to discuss an unbiased review of the physical and biological impacts of this project, and also mentions the economic implications. The extension educator gave 17 presentations on his paper and the project reaching a total of 789 people. The dredging project was eventually abandoned partially as a result of the education efforts of MISG's extension educator. End users: decision makers at the Michigan Department of Natural Resources, stakeholders in potentially impacted communities	Yes	Yes
Total	**2**	**2**

Sea Grant Products Developed or Used

Products developed by Sea Grant staff that are used to advance environmental literacy and workforce development

Name of Product	Developed (Yes/No)	Used (Yes/No)
Collaborative efforts to model potential oil spills in the Great Lakes: this webinar was hosted by MISG and included a presentation by Dr. Guy Meadows, and was designed to provide the latest research and resources to stakeholders related to crude oil transport in the Great Lakes region. Dr. Meadows is the Director of the Great Lakes Research Center at Michigan Technological University. Dr. Meadows discussed the collaborative research effort that took place to estimate the potential worst-case liability costs of a spill in the Straits of Mackinac, and the accompanying risk analysis. This webinar was originally held on June 26, 2019 and attended by 41 people. It has since been posted on the Great Lakes Crude Oil Transport website and YouTube with closed captioning provided, and has 105 total views since. End users: stakeholders of the Great Lakes region	Yes	No
Oil spill response exercises and planning: this webinar was hosted by MISG and included a presentation by Steven Keck, and was designed to provide the latest research and resources to stakeholders in the region related to crude oil transport in the Great Lakes. Steven Keck is the Chief of Contingency Planning and Force Readiness at the U.S. Coast Guard Sector Sault Ste. Marie. The webinar was originally held on July 23, 2019 and attended by 41 people. It has since been posted on the Great Lakes Crude Oil Transport website and YouTube with closed captioning provided, and has 152 total views since. End users: stakeholders of the Great Lakes region	Yes	No
Oil spill response capability for heavy oil products: this webinar was hosted by MISG and included a presentation by Bill Hazel, and was designed to provide the latest research and resources to stakeholders related to crude oil transport in the Great Lakes region. Bill Hazel is the Vice President of Marine Services, Marine Pollution Control in Detroit, Michigan. The webinar was originally held on August 19, 2019 and attended by 33 people. It has since been posted on the Great Lakes Crude Oil Transport website and YouTube with closed captioning provided, and has 95 total views since. End users: stakeholders of the Great Lakes region	Yes	No
NOAA scientific support for oil spills: this webinar was hosted by MISG and included a presentation by Lt. Michael Doig, and is designed to provide the latest research and resources to stakeholders related to crude oil transport in the Great Lakes region. Lt. Michael Doig is the NOAA Scientific Support Coordinator for the U.S. Coast Guard Great Lakes District. This webinar was originally held on September 11, 2019 and attended by 28 people. It has since been posted on the Great lakes Crude Oil Transport website and YouTube with closed captioning provided, and has 28 total views since. End users: stakeholders in the Great Lakes region	Yes	No
The Life of the Lakes, 4th Edition: this book was written by MISG Extension educators Dan O'Keefe and Brandon Schroeder. The book offers a review of the Great Lakes fishery of the past, outlines the current status of the fishery today, and discusses fisheries issues expected in the future. It also provides an overview of freshwater ecology and management, and added a new section that provides a quick reference for each lake and connecting channel. The book is currently offered on the MISG Bookstore and through UM Press, and a total of 839 books have been ordered. In addition, these books have been utilized at various conferences, including the 2019 GLSGN Meeting and the 2019 MSTA Conference. End users: stakeholders interested in the history and future of the Great Lakes	Yes	Yes
2019 South Haven Fishery Workshop Series: this live event and webinar series was held on April 18, 2019. Hosted by MISG, this series covered a variety of topics impacting the Lake Michigan fishery and MISG programming available to assist with monitoring changes to the fishery. Topics included the MISG Salmon Ambassador program and updates regarding the Huron-Michigan Diet study, a Lake Michigan fisheries	Yes	Yes

management plan and proposed fish stocking paradigm, the status of alewife and other prey fish in the lake, and the Great Lakes Mass Marking program. Presenters included MISG's Dan O'Keefe, Matt Kornis (USFWS), Chuck Madenjian (USGS), and Jay Wesley (MDNR). Survey results that were collected following these workshops that showed a majority of those that participated learned something and would alter their actions as a result. The series was first presented to a live audience in South Haven, MI, and the webinar videos have since been posted on YouTube and viewed a total of 427 times. End users: stakeholders interested in the Lake Michigan fishery		
Salmon and Trout of the Great Lakes: a Visual Identification Guide: this brochure offers a compact way to identify the major salmon and trout that can be found in the Great Lakes. It was a collaborative effort, developed by Sea Grant programs in New York, Michigan, Wisconsin, and Illinois-Indiana. It was printed for distribution by MISG. The MISG communications team also assisted with designing and editing the final product. The brochure focuses closely on body features that are used in identification of fish species. The brochure is now listed on the MISG Bookstore and has been ordered five times, in addition to supplying bulk copies for extension educators to use at public events. End users: experienced and new anglers	Yes	Yes
MI Paddle Stewards Clean, Drain, and Dry Checklist Sticker: this reusable, waterproof sticker was designed by the MISG communications team and an MISG Extension educator. It is used by participants in the MI Paddle Stewards program, which teaches kayakers, canoers, and paddleboarders how to identify and halt the transport of aquatic hitchhikers (aquatic invasive species). During 2019, over 150 people participated in the Paddle Stewards program, and utilized this checklist to remind them to check key points on their kayak/canoe to ensure they were not inadvertently transporting aquatic invasive species. As stated previously, the checklists are reusable and waterproof, and can be kept directly in the kayak or canoe for safekeeping. End users: participants in the MI Paddle Stewards program, kayakers, canoers, and paddleboarders in Michigan	Yes	Yes
The Wild Rice Photobook Toolkit: this photograph-based book was developed by MISG's communications team in collaboration with the NOAA Wild Rice project team. This photobook illustrates the practice of harvesting wild rice using pictures taken during a Wild Rice Camp in Baraga, MI, and also features text translated by tribal partners. This photobook is being used to educate community members on the wild rice harvesting process. Several toolkits have been printed and used by the Wild Rice team in public events, but the book is also available for direct purchase through Shutterfly. End users: extension educators, community members interested in wild rice and tribal practices	Yes	Yes
NOAA Classroom Curriculum: As a part of the NOAA Climate Resiliency grant, project partners at EcoWorks developed a classroom curriculum that has been introduced into participating classrooms. Youth Energy Squad Coordinators developed this NOAA curriculum to focus on introducing students to climate science from a place-based perspective. MISG administers this grant for all project partners. End users: middle school and high school teachers in southeast Michigan	Yes	Yes
Upwellings (four editions): The Michigan Sea Grant Communications team published four editions of the Upwellings newsletter during 2019. This MISG newsletter has been reporting on Great Lakes research and education since 1976. The topics discussed vary in each issue, but have always been tied to the core of Michigan Sea Grant's mission: research, education, and outreach surrounding the Great Lakes. The newsletter provides links to relevant fact sheets, outreach materials, and videos, such as a video on YouTube that has been viewed 464 times and details how to collect fish stomachs and participate in an ongoing diet study of fish. The newsletters are available on the MISG website, and print editions are also available for select issues. End users: newsletter subscribers, including resource management professionals, sustainable development professionals, resiliency professionals, the public	Yes	No
The Fish Notes Newsletter (one edition): this newsletter produced by MISG's Extension Office and Extension educators' targets anglers and other individuals interested in fisheries. The goal of the newsletter is to increase industry knowledge of sustainability practices. In the one edition released during 2019 there	Yes	Yes

was information and links provided on tools and products that have been developed by Michigan Sea Grant. The newsletters are sent out via email to subscribers and are also posted on the MISG website. End users: newsletter subscribers, including resource management professionals, anglers, and the public		
Michigan Sea Grant Extension News Articles: these articles are created by the Michigan Sea Grant Extension Office. They released 34 articles during 2019 covering topics related to science, Sea Grant programming, and environmental literacy. Many of the articles link to informational videos and provide information on how to attend various outreach programs and participate in ongoing data collection efforts with MISG Extension educators. These articles were shared on the MSU Extension and MISG websites. End users: the public, educators, students	Yes	Yes
The Michigan Sea Grant Bookstore: the MISG bookstore houses various publications, products, and educational materials related to the Great Lakes. The bookstore supplies museum-quality posters and maps, books, brochures, and booklets that are created by Michigan Sea Grant and Extension staff. The purpose of the bookstore is to provide a wide array of high-quality publications and educational materials at low or no cost to educators, scientists, resource managers, and the public. The bookstore can be accessed via the MISG website, but individuals can also call the MISG office to place an order, making this a useful tool for accessing various scientific and educational materials. During 2019, we expanded our bookstore inventory to include the newest Life of the Lakes, a Great Lakes Basin map developed by partners at the Erb Foundation and Nature Conservancy, and a revised edition of a Belle Isle guidebook. End users: educators, scientists, resource managers, the public	Yes	Yes
Total	**14**	**9**

Program Metrics

The Metrics page is used to report Michigan Sea Grant metrics data.
These data are used to explain the scope and work of the National Sea Grant College Program.
Annual Report Year: February 1, 2019 - January 31, 2020

Sea Grant Staffing	Number of Individuals	Number of FTE's (Funded by Federal Sea Grant $)	Number of FTE's (Funded by Match and Non-Sea Grant $)
Administrative	7	2.60	3.90
Communications	4	3.45	0.55
Extension	15	8.41	5.02
Education	0	0	0
Research	11	2.21	1.14
Individuals Staffing the Program in All Areas	0		

Core Funding (not NSI's)	Number of Proposals	Number of Institutions Involved	Number from Home Institution
Pre-proposals Submitted	22	14	5
Full Proposals Submitted	21	18	3
Proposals Funded	8	16	2

	Number
Volunteer Hours	949

	Number of New Students	Number of Continuing Students	Number of Degrees Awarded
Sea Grant-Supported Undergraduate Students	5	0	3
Sea Grant-Supported MS/MA Graduate Students	0	8	5
Sea Grant-Supported PhD Graduate Students	0	2	0
Other Sea Grant-Supported Professional Degree Graduate Students	0	3	1

	Number
Number of P-12 Students Reached through Sea Grant-Trained Educators or Directly through Sea Grant Education Programs	11,131
Number of P-12 Educators Who Participated in Sea Grant Education Programs	1,103
SG-Sponsored/Organized Events	47
Attendees in SG Meetings/Workshops	3,427
Public or Professional Presentations	94
Attendees at Public or Professional Presentations	12,355
Clean Marina Program Certifications	17
HACCP Certifications	31

Leveraged Funding

02/01/2019 – 01/31/2020

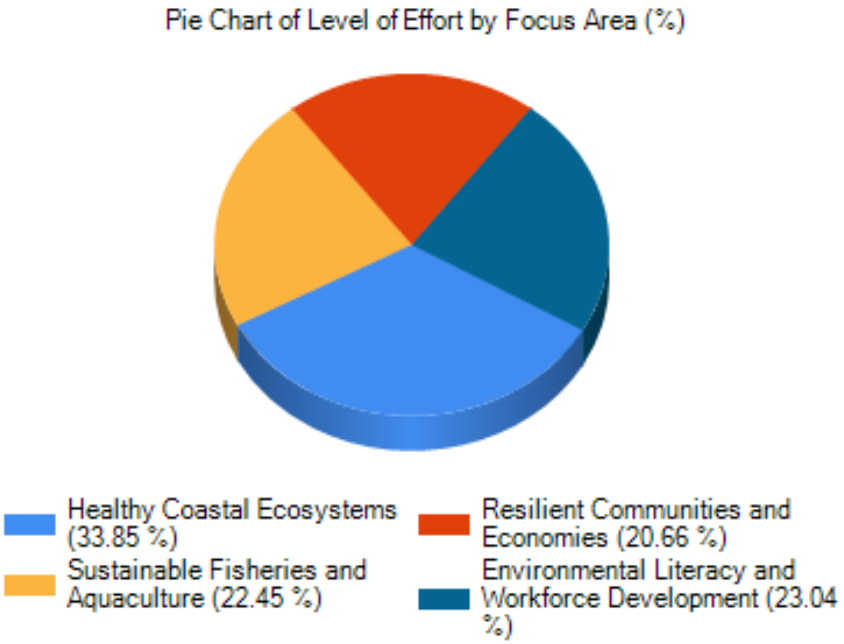
Managed by Michigan Sea Grant			
Title	**Leveraged Amount**	**Fund Start Date**	**Fund End Date**
Applying a Flipped-Classroom Approach to Engage, Educate, and Connect Michigan's Great Lakes Coastal Communities Towards Improved Coastal Resilience (RC110597)	61,786.00	10/01/2019	12/31/2020
Center for Great Lakes Literacy (CGLL) – Year 4 (RC11076/RC110194)	49,124.00	07/15/2019	07/28/2020
Climate Resilience from the Youth Up: a Place-Based Strategy for Uniting High School Students, Educators, Scientists, Community Organizations, and Municipalities in SE MI Environmental Literacy (RC109415/RC109416)	35,359.00	10/01/2019	09/30/2021
Community Engaged Scholarship Training for Scientist and Stakeholders (RC109123/RC109160)	102,461.00	09/03/2019	06/30/2020
Enhancing the Water School (RC18350)	70,000.00	04/01/2019	03/31/2020
Invasive Species Paddling, Detection Reporting, and Public Awareness Program – AIS Paddling (RC108498)	105,513.00	04/01/2019	03/31/2020
Stewardship Motivations and a Collaborative Governance Model for Great Lakes Coastal-Based Wildlife Management Areas for Waterfowl Hunting, Bird Watching, and Community Development (RC1000693)	41,181.00	10/01/2019	09/30/2020
NOAA-GLRI: Piloting Green Infrastructure BMP's at CM in the Western Lake Erie Basin	124,000.00	05/01/2019	04/30/2020
National Ocean Science Bowl 2020 (R/EU-28)	9,000.00	11/01/2019	06/30/2020
NOSB Sponsorship 2020	2,500.00	11/01/2019	06/30/2020
Total	**600,924.00**		

Influenced by Michigan Sea Grant			
Title	**Leveraged Amount**	**Fund Start Date**	**Fund End Date**
2019 Grants for School-Community Fishing Programs	400.00	03/01/2019	12/31/2019
GLOW Project (DS022373/M0121)	11,065.94	01/01/2019	12/31/2019
Enhancing Coastal Recreation from the Au Gres River to Lake Huron	44,546.00	01/01/2020	12/31/2020
Friends of the Detroit River (Downriver Linked Greenways Iron Belle Continuation Project) ~ $400,000 directly to Wayne County	1,900,000.00	04/28/2019	04/27/2020
Friends of the Detroit River (Downriver Linked Greenways Iron Belle Continuation Project) These funds are being used as match on the Ralph Wilson funds	500,000.00	04/28/2019	04/27/2020
Great Lakes Education Program (GLEP)	10,000.00	04/01/2019	10/31/2019
MI Water School Workshop	5,000.00	10/01/2019	09/30/2019
Terrestrial Systems Today for Health Waters	80,000.00	01/01/2020	12/31/2021
NEMI GLSI Network (3 Grants Supported)	5,500.00	09/01/2019	09/01/2020
NEMI GLSI – PBE – Women in Great Lakes Science	2,500.00	12/01/2019	12/01/2020
Total	**2,559,011.94**		

Estimated Level of Effort by Focus Area

02/01/2019 – 01/31/2020

National Focus Area Name	SG Federal	Match	Pass Through	Federal + Match + Pass Through	LOE without Leverage (%)	Leveraged (Managed)	LOE with Leverage (%)
Healthy Coastal Ecosystems	$533,988	$259,727	$306,752	$1,100,467	35%	$116,977	33.85%
Sustainable Fisheries and Aquaculture	$375,664	$195,413	$109,884	$680,961	22%	$126,485	22.45%
Resilient Communities and Economies	$383,384	$192,161	$45,521	$621,065	20%	$121,731	20.66%
Environmental Literacy and Workforce Development	$464,534	$176,117	$66,083	$706,733	23%	$121,731	23.04%
Unclassified	$0	$0	$0	$0	0%	$0	0%
Total	**$1,757,570**	**$823,418**	**$528,239**	**$3,10,226**	**100%**	**$744,212**	**100%**



Distribution of Effort across Focus Areas by Project

02/01/2019 – 01/31/2020

Project Title	Program Project ID	Federal + Match + Pass Through	Leveraged (Managed)	% HCE	% SFA	% ELWD	% RCE
Omnibus FY 2018-2021: Extension	A/AS-25	$1,026,389	$613,424	24%	26%	25%	25%
Omnibus FY 2018-2021: UM Communications	C/CC-19	$311,382		30%	25%	20%	25%
Piloting Green Infrastructure BMPs at Clean Marinas in the Western Lake Erie Basin	C/CC-20	$91,041		50%	0%	0%	50%
2019 Knauss Fellowship (Jillian Mayer)	E/2019Knauss-JillianMayer	$61,500		0%	0%	100%	0%
2019 Knauss Fellowship (Kaitlyn Pritchard)	E/2019Knauss-KaitlynPritchard	$61,500		0%	0%	100%	0%
2019 Knauss Fellowship (Kathryn Frens)	E/2019Knauss-KathrynFrens	$62,750		0%	0%	100%	0%
MISG Program Development	M/PD-66	$24,699		25%	25%	25%	25%
Omnibus FY 2018-2021: UM Administration	M/PM-64	$409,583	$130,787	25%	25%	25%	25%
Omnibus FY 2018-2021: MSU Administration	M/PM-65	$45,034		25%	25%	25%	25%
Placeholder - Future Competed Research Projects	P/PM-68	$146,826		25%	25%	25%	25%
“I once caught a fish ‘THIS BIG’”: Using Parcipatory Photovoice to Understand Michigan’s Great Lakes Anglers	R/CBD-2	$22,733		0%	25%	25%	0%
Tracking Biodiversity, Community Assemblage, and Gene Flow Among Interdunal Wetlands Along the Eastern Shore of Lake Michigan	R/CGLH-5	$146,572		100%	0%	0%	0%
Cladophora, Mussels, and the Nearshore Phosphorus Shunt in Lake Michigan	R/CGLH-7	$149,902		75%	0%	0%	25%
GLANSIS: Science and Management Support	R/CGLH-9	$343,864		75%	25%	0%	0%
MISG Environmental Internship Program	R/ERA-1	$75,000		25%	25%	25%	25%
Wild Rice (Manoomin) Education & Outreach Toolkit for Lake Superior Audiences – Michigan Sea Grant	R/EU-18	$8,333		50%	0%	50%	0%
2019 Advancement of Sea Grant Visioning	R/EU-26	$60,392		25%	25%	25%	25%
NMFS/Sea Grant Population and Ecosystem Dynamics Graduate Fellowship (Emily Liljestrand): Using Simulation and Application to Evaluate the Performance of State Space Stock Assessment Models	R/NCF-3	$54,221		0%	100%	0%	0%
Harmful Algal Bloom Aerosolization in the Great Lakes: Potential Health and Climate Impacts	R/WQ-7	$7,503		50%	0%	25%	25%