Sea Grant

MICHIGAN SEA GRANT

UNIVERSITY OF MICHIGAN + MICHIGAN STATE UNIVERSITY

STRATEGIC PLAN

FISCAL YEAR 2018-2023

michiganseagrant.org

Michigan Sea Grant Strategic Plan 2018-2023
Michigan Sea Grant College Program, MICHU-16-102

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University of Michigan and Michigan State University
Michigan Sea Grant is a cooperative program of University of Michigan and Michigan State University. It is part of the National Sea Grant College Program, a network of 33 university-based programs in coastal states across the country. See: *www.miseagrant.umich.edu*

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National Oceanic Atmospheric Administration
Michigan Sea Grant is part of the National Oceanic Atmospheric Administration National Sea Grant network of 33 university-based programs. The National Sea Grant College Program envisions a future where people live, work, and play along our coasts in harmony with the natural resources that attract and sustain them. This is a vision of coastal America where we use our natural resources in ways that capture the economic, environmental, and cultural benefits they offer, while preserving their quality and abundance for future generations.

This vision complements the vision articulated in NOAA's Strategic Plan: "Healthy ecosystems, communities and economies that are resilient in the face of change." Sea Grant's mission is to provide integrated research, communication, education, extension, and legal programs to coastal communities that lead to the responsible use of the nation's ocean, coastal, and Great Lakes resources through informed personal, policy, and management decisions. With its strong research capabilities, local knowledge, and on-the-ground workforce, Sea Grant provides an effective national network of unmatched ability to rapidly identify and capitalize on opportunities and to generate timely, practical solutions to real problems in real places.

About Michigan Sea Grant

Cooperative Program
Michigan Sea Grant is a cooperative program of University of Michigan and Michigan State University. It is part of the National Sea Grant College Program, a network of 33 university-based programs in coastal states across the country.

Mission and Vision
Mission: Michigan Sea Grant supports research, outreach, and education to enhance the sustainable use of Great Lakes resources, benefiting the environment, quality of life, and the Michigan, Great Lakes, and national economy.

Vision: Our vision is healthy and sustainable Great Lakes resources achieved through an integrated program that engages universities, as well as public and private sectors.

Core Values
These values will guide Michigan Sea Grant's behavior and actions during the 2018-2023 strategic planning cycle:

- Innovation – Advance innovative solutions to emerging challenges.
- Engagement – Be responsive and accessible. Respect partners, maintain scientific neutrality, integrate diverse expertise, and support and provide the necessary science and knowledge to inform stakeholders and support decision making.
- Collaboration – Seek out diverse relationships that leverage our strengths and promote efficiency.
- Accountability – Be willing to take responsibility for one's own actions.
- Sustainability – Communicate the importance of good stewardship and the value of Great Lakes ecosystems.

Michigan Sea Grant Cross-cutting Principles – Partnerships, Organizational Excellence, Diversity and Inclusion
Michigan Sea Grant will strive to apply the following three principles in order to enhance our capabilities to meet future needs:

- **Cultivate partnerships** by integrating the expertise and capabilities of our partners from international, federal, tribal, and state communities and from academia and nongovernmental organizations.
- **Achieve organizational excellence** by establishing a framework of standards and processes intended to deliver products and services that fulfill Michigan's needs.
- **Enhance diversity and inclusion** by seeking and welcoming diverse perspectives and viewpoints in order to strengthen and renew Michigan Sea Grant's mission and vision.

Support
The Michigan Sea Grant College Program receives core funding from National Sea Grant within the National Oceanic and Atmospheric Administration (NOAA). Matching funds are provided by the University of Michigan, Michigan State University, other Michigan universities, and other non-federal sources. **Management and Oversight**

Management Team: Day-to-day operational decisions are made by a six-person Management Team, which consists of representatives from the University of Michigan Sea Grant Program, including the Director, Research Program Manager, and Communications Program Leader; Michigan State University Sea Grant Program, including the Associate Director and Extension Program Leader; and the National Sea Grant Program Officer for Michigan. The Sea Grant Management Team receives guidance from the following primary sources: Sea Grant staff, Advisory Committee, and Sea Grant constituents.

Michigan Sea Grant Advisory Committee: Michigan Sea Grant enlists an Advisory Committee to leverage strong constituent support. The Advisory Committee is composed of key stakeholders and senior university administrators. The Committee provides strategic advice, guidance, and feedback on existing and future programs, as well as specific feedback on our Strategic Plan. Committee members serve as program advocates by identifying opportunities for collaboration and support, both internally and externally to the members' organizations, particularly with state and federal agencies and legislators. The Committee is co-chaired by the Vice Presidents for Research of the University of Michigan and Michigan State University.

Program Integration and Innovation
Sea Grant-sponsored research often leads to the development of new products, tools, or other discoveries used by stakeholders and Sea Grant outreach specialists. Sea Grant promotes science in action to effectively integrate research with education, extension, communication, and other areas of the program more effectively.

In recognition that a healthy environment is essential to a healthy economy, Michigan Sea Grant allocates resources to support coastal economies. Programs that facilitate community planning to improve quality of life, business best practices for marinas and commercial fishing operations, and projects that support a healthy and prosperous sport fishery are strategic initiatives that will continue over the next four years.

Program Evaluation and Assessment
Michigan Sea Grant interacts with a wide variety of individuals and organizations that work, live, and play on Michigan's coasts. Ranging from business owners to local, state, tribal, and federal government officials, these constituents are the people with whom Sea Grant Extension educators, communicators, and Management Team work on a daily basis. Sea Grant's primary mission is to meet the needs of coastal communities. Consistent and frequent engagement ensures that Sea Grant efforts are on target. Additionally, the program seeks periodic formal input to confirm that we continue to meet the needs of coastal communities, businesses, industries, and key stakeholders. The program is formally reviewed every four years through the National Sea Grant College Program.

Development of This Plan

The Michigan Sea Grant Management Team began working on our Strategic Plan in February 2016 by first consulting with members of the Advisory Committee. In July 2016, the Management Team facilitated a program-wide retreat to elicit staff input to the plan. At the retreat, staff members discussed a number of initiatives related to the national focus areas and how these initiatives will address the needs of our Michigan constituents. Input from a stakeholder survey (see below), Advisory Committee, Management Team, and program staff was considered and aligned to the planning guidelines from the National Sea Grant College Program to develop this plan.

Stakeholder Survey Shows Michigan Sea Grant Is Making a Difference
Constituents are the ultimate beneficiaries of Sea Grant work. As a result, we periodically ask them to assess the value of our programs and identify upcoming important issues we should be addressing. What we learn from this assessment is essential to developing a robust strategic plan critical for program improvement.

Michigan Sea Grant sent an email message to 1,717 constituents identified by the Management Team and staff on June 21, 2016. The email included a link to an online survey modeled after a survey sent in 2012, but updated to include current and anticipated future issues. The survey included 15 questions and was designed to take no longer than 15 minutes to complete. Two reminder email messages were sent. Survey response was closed on July 13, 2016. Within the 22-day period during which the survey was open, 532 electronic responses were received, resulting in a combined response rate of 31 percent.

As in previous surveys, constituents reaffirmed the importance of Michigan Sea Grant's work in all the National Sea Grant focus areas. Respondents were asked to provide their opinion on how Michigan Sea Grant should target future programs by rating a series of 12 statements describing major programming on a scale of 1 (very important) to 4 (not important). Respondents indicated that all 12 areas were "important" to "very important." Average ratings ranged from 2.73 for "assisting the aquaculture industry by providing technical support to diversify markets for Great Lakes fish and educate consumers about healthy seafood choices," to 1.43 for "helping reduce the spread, and minimize the negative impacts, of invasive species through education and outreach."

What follows are some of the more pertinent findings of the survey (also see Table 1 for a summary of results):

- **When asked how constituents have benefited, 84 percent indicated increased awareness of coastal issues,** 47 percent noted enhanced networking, and 38 percent indicated paying more attention to Great Lakes or coastal issues in their work.
- **Of the constituents surveyed, more than 12 percent reported that they changed practices in their business or community** and have economically benefited from Sea Grant programs or products.
- **Survey respondents overwhelmingly agreed that Sea Grant was responsive to requests,** accessible, unbiased, networked, proactive, targeted, and committed. Responses to these questions averaged from 2.00 to 2.31 on a scale of 1 (strongly agree) to 7 (strongly disagree).
- **Respondents interact with the program and personnel in a variety of ways.** Sea Grant publications, web resources, or curricula (68 percent), and participation in Sea Grant-sponsored meetings or events (62 percent) were most often mentioned as a means of contact. Additionally, 33 percent of respondents said they had collaborated with Sea Grant staff on a project, publication, event, or proposal, and 31 percent said they had contacted Sea Grant staff about a coastal or Great Lakes issue.
- **Michigan Sea Grant continues to reach a broad spectrum of constituents, which is reflective of the diversity and variety of projects and programs that reach many different sectors**, such as coastal-dependent businesses, communities, natural resource managers, legislators, and K-12 educators. When asked to describe their employment, respondents most often characterized their affiliation as retired (23 percent), private business/industry (18 percent), university (12 percent), or K-12 school (9 percent). Responses from other important target groups include NGOs (6 percent), local government (7 percent), state government (6 percent), and federal government (5 percent).

- **Stakeholders reported that Sea Grant web and print resources are valuable.** Constituents most often access the Michigan Sea Grant website (77 percent) and electronic newsletters (82 percent). There continues to be widespread satisfaction with program performance.
- **Water quality/contamination, watershed health, and aquatic invasive species prevention ranked the highest** when respondents were asked to prioritize a list of coastal issues.

Table 1

MICHIGAN SEA GRANT CONSTITUENT SURVEY RESULTS

Help solve coastal and Great Lakes problems by promoting communication among decision makers and stakeholders that may have competing interests	Cross-cutting	1.54
Support research projects that promote collaboration and develop information to guide decisions about complicated environmental issues	Cross-cutting	1.71
Help decision makers anticipate the likely impacts of climate change and ensure that climate issues are incorporated into coastal community planning	Cross-cutting	2.19
Help reduce the spread and minimize the negative impacts of invasive species through education and outreach	Healthy Coastal Ecosystems	1.43
Promote the health of coastal habitats including nearshore lake habitats, watersheds, and dunes through education, conservation, and restoration	Healthy Coastal Ecosystems	1.51
Assist recreational and charter fishing stakeholders by providing information related to access, diverse quality fishing experiences, and expectations for future success	Sustainable Fisheries and Aquaculture	2.15
Assist commercial fishing industry by providing technical support to diversify markets for Great Lakes fish and educate consumers about healthy seafood choices	Sustainable Fisheries and Aquaculture	2.68
Assist aquaculture industry by providing technical support to diversify markets for Great Lakes fish and educate consumers about healthy seafood choices	Sustainable Fisheries and Aquaculture	2.73
Assist businesses, coastal communities, and homeowners to adopt sustainable development practices that support vibrant economies, enhance quality of life, and protect the environment	Resilient Communities and Economies	1.97
Educate the public about coastal hazards, such as dangerous currents, fishing nets, and harmful algal blooms, and work with public safety specialists to minimize risks associated with these hazards	Resilient Communities and Economies	2.04
Improve Great Lakes literacy by developing K-12 educational programs, supporting teachers, and raising awareness about Great Lakes and coastal topics	Environmental Literacy and Workforce Development	1.83
Support development of a qualified workforce in research, engagement, and fields related to Great Lakes and coastal resource management	Environmental Literacy and Workforce Development	2.00

Michigan Sea Grant Strategic Plan 2018-2023

This plan describes how Michigan Sea Grant will achieve the measures, goals, and outcomes in four strategic focus areas from 2018-2023. The following strategic focus areas reflect the most urgent needs along our coasts in Michigan and throughout the nation:

- Healthy Coastal Ecosystems;
- Sustainable Fisheries and Aquaculture;
- Resilient Communities and Economies; and
- Environmental Literacy and Workforce Development.

Collectively, the 4 focus areas above include 10 performance measures, 11 goals, and 91 outcomes. This plan is aligned to the strategic priorities in NOAA's Next Generation Strategic Plan and NOAA's National Sea Grant Strategic Plan. This plan capitalizes on Michigan Sea Grant's unique capabilities and strengths and provides the flexibility and creativity required to adapt to Michigan's emerging needs.

Each focus area has performance measures, goals, and outcomes. Performance measures help determine how well we have achieved our anticipated outcomes. Measures are a quantitative (numerical) evaluation tool to monitor progress. Information from constituent surveys (see p. 6) provides input about how relevant various issues are to our stakeholders. Information from our Advisory Committee, stakeholders, and internal staff discussions is used to improve programs and help direct future efforts to achieve the goals and outcomes outlined in this plan.

There are two types of performance measures identified in this plan:

1. *Performance measures most closely linked to a single focus area, and*
2. *Cross-cutting performance measures of progress toward goals for all four focus areas.*

Goals and Outcomes

Goals: Each goal represents the desired future condition for Michigan, the region, and the nation. The goals describe the long-term direction related to each focus area for Michigan Sea Grant.

Outcomes: These are benchmarks from which Michigan Sea Grant can track progress toward achieving each goal. This plan includes three types of outcomes:

1. *Learning (short-term)*
2. *Action (medium-term)*
3. *Consequence (long-term)*

Progress toward a goal starts with a short-term, achievable, and measurable learning outcome. Learning outcomes are followed by medium- and long-term (action and consequence) outcomes until the goal is met.

- *Learning outcomes* lead to increased awareness, knowledge, skills, changes in attitudes, opinions, aspirations, or motivations through research or stakeholder engagement.
- *Action outcomes* lead to behavior change, social action, adoption of information, changes in practices, improved decision making, or changes in policies.

- *Consequence outcomes* are long-term and, in most cases, require focused efforts over multiple strategic planning cycles. Consequence outcomes in a four-year strategic plan serve as reference points toward reaching focus area goals between the current and future strategic plans.

Cross-cutting Performance Measures

Michigan Sea Grant employs an integrated approach to our research, education, and outreach programs to achieve outcomes. Our research and outreach programs promote better understanding, conservation, and use of Michigan's Great Lakes and coastal resources. Michigan Sea Grant currently funds scientific research, education, and extension projects designed to foster science-based decisions about the use and conservation of Great Lakes resources. Sea Grant also provides access to science-based information about Michigan's coasts and the Great Lakes.

Water is a huge draw for the Great Lakes Region — coastal trails, clean beaches, and waterfront businesses add tremendous value to both metropolitan and rural areas. In this new economic era, growth in coastal communities will be focused on quality of life and quality of the region's natural resources. Protection and restoration of our environmental assets, especially the Great Lakes, will help attract and retain new businesses and great human resources.

The following measures are directly relevant to the outcomes from Michigan Sea Grant's research, education, and outreach programs to enhance the economy and the availability of information accessible by the public about Michigan's coasts and the Great Lakes:

- Economic and societal impacts derived from Sea Grant activities, including:
    - Market benefits
    - Non-market benefits
    - Businesses created
    - Businesses sustained
    - Jobs created
    - Jobs sustained
- Number of Sea Grant tools, technologies, and information services that are used by our partners/customers to improve ecosystem-based management.
- Number of publications produced by Sea Grant staff and researchers, and number of Michigan Sea Grant outreach publications, including:
    - Peer-reviewed publications
    - Michigan Sea Grant produced publications
        - Newsletters
        - Articles in the media
        - Educational posters and brochures
        - Research summaries

STRATEGIC FOCUS AREAS, PERFORMANCE MEASURES, GOALS, AND OUTCOMES

Healthy Coastal Ecosystems

Performance Measures

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

GOAL 1: Ecosystem sustainability is improved by better understanding of ecosystem services.

OUTCOMES

Learning

- 1.1. Develop baseline data, standards, and methodologies to assess the health of ecosystems and watersheds.
- 1.2. Develop and calibrate new measures and indicators of ecosystem sustainability.
- 1.3. Identify critical uncertainties that impede progress toward achieving sustainability of ecosystems and the goods and services they provide.

Action

- 1.4. Resource managers and policy and decision makers working with Michigan Sea Grant use standards and indicators to support ecosystem-based management.

Consequence

- 1.5. Dynamic ecological systems provide a wide range of ecological, economic, and societal services and are more resilient to change.
- 1.6. Greater public stewardship leads to participatory decision making and collaborative ecosystem-based management decisions.

GOAL 2: Ecosystem-based approaches are used to manage land, water, and living resources.

OUTCOMES

Learning

- 2.1. Stakeholders have access to data, models, policy information, and training that support ecosystem-based planning, decision making, and management approaches.
- 2.2. Residents, resource managers, businesses, and industries better understand the effects of human activities and environmental changes on coastal resources.
- 2.3. Resource managers have a better understanding of the policies that apply to sensitive coastal areas.

Action

- 2.4. Methodologies are used to evaluate a range of practical ecosystem-based management approaches for planning and adapting to future management needs.
- 2.5. Resource managers apply ecosystem-based management principles when making decisions.
- 2.6. Resource managers incorporate laws and policies to facilitate and implement ecosystem-based management.
- 2.7. Residents, resource managers, and businesses integrate social, natural, and physical science when managing resources and work with all sectors in the decision-making process.

Consequence

- 2.8. Land, water, and living resources are managed using ecosystem-based approaches.

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

OUTCOMES

Learning

- 3.1. Residents, resource managers, and businesses better understand the importance of the benefits provided by preserving non-degraded ecosystems.
- 3.2. Residents, resource managers, and businesses better understand the threats to ecosystems and the consequences of degraded ecosystems.

Action

- 3.3. Scientists develop technologies and approaches to restore degraded ecosystems.
- 3.4. Resource managers set realistic and prioritized goals to protect, enhance, and restore habitats by incorporating scientific information and public input.
- 3.5. Resource managers, businesses, and residents adopt innovative approaches and technologies to maintain or improve the function of ecosystems.

Consequence

- 3.6. Resource managers have prioritized management plans to restore ecosystems.
- 3.7. Degraded ecosystem function and productivity are restored.

Sustainable Fisheries and Aquaculture

Performance Measure

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

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

OUTCOMES

Learning

- 4.1. Fishery managers and fishers better understand the dynamics of wild fish populations.
- 4.2. The seafood industry — including charter, commercial, and aquaculture businesses — is knowledgeable about innovative technologies, approaches, and policies.

- 4.3. Commercial and recreational fishers are knowledgeable about efficient and responsible fishing techniques.
- 4.4. The seafood industry is aware of innovative marketing strategies to add value to its product.
- 4.5. The seafood processing industry better understands economically viable techniques.

Action

- 4.6. Fishers employ efficient fishing techniques, including by-catch reduction.
- 4.7. Fishers apply techniques to reduce negative impacts on depleted, threatened, or endangered species.
- 4.8. The seafood industry adopts innovative technologies and approaches to supply safe and sustainable seafood.
- 4.9. The seafood industry adopts innovative marketing strategies to add value to their products.
- 4.10. The seafood industry adopts techniques and approaches to minimize the environmental impact of their sectors.
- 4.11. Resource managers establish policies and regulations that achieve a better balance between economic benefit and conservation goals.
- 4.12. The seafood processing industry implements innovative techniques and processes to create new value-added products and ensure the delivery of safe and healthy seafood.

Consequence

- 4.13. Michigan's seafood supply is sustainable and safe.
- 4.14. There is a sustainable expansion of the domestic fishing and aquaculture industries.

Goal 5: Informed consumers understand the health benefits of seafood consumption and how to evaluate the safety and sustainability of the seafood they buy.

OUTCOMES

Learning

- 5.1. The seafood industry is aware of the standards for safe seafood.
- 5.2. The seafood industry is knowledgeable about consumer trends regarding seafood sustainability and safety and how to adjust operations to meet emerging demands.
- 5.3. Seafood consumers have access to information that helps them evaluate sustainable seafood choices.
- 5.4. Seafood consumers have an increased knowledge of the nutritional benefits of seafood products and know how to judge seafood safety and quality.

Action

- 5.5. The seafood industry adopts standards for safe and sustainable seafood.
- 5.6. The seafood industry adopts technologies and techniques to ensure seafood safety.
- 5.7. Seafood consumers preferentially purchase sustainable seafood products.

Consequence

- 5.8. Consumers improve their health through increased consumption of safe and sustainable seafood products.
- 5.9. The seafood industry operates sustainably and is more economically viable.

Resilient Communities and Economies

Performance Measures

- Number of communities that adopt/ implement sustainable economic and environmental development practices and policies as a result of Sea Grant activities.
- Annual number of communities that adopt/ implement hazard resiliency practices to prepare for and respond to/ minimize coastal hazardous events.

GOAL 6: Coastal economies are vibrant and resilient.

OUTCOMES

Learning

- 6.1. Communities and water-dependent businesses are aware of the interdependence between health of the economy and health of the natural and cultural systems.
- 6.2. Communities have access to information needed to better understand the value of waterfront- and tourism-related economic activities.
- 6.3. Communities and water-dependent businesses better understand the strengths and weaknesses of alternative development scenarios on natural resources and local economies.
- 6.4. Communities are aware of regulatory regimes affecting economic sustainability.
- 6.5. Communities and water-dependent businesses are knowledgeable about economic savings from energy planning and conservation.

Action

- 6.6. Citizens are actively engaged in management and regulatory decisions.
- 6.7. Communities engage in economic development initiatives that capitalize on the value of their natural and cultural resources, while balancing resource conservation and economic growth.

Consequence

- 6.8. Communities have diverse, healthy economies and industries that enhance natural resource assets without displacing traditional working waterfronts.

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

OUTCOMES

Learning

- 7.1. Communities and water-dependent businesses better understand the connection between planning and natural resource management issues and make management decisions that minimize conflict and improve resource conservation.

Action

- 7.2. Communities and water-dependent businesses make use of tools and information to explore the different patterns of coastal development, including community visioning exercises, resource inventories, and coastal planning.
- 7.3. Communities and water-dependent businesses develop and adopt management plans that include coastal resources and ecosystems.
- 7.4. The public, leaders, and businesses work together to implement balanced plans for multiple uses of coastal areas.

Consequence

- 7.5. Quality of life in communities, as measured by economic and social well-being, improves without adversely affecting environmental conditions.

GOAL 8: Improvements in coastal water resources sustain human health and ecosystem services.

OUTCOMES

Learning

- 8.1. Communities are aware of the impact of human activities on water quality and supply.
- 8.2. Communities better understand the value of clean water, adequate supplies, and healthy watersheds.
- 8.3. Communities better understand laws and policies affecting the use and allocation of water resources.

Action

- 8.4. Communities engage in planning efforts to protect water supplies and improve water quality.
- 8.5. Communities adopt mitigation measures, best management practices, and improved site designs in local policies and ordinances to address water supplies and water quality.

Consequence

- 8.6. Water supplies are reliable and sustainable.
- 8.7. Water quality improves, creating subsequent benefits to human health and ecosystem services.

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

OUTCOMES

Learning

- 9.1. Residents and decision makers better understand the processes that produce coastal hazards and climate change and the implications of those processes for them and their communities.
- 9.2. Decision makers are aware of existing and available hazard- and climate-related data and resources and have access to information and skills to assess local risk.
- 9.3. Communities have access to data and innovative and adaptive tools and techniques to minimize the potential negative impact from hazards.
- 9.4. Decision makers better understand the legal and regulatory systems affecting adaptation to climate change, including coastal and riparian property rights, disaster relief, and insurance issues.

Action

- 9.5. Communities apply best available information, tools, and technologies on coastal hazards and climate change in their planning processes.
- 9.6. Decision makers apply data, guidance, policies, and regulations to hazard planning and recovery efforts.
- 9.7. Communities develop and adopt comprehensive hazard mitigation and adaptation strategies suited to local needs.
- 9.8. Residents take action to reduce the impact of coastal hazards on their life and property.
- 9.9. Communities adopt a comprehensive risk communications strategy for hazardous events.

Consequence

- 9.10. Communities effectively prepare for hazardous events and climate change.
- 9.11. Communities are resilient and experience minimum disruption to life and economy following hazard events.

Environmental Literacy and Workforce Development

Performance Measures

- Number of Sea Grant products that are used to advance environmental literacy and workforce development.
- Number of people engaged in Sea Grant-supported informal education programs.
- Number of Sea Grant-supported graduates who become employed in a job related to their degree within two years of graduation.

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

OUTCOMES

Learning

- 10.1. Educators are knowledgeable of the best available science on the effectiveness of formal and informal education about environmental science.
- 10.2. Educators better understand environmental literacy principles.
- 10.3. Lifelong learners are able to engage in informal science education opportunities focused on coastal topics.

Action

- 10.4. Formal and informal education programs incorporate environmental literacy components.
- 10.5. Lessons and engagement programs are developed and refined, using the best available research on the effectiveness of environmental and science education.
- 10.6. Formal and informal education programs take advantage of the knowledge of Sea Grant-supported scientists and engagement professionals.
- 10.7. Educators, students, and the public collect and use coastal weather data in inquiry and evidence-based activities.
- 10.8. Lifelong learners make choices and decisions based on information learned through informal science education opportunities.
- 10.9. Educators work cooperatively to leverage federal, state, and local investments in coastal environmental education.

Consequence

- 10.10. Members of the public incorporate broad understanding of their actions on the environment into personal decisions and resource stewardship.

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

OUTCOMES

Learning

- 11.1. Students, teachers, and practitioners are aware of opportunities to participate in science, technology, engineering, mathematics, and active stewardship programs.

Action

- 11.2. A diverse and qualified pool of applicants pursues professional opportunities for career development in natural, physical, and social sciences and engineering.
- 11.3. Graduate students are trained in research and engagement methodologies.
- 11.4. Research projects support undergraduate and graduate training in fields related to better understanding and managing coastal resources.

Consequence

- 11.5. A diverse workforce trained in science, technology, engineering, mathematics, law, policy, and other job-related fields is employed and has high job satisfaction.
- 11.6 Communities are vibrant, and coastal ecosystems are protected.

CONCLUSION

Michigan Sea Grant will use logic models to develop activities that achieve the outcomes described in this plan. The program's annual report includes information about performance measures related to each focus area outlined in this plan. In addition, the program develops case studies that demonstrate the impacts of program implementation. This information is collected and submitted to the National Sea Grant Program Office and archived in a database. Publications are submitted to the National Sea Grant Library and are accessible to the public.

The next planning cycle will begin in 2022.