

Minnesota Sea Grant

2024-2027 Strategic Plan

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Introduction

Minnesota Sea Grant serves select aquatic interests of communities, industries and people living in the Lake Superior region and throughout Minnesota.

Lake Superior is the largest of the Laurentian Great lakes, the largest freshwater lake in the world by surface area, and the third largest by volume. Lake Superior borders Minnesota, Wisconsin, Michigan, and the Canadian province of Ontario and the ancestral and contemporary land of Indigenous peoples, including the Ojibwe/Anishinaabeg people who call Lake Superior [gichigami](#)¹ the "great sea or great lake." Minnesota has approximately 180 miles (290 km) of Lake Superior shoreline. It is this shoreline that qualifies the University of Minnesota as a National Sea Grant College Program. The term "Sea Grant" was chosen to emphasize the parallel between this program that focuses on the nation's marine resources and the land grant program that had been established a century earlier to develop agricultural resources. There are 34 Sea Grant College programs located in states and territories with coastal marine shorelines and in each of the Great Lakes states. The National Sea Grant College Program is administered by the National Oceanic and Atmospheric Administration (NOAA).

The National Sea Grant College Program Act calls for a strategic plan to be developed at least every four years that establishes priorities for the University of Minnesota Sea Grant College Program (MNSG). At a minimum, the plan of Minnesota Sea Grant and of the other 33 nationwide Sea Grant programs are expected to align with the National Sea Grant strategic plan and national performance measures.

The MNSG 2024-2027 Strategic Plan was developed in 2022 by MNSG in consultation with the MNSG Advisory Board, MNSG staff, and other interested parties and community members following implementation and analysis of a strategic planning survey ([Appendix E](#)). The MNSG Strategic Plan is integrated with the National Sea Grant Office (NSGO) Strategic Plan ([33 U.S. Code § 1123](#))².

For more than 50 years, the National Sea Grant College Program has supported Great Lakes and coastal communities through research, extension, and education. The National Sea Grant College Program was established by the U.S. Congress in 1966. The [University of Minnesota Sea Grant College Program](#)³ (MNSG) achieved college status in 1985 and is a systemwide program of the University of Minnesota.

This strategic plan describes the goals, actions, and outcomes for the four major focus areas of the National and MNSG programs for the period from 2024-2027. It also highlights several other areas important to the MNSG program. This plan, like those that preceded it, proposes broad themes that can be built upon to initiate specific activities that are important to the people of Minnesota and can be enacted by our scientists, researchers, extension educators, communicators, and partners.

As the services, programming, and products described in this strategic plan are developed and realized, they will be made available on the program website (www.seagrants.mn.edu).

Vision Statement

The vision of Minnesota Sea Grant is to promote a present and future where citizens use science-based understanding of the environment to address issues concerning Lake Superior and Minnesota's aquatic resources and associated economies.

Mission Statement

Minnesota Sea Grant's mission is to inform and facilitate interaction among the public and scientists to enhance the communities, the environment, and the economies along Lake Superior and across Minnesota's inland waters by identifying information needs, supporting scientific research to address those needs, translating the resulting science into actionable information, and communicating those results to the public.

Core Values

Minnesota Sea Grant's (MNSG) core values are essential and enduring tenets that influence and support our mission. The core values support a culture of integrity and scientific neutrality that enables Sea Grant to serve as a trusted broker of information. The core values reflect those of the National Sea Grant Program, the [University of Minnesota](#)⁴, and the [University of Minnesota Duluth](#)⁵.

1. **Vision.** Advancing creative, innovative solutions that address emerging and chronic challenges through engagement, science and [stewardship](#)⁶.
2. **Collaboration.** Seeking and sustaining diverse partners and building networks to leverage each other's strengths and integrate diverse expertise and perspectives to reach shared goals.
3. **Sustainability.** Advancing environmental [stewardship](#)⁶ practices and communicating the value of the services that the Great Lakes, especially Lake Superior, and Minnesota's inland water ecosystems provide to the state and nation.
4. **Accountability.** Operating with integrity, consistency, and transparency while maintaining quality and relevance in all functional areas, including program management.
5. **Diversity, equity, inclusion, justice, and accessibility.** Proactively engaging with the range of identities, cultures, communities, and capacities present throughout our areas of work, with respect and sensitivity to each person's experiences, history, and systemic challenges.
6. **Nonadvocacy.** Maintaining a commitment to objective research and programming that avoids bias and advocacy in the development and delivery of information, tools, and services.

Cross-Cutting Principles

The four cross-cutting principles listed below provide a common foundation for the work Sea Grant conducts. The principles are adapted and expanded from those of the National Sea Grant College Program. Enacting these cross-cutting principles enhances Minnesota Sea Grant's (MNSG) capabilities to meet future state and national needs.

1. **Diversity, equity, inclusion, justice, and accessibility:** MNSG seeks and integrates diverse perspectives that enable us to pursue our mission and vision through programs, services and engagement of communities of interested parties that are representative of and accessible to all communities in Minnesota. MNSG will actively reevaluate our programs and strategies to engage with the range of identities, cultures, communities, and capacities present throughout our areas of work, with respect and sensitivity to each person's experiences, historic and systemic challenges.

2. **Partnership:** MNSG will cultivate and sustain mutually beneficial partnerships from international, federal, tribal, and state communities and from academia, nongovernmental organizations, community groups, and industry. This will strengthen and expand MNSG and our partners' abilities to engage in research, extension, and education in pursuit of our mission and vision.
3. **Leadership:** MNSG works to be a trustworthy federal-university organization known for research, scientific synthesis, excellent communication and outreach, and effective, innovative approaches that address Minnesota's water-related challenges. We aim to share information to diverse audiences at local, state, regional, national, and international levels.
4. **Responsiveness:** MNSG is committed to being responsive to emerging situations and the rapidly changing needs of communities. MNSG staff will maintain close connections with our partners and interested parties to respond as quickly as possible when needs arise (e.g., global pandemics, flooding, drought, severe weather).

Functional Areas

Minnesota Sea Grant integrates its efforts across the following National Sea Grant College Program functional areas that represent how Sea Grant generates, transmits, translates, and transitions knowledge to address critical issues with interested parties and partners:

1. **Research.** The generation of new knowledge is a core part of Sea Grant, providing answers to key questions about our Great Lakes, coasts, and watersheds. Research may be conducted by Sea Grant staff or through extramural research that has been reviewed for merit and that is often competitively selected.
2. **Education.** Facilitating learning through formal and nonformal activities which help people integrate knowledge into their behaviors is central to the transformational nature of Sea Grant's work.
3. **Extension.** The exchange of knowledge and its application by communities, governments, non-governmental organizations (NGOs), business and industry — often accomplished through direct interaction, technical assistance, and demonstration projects — is at the heart of Sea Grant's operational engagement model.
4. **Communication.** The transmission of information to targeted audiences through a variety of media to create awareness and engagement complements traditional research, extension, and education activities.
5. **Management.** Establishing and maintaining the infrastructure and partnerships needed to support the activities of a Sea Grant program is an essential task. This function allows programs to exist, grow and serve.

Focus Areas Overview

The four focus areas of the National Sea Grant and Minnesota Sea Grant (MNSG) programs identify the broad categories in which MNSG will concentrate capabilities, programs, and resources to address the most urgent Great Lakes, coastal, and riparian needs.

1. Environmental Literacy and Workforce Development
2. Healthy Coastal Ecosystems
3. Sustainable Fisheries and Aquaculture

4. Resilient Communities and Economies

The four focus areas provide an order to the wide expanse of Sea Grant’s topical interests. In practice, MNSG recognizes that focus areas are interrelated and that a single activity may advance the goals of multiple focus areas. Additionally, no focus area is structured to align with one or more [Sea Grant functional areas](#) (see also [Figure 1](#) below). Rather, MNSG and National Sea Grant expect each focus area to be fulfilled through efforts in each of the functional areas.

Focus Area Cycle and Functional Area Wheel

Sea Grant’s four Focus Areas and five Functional Areas are not individual boxes or silos with crisp delineations. They are an integrated system, overlapping and connecting with each other.

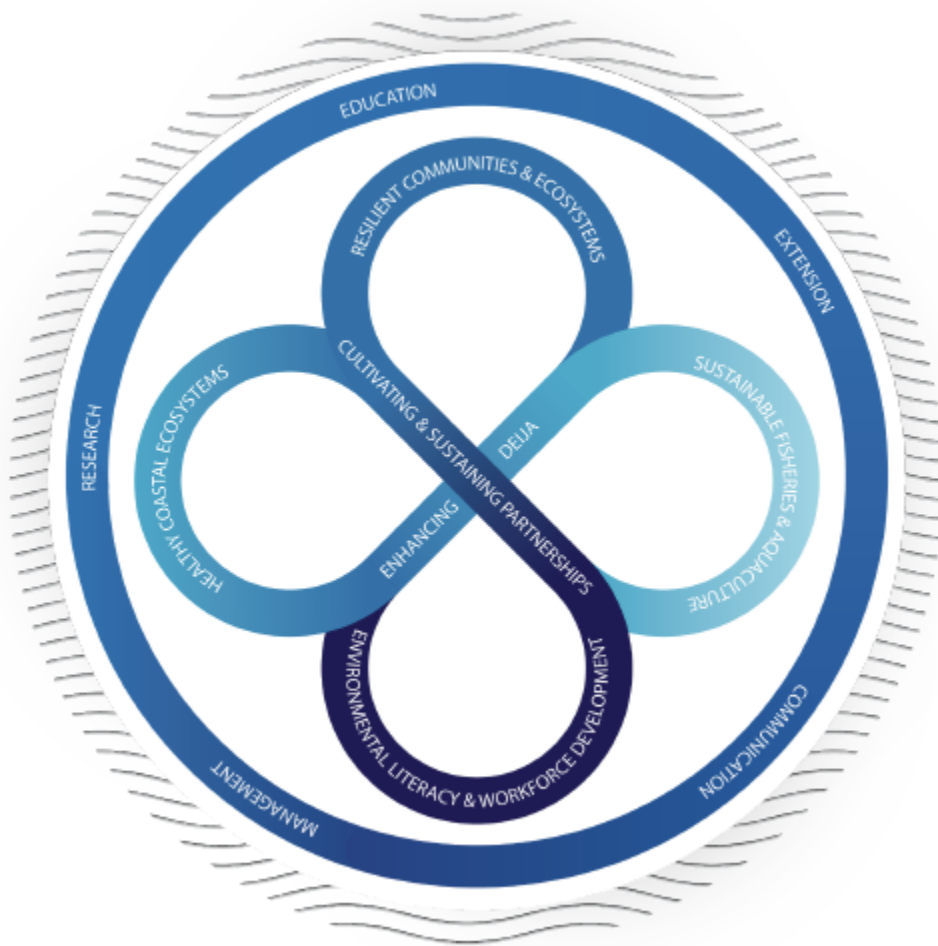


Figure 1. The Focus Area inner cycle is turned by the efforts of the Functional Area outer wheel. No one area is more important or more valuable and the absence of even one element would lessen the whole. *Graphic credit: National Sea Grant Office.*

Focus Area Goals, Actions, and Outcomes

The focus areas provide a structure to organize relevant accomplishments, impacts, and outcomes with applicable priorities ([Figure 1](#)). MNSG's program focus areas, goals, actions, and outcomes are aligned with and support those of the National Sea Grant Program and are determined after consultation with local and regional interested parties and advisors.

The goals, actions, and outcomes Minnesota Sea Grant plans to accomplish for each focus area during the 2024-2027 strategic plan period are as follows:

Environmental Literacy and Workforce Development (ELWD)

Minnesota has 325 public elementary and secondary independent school districts and 180 charter schools; the state's public schools employ 56,358 full-time equivalent teachers who educate nearly 875,000 K-12 students ([Minnesota Department of Education, July 2022⁷](#)). In addition, there are innumerable lifelong learners seeking opportunities outside of the formal classroom environment. Minnesota Sea Grant supports formal and non-formal education to create an environmentally literate society who understand and use the best-available science to make decisions. One of the ways MNSG does this is by bringing educators together with scientists and natural resource managers to help them learn about water science.

Minnesota's economy supports many water-based career opportunities from professional and technical services to transportation and warehousing, recreation, construction, trade, and industries, like mining, that support these professions. According to the Minnesota Department of Employment and Economic Development, employment for port-related occupations in Minnesota is expected to grow by nearly 6% by 2030 (Gorecki, 2022). Minnesota Sea Grant works to create a diverse workforce trained in Great Lakes and marine science, technology, engineering, mathematics, law, and policy.

The MNSG engagement process for interested parties ([Appendix E](#)) guided the development of the ELWD goals, actions, and outcomes. Survey respondents clearly supported continued work on ELWD topics when asked about the importance of specific issues. Most respondents indicated that it is somewhat or very important that MNSG work on "direct education to public audiences about aquatic and coastal issues" (89%), "teacher trainings about using science in the classroom" (85%), "training the next generation of workers in water resource-related businesses" (84%), "direct education to youth about aquatic and coastal issues" (81%), and "training the next generation of scientists" (76%).

Goals, Actions, and Outcomes

1. GOAL: Create an environmentally literate society by actively reaching diverse communities to support and provide lifelong formal and non-formal learning opportunities.
 - 1.1. ACTION: Create and implement educational resources and opportunities that are diverse, equitable, inclusive, just, and accessible for all learners and communities in Minnesota.

- 1.1.1. DESIRED OUTCOME: Provide Minnesota communities with the knowledge, skills, and best available science and technology to enable them to contribute to community planning in a changing environment.
 - 1.1.2. DESIRED OUTCOME: Provide formal educators with relevant opportunities, peer-reviewed resources, and support leading to the development of actionable science, technology, engineering, arts, and mathematical (STEAM) curricula to meet [Next Generation Science Standards](#).
 - 1.1.3. DESIRED OUTCOME: Provide learners of all ages with formal and non-formal resources and learning opportunities to help them make informed choices that support sustainable coastal and riparian ecosystems, communities, and economies.
2. GOAL: Create a skilled and diverse workforce equipped to address coastal and inland water issues and respond to local, state, tribal, and national needs in changing environmental and economic conditions.
 - 2.1. ACTION: Identify and remove barriers to training opportunities, materials, and products that diverse individuals, organizations, and communities can use to address coastal and inland water issues.
 - 2.1.1. DESIRED OUTCOME: Provide opportunities to train graduate and undergraduate students in the science, planning, policy, management, and outreach of the science of coastal and inland water resources.
 - 2.1.2. DESIRED OUTCOME: Provide coastal and riparian community members with opportunities to share cultural knowledge, build skills, and participate in training and mentoring to help ensure that these communities can make science-informed choices.
 - 2.1.3. DESIRED OUTCOME: Middle- and high-school students of all communities throughout Minnesota are aware of water-based industries, job opportunities and careers in the state and have the resources to pursue those opportunities that interest them.
 - 2.1.4. DESIRED OUTCOME: Provide career and professional development opportunities in the science and management of water resources to students and lifelong learners.

Healthy Coastal Ecosystems (HCE)

Minnesota contains 180 miles (290 kilometers) of coastline on Lake Superior and an additional 32,000 miles (51,499 kilometers) of interior coastline along our lakes and rivers. Minnesota Sea Grant (MNSG) works to ensure that these coastal and riparian areas and the ecosystem services they provide are protected, enhanced, and restored. MNSG partners with natural resource managers; businesses; local, state, and tribal governments; and local communities to use science-based tools to manage and sustain Minnesota's coastal and riparian ecosystems.

The MNSG engagement process for interested parties ([Appendix E](#)) guided the development of the HCE goals, actions, and outcomes. Specifically, in the survey's free-response questions, pollution and water quality,

climate change, and aquatic invasive species-related issues were consistently identified as top water-related concerns, outreach needs, and research needs. Survey respondents strongly supported continued work on HCE topics. Most respondents indicated that it is somewhat or very important that MNSG work on “water pollutants and contaminants” (92%), “fish and aquatic habitat protection, enhancement, and restoration” (91%), and “aquatic invasive species” (92%).

Goals, Actions, and Outcomes

1. GOAL: Protect and restore habitat and biodiversity of freshwater inland and coastal ecosystems, and the services they provide.
 - 1.1. ACTION: Support and share research, tools, technologies, and training with managers and other interested parties to protect, enhance, and restore freshwater ecosystems.
 - 1.1.1. DESIRED OUTCOME: Communities increase their scientific understanding of ecosystems and ecosystem management best practices.
 - 1.1.2. DESIRED OUTCOME: Resource managers and other interested parties use evidence-based decision-support tools, technologies, and training that support the restoration, protection, and management of ecosystems.
 - 1.1.3. DESIRED OUTCOME: Increase the number of coastal communities who have restored degraded or at-risk ecosystems as a result of MNSG activities.
 - 1.1.4. DESIRED OUTCOME: Communities and resource managers understand and reduce the impacts of pollution (e.g., nutrients, algae, sedimentation, marine debris, toxicity, etc.) on coastal and inland aquatic ecosystems, including those of cultural importance.
 - 1.1.5. DESIRED OUTCOME: Communities understand the risks of invasive species to ecosystems and explore and use novel and demonstrably effective invasive species management approaches.
2. GOAL: Facilitate and encourage the use of sound science and best management practices to sustain freshwater ecosystems within the contexts of culture and a changing climate.
 - 2.1. ACTION: Develop partnerships and activities with managers, decision-makers, community members, and other interested parties to support the development and sharing of culturally relevant and applied freshwater science focused on climate change that reflects local and traditional knowledge.
 - 2.1.1. DESIRED OUTCOME: Partners have access to data, models, policy information, and training that support their implementation of sound-science ecosystem planning, decision-making, and management.
 - 2.1.2. DESIRED OUTCOME: Minnesota communities and especially historically excluded and/or marginalized communities have access to data, tools, case studies, and training to understand ecosystem services and adaptive management concepts.

- 2.1.3. DESIRED OUTCOME: Community members are engaged in and contribute to research, monitoring, community science, and stewardship to expand knowledge about water-related ecosystems and their management.

Sustainable Fisheries and Aquaculture (SFA)

Fishing is an important industry in Minnesota with its many natural lakes and streams readily available to anglers. Approximately 1.4 million fishing licenses are sold annually with anglers and the industry providing \$2.4 billion ([2011 National Survey of Fishing, Hunting, & Wildlife-Associated Recreation⁸](#)) in direct impact to the state's economy.

The Lake Superior fishery is a major focus for MNSG and includes both recreational and commercial fisheries. Fish populations have rebounded over the last 50 years; for example, Lake Trout stocking in Minnesota is no longer required. Lake Superior's water quality is better than that found in the other Great Lakes due to the lower human population in the watershed and the underlying hydrology and geology of the lake. The current fish community (2022) closely resembles the lake's historic native species composition. Along with thousands of recreational anglers, there are approximately 45 charter captains ([Minnesota Department of Natural Resources 2019⁹](#)), and 25 commercial fishers that operate in Minnesota's portion of Lake Superior ([Reeves, K.A. and J. Blankenheim 2021¹⁰](#)). The Great Lakes fishery overall continues to recover from the negative human-induced impacts (poor water quality, habitat degradation, overfishing and invasive species) that have affected the resource over the last 100 years. The overall economic impact of the commercial, recreational, and for-hire fisheries in the Great Lakes region is approximately \$7 billion annually and supports over 75,000 jobs ([Great Lakes Fishery Commission, 2013¹¹](#)).

In contrast to the high value of the wild fishery, Minnesota's aquaculture industry is small, contributing approximately \$5 million in annual economic activity ([USDA, 2018¹²](#)). In 2018 about 33% of the aquaculture industry was involved in rearing bait for the recreational fishery, about 33% raised fish for stocking and approximately 33% reared fish for food ([USDA, 2018¹²](#)). There is growing interest in food-fish production and developing new technologies to raise bait in Minnesota ([Moen, 2017¹³](#)).

Minnesota Sea Grant (MNSG) continues to assist Lake Superior and inland fisheries by providing competitive research funding and related outreach materials to help managers and anglers better understand the dynamics of the state's important resources. Since 2017, MNSG has taken a leadership role in helping to develop policy, innovative technologies, and consumer understanding about the process and economic impact of aquaculture in Minnesota. MNSG seeks to provide sustainable fish products and recreational fishing opportunities to the people of Minnesota through partnerships with recreational anglers and related organizations, tribal and state commercial fishers, charter captains, fishery management agencies, and members of the aquaculture industry.

The MNSG engagement process for interested parties guided the development of the SFA goals, actions, and outcomes ([Appendix E](#)). Specifically, in survey, free-response questions, respondents identified impacts of climate change to sustainable fisheries and fisheries production as outreach and research needs. Specific aquaculture and fisheries concerns recorded in the survey included concerns about contaminants in fish and aquatic invasive species impacts on fisheries. Survey respondents clearly supported continued work on SFA

topics. When asked about the importance of specific issues, most respondents indicated that it is somewhat or very important that MNSG work on “fish and aquatic habitat protection, enhancement, and restoration” (91%), “sustainable commercial fisheries” (84%), “consumer education about locally caught and grown fish/seafood” (80%), “collaboration with charter captains and other recreational fishing groups” (62%), and “sustainable aquaculture” (61%).

Goals, Actions, and Outcomes

1. GOAL: Fisheries and aquaculture resources provide recreation, cultural benefits, food, jobs, and economic value to the diverse communities of Minnesota.
 - 1.1. ACTION: Support harvesting, culturing, and processing techniques and communication and outreach that lead to safe, sustainable, high-quality food and other products, in addition to economic, social and ecosystem benefits.
 - 1.1.1. DESIRED OUTCOME: Aquaculture producers, tribal and state commercial fishers, processors, and fish distributors employ technologies and strategies to ensure safe, sustainable seafood products for consumers.
 - 1.1.2. DESIRED OUTCOME: Consumers understand the environmental and health benefits and risks of seafood consumption, both wild and farmed, and can choose safe, healthy, and environmentally sustainable products.
 - 1.1.3. DESIRED OUTCOME: Commercial and recreational fishing and aquaculture industries employ strategies that balance economic, social, cultural, and environmental goals.
 - 1.2. ACTION: Support development of a trained and diverse workforce and enhance technology transfer using a variety of methodologies and approaches, including those based on traditional and local knowledge.
 - 1.2.1. DESIRED OUTCOME: Increased scientific understanding and awareness of technological solutions that aid fisheries and aquaculture management and production in Minnesota.
 - 1.2.2. DESIRED OUTCOME: Facilitate partnerships that enable the commercial, tribal, and recreational fishing and aquaculture industries to adopt innovative and sustainable technologies that minimize environmental risk to water resources, aquatic ecosystems and wild fish stocks.
 - 1.2.3. DESIRED OUTCOME: Encourage formal education institutions in Minnesota to develop an aquaculture curriculum and/or an entire aquaculture program and establish hands-on learning experiences that will better prepare a diverse pool of individuals interested in pursuing careers in aquaculture.

2. GOAL: Sustain and manage freshwater resources to balance and support diverse local communities, tourism, recreational fisheries, tribal and state commercial fisheries, subsistence fisheries, and aquaculture industries.
 - 2.1. ACTION: Provide the best available science, services, data and tools to resource managers, fishing communities, and aquaculture producers and consumers.
 - 2.1.1. DESIRED OUTCOME: Partners and interested parties engaged in recreational fisheries, tribal and state commercial fisheries and aquaculture industries are knowledgeable about efficient, sustainable, and innovative tools, techniques, and management practices to sustain Minnesota's aquatic resources into the future.
 - 2.1.2. DESIRED OUTCOME: Develop and share innovative solutions and resources to increase the understanding of climate change impacts on fisheries and aquaculture among resource managers, fishing and aquaculture industries, the recreational angler community, and the public.
 - 2.1.3. DESIRED OUTCOME: Increase public engagement and awareness of Minnesota's fisheries and aquaculture industries and increase knowledge about the importance of healthy aquatic ecosystems to sustain fisheries resources for human communities and ecosystem health.

Resilient Communities and Economies (RCE)

Minnesota Sea Grant supports research, extension, and outreach in the areas of climate change, coastal processes, stormwater management, hazards, and tourism. Sustainable and resilient communities require an equal emphasis on healthy ecosystems and healthy economies. One of the greatest challenges facing Minnesota's communities, economies, and ecosystems is climate change, the impacts of which are already being measured on Lake Superior ([Graham, 2021¹⁴](#)). Due to its abundance of water, moderate climate, and room for growth, Duluth, Minnesota, is predicted to be a future climate refuge ([Pierre-Louis, 2019¹⁵](#) and [Dagenais, 2019¹⁶](#)). MNSG works to ensure Minnesota's communities, economies, and ecosystems continue to thrive under changing conditions.

Minnesota communities seek MNSG expertise to support and sustain diverse and vibrant coastal and riparian communities and economies, which includes maritime shipping and transportation. Minnesota's 180 miles of Lake Superior coastline and [1,360 miles of Mississippi River¹⁷](#) shoreline support a vibrant economy, and enable the transportation of raw materials and goods produced by the manufacturing, agriculture, and mining industries. The Port of Duluth-Superior is the [largest tonnage port¹⁸](#) ([U.S. Army Corps of Engineers, 2020¹⁹](#)) on the Great Lakes and ranks among the top 20 in the United States. Saint Paul Harbor is the [13th-largest inland port²⁰](#) in the nation based on gross tonnage. The Great Lakes cruise industry has the potential to add more than \$10.9 million in additional spending to the Duluth-Superior metro area ([Haynes et al., 2021²¹](#)). MNSG works to ensure a sustainable and safe maritime economy in Minnesota.

The goals, actions, and outcomes within the RCE focus area support Minnesota Sea Grant's Community Resilience, Maritime and Hazmat Transport, and Recreation and Water Safety programs. They emphasize the

existing strengths of these program areas, while addressing opportunities, aspirations, and results identified through the needs assessment process for interested parties.

The MNSG engagement process for interested parties guided the development of the RCE goals, actions, and outcomes ([Appendix E](#)). Specifically, in survey free-response questions, climate change, drinking water quality, stormwater, and watersheds, impacts of development, and safe and responsible recreation were identified as relevant water-related concerns, outreach needs, and/or research needs. Climate change-related work was a [cross-cutting](#) issue identified in the survey. Survey respondents supported continued work on RCE topics. Most respondents indicated that it is somewhat or very important that MNSG work on “stormwater runoff and watershed management” (97%), “water levels and erosion” (93%), “extreme storms and flooding” (85%), “transport of crude oil and other hazardous materials” (69%), and “maritime transportation” (51%).

Goals, Actions, and Outcomes

1. GOAL: Minnesota’s coastal communities understand the ways in which climate change and extreme weather events will impact the state and its people, economies, and aquatic resources and can develop adaptation strategies to mitigate the negative effects of climate change.
 - 1.1. ACTION: Provide a forum for ongoing dialogue among researchers, community members, policymakers, economic development organizations, and others leading to knowledge, education, and partnerships that advance applied climate science and hazard mitigation.
 - 1.1.1. DESIRED OUTCOME: Collaborative planning and community preparation to increase resilience to climate change and extreme weather events.
 - 1.1.2. DESIRED OUTCOME: Diverse community groups have access to climate change information and climate adaptation resources and are actively participating in adaptive management planning and strategies.
 - 1.2. ACTION: Facilitate the use of and sharing tool(s) for resilience-based decision-making, including economic impact assessments and effectiveness of potential hazard mitigation practices.
 - 1.2.1. DESIRED OUTCOME: Development of effective strategies to mitigate the impacts of climate change on Great Lakes water levels and hydrology, fisheries, recreation, shipping, and tourism and to improve community preparedness for potential changes due to climate migration.
 - 1.2.2. DESIRED OUTCOME: Inclusion of traditional and local knowledge in climate adaptation management planning and strategies.
2. GOAL: All Minnesota communities have access to safe, water-based recreation through equitable community engagement and public education.
 - 2.1. ACTION: Explore partnerships to provide opportunities for historically excluded and/or marginalized communities to engage in water-based recreation and become informed on water safety practices.

- 2.1.1. DESIRED OUTCOME: Historically excluded and/or marginalized communities increase participation in water-based recreation throughout Minnesota.
- 3. GOAL: Individuals and communities are aware of and engaged in actions to reduce negative human impacts on Minnesota's water resources.
 - 3.1. ACTION: Improve economic valuation of Minnesota's aquatic ecosystem goods and services and share this information with interested parties and community members to enhance understanding of their environmental and human health benefits.
 - 3.1.1. DESIRED OUTCOME: Individuals and communities understand what ecosystem services are, their connections to water, and their impact on community health and well-being.
 - 3.1.2. DESIRED OUTCOME: Individuals and communities understand the risks and benefits of hazardous materials transportation and are knowledgeable about spill response equipment, emerging technology, and effective hazardous materials spill preparedness.
 - 3.2. ACTION: Improve effectiveness of stormwater management practices, specifically nature-based solutions, green infrastructure, and storm resilience in watershed planning processes.
 - 3.2.1. DESIRED OUTCOME: Reduction in the negative impact of the built environment (i.e., human infrastructure) on aquatic ecosystems.

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Appendix B: Definitions

National Sea Grant College Program: Includes the National Sea Grant Office, 34 sea Grant programs, the Sea Grant Collection at the NOAA Central Library, and the National Sea Grant Advisory Board. Minnesota Sea Grant achieved college status in 1985 and is a University of Minnesota systemwide program.

Action: The tactic or means used to achieve the desired outcomes.

Adaptive management: A systematic approach for improving resource management by monitoring and learning from management outcomes. An adaptive approach provides a framework for making good decisions in the face of critical uncertainties, and a formal process for reducing uncertainties so that management can improve over time.

Aquatic ecosystems: Aquatic ecosystems connect people, land, and wildlife through water. Wetlands, rivers, lakes, and coastal estuaries are all aquatic ecosystems—critical elements of Earth's dynamic processes and essential to human economies and health.

Coastal communities: Marine, coastal, island and Laurentian Great Lakes communities that represent a variety of interests (e.g., government, business, education, industry, research, non-governmental organizations, etc.) served by the National Sea Grant College Program.

Core values: Values that guide behavior and actions of the National Sea Grant College Program.

Cross-cutting principles: Cross-cutting principles: Main beliefs or ideologies embraced by the National Sea Grant College Program that will strengthen the organization as it strives to implement the strategic plan. The MNSG cross-cutting principles also include examples of how we enact each principle in our work.

Diversity: A collection of individual attributes that together help an organization pursue objectives effectively and efficiently.

Ecosystem: A dynamic and complex association of plant, animal, and human communities and the non-living physical components interacting as a functional unit.

Focus Areas: Areas of emphasis that are shaped to address the nation's most urgent Great Lakes and coastal needs

Functional Areas: Minnesota Sea Grant integrates its efforts across the National Sea Grant College Program's six functional areas (i.e., research, extension, education, communication, and management) that represent how Sea Grant generates, transmits, translates, and transitions knowledge to address critical issues with interested parties and partners. See Functional Areas above for details.

Goal: An aspirational concept that inspires a level of success in a focus area and describes the desired broad long-term outcome.

Hazard Analysis and Critical Control Point (HACCP) Certification: An international standard defining the requirements for effective control of food safety, as well as identifying pathways that may introduce invasive species in an ecosystem. Various tools and techniques are used to examine, question, evaluate, and report on the potential hazards.

Historically excluded and/or marginalized communities: Any group of people that has been historically excluded or marginalized from full rights, privileges and opportunities in a society or organization.

Inclusion: An organizational culture that aims to connect all individuals to the organization.

Mission: Communicates the purpose of the organization.

Outcome: An intended result or consequence.

Performance Measure: A quantitative way of measuring the achievement of a result.

Resilience: The ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events and changing conditions (e.g., severe storms, economic conditions, demographic shifts, or ecosystem changes).

Riparian: Riparian zones, or areas, are lands that occur along the edges of rivers, streams, lakes, and other water bodies. Examples include streambanks, riverbanks, and floodplains. They're different from the surrounding uplands because their soils and vegetation are shaped by the presence of water.

Stewardship. Environmental stewardship: The responsible use and protection of the natural environment through conservation and sustainable practices to enhance ecosystem resilience and human well-being (Chapin et al., 2010 [offsite link](#)).

Underserved community: a community with inadequate services and/or facilities which may affect the community's rates of poverty, unemployment, and/or population loss.

Vision: A description of a future state that explains the basis for developing a strategic plan.

Appendix C: National Sea Grant Goals, Actions, and Outcomes

National Sea Grant 2024-2027 Strategic Plan. See pages 14-21.

Appendix D: Performance Measures and Metrics

National Sea Grant 2024-2027 Strategic Plan. See pages 25-26.

Appendix E: Program Planning Process Outline

The Minnesota Sea Grant College program (MNSG) drafted its 2024-2027 strategic plan through a series of knowledge gathering, information distillation, and review activities. These activities included a survey of interested parties, discussions with MNSG staff, and engagement with the MNSG advisory board ([Figure 2](#)).

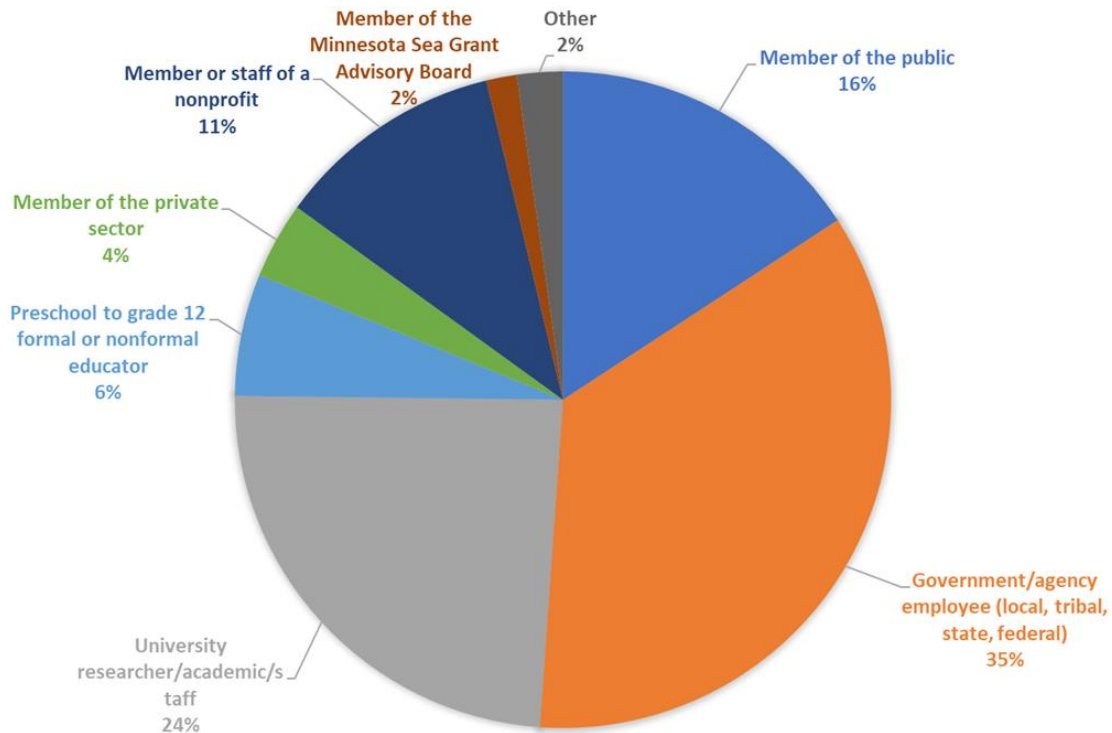


Figure 2. The distribution of survey respondents displayed as a pie chart. Respondents included members of the Minnesota Sea Grant Advisory Board (2%), members or staff of nonprofits (11%), members of the private sector (4%), preschool to grade 12 formal or non-formal educators (6%), university researchers, academics, or staff (24%), government/agency employees (local, tribal, state, federal) (35%), members of the public (16%), other (2%).

Program Planning Process Timeline

1. **January 2022:** MNSG established a strategic planning committee, which developed a planning timeline and began drafting a survey of interested parties.
2. **February 2022:** The committee reviewed the proposed survey with advisory board members and MNSG staff. The strategic planning committee then refined the survey based on feedback from the advisory board and staff.
3. **March 2022:** The survey was sent directly to the MNSG program contact list and individual staff were asked to directly send the survey to interested parties within their networks.
4. **April 2022:** The survey was open for 27 days and closed with 133 partial responses and 65 complete responses. The strategic planning committee then began analyzing and summarizing survey responses.

5. **May 2022:** The committee presented a summary of the survey results to MNSG staff and discussed additional needs not revealed in the survey responses.
6. **June 2022:** The committee shared a summary of the survey and staff needs assessments with the MNSG advisory board. The committee then met with the advisory board, reviewed the survey results, and discussed the priority needs of the advisory board members.
7. **July 2022:** Using information from the survey, staff, advisory board, and the draft National Sea Grant College Program 2024-2027 strategic plan, the committee drafted an initial Minnesota Sea Grant Strategic plan. This initial draft was then shared with MNSG staff and leadership for review. The committee incorporated feedback from this review into the draft plan to be submitted to the National Sea Grant College Program.
8. **August 2022:** The initial draft MNSG 2024-2027 strategic plan was submitted to the National Sea Grant College Program for review.
9. **September 2022:** Feedback on the initial draft MNSG 2024-2027 strategic plan was received from the National Sea Grant College Program and incorporated into the final draft.
10. **October 2022:** The final draft MNSG 2024-2027 strategic plan was submitted to the National Sea Grant College Program for review.

Appendix F: Sea Grant Publication Collection

The Sea Grant Collection at the NOAA Central Library serves as a comprehensive collection of Sea Grant-produced publications from across the country. The Collection supports the Sea Grant mission by ensuring that Sea Grant publications are made accessible to researchers, students, teachers, policy makers, and other audiences. Listed below are the types of documents accepted to the Sea Grant Collection, along with corresponding examples, in addition to peer-reviewed journal articles listed above under National Performance Measures and Metrics #14.

[National Sea Grant 2024-2027 Strategic Plan](#). See page 27.

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