

Illinois-Indiana Sea Grant Strategic Plan 2018-2023

Vision and Mission

Illinois-Indiana Sea Grant's vision for the Great Lakes and the southern Lake Michigan region is healthy aquatic ecosystems that support resilient and sustainable communities.

Our mission is to provide unbiased, research-based information to foster an environmentally-literate population so communities and individuals can make decisions that incorporate ecological priorities along with other societal needs.

Core Values

Illinois-Indiana Sea Grant seeks to:

- Build stronger, more resilient coastal communities.
- Conduct and fund peer-reviewed research that helps communities adaptively manage competing economic, societal, and ecological priorities.
- Empower people to make informed decisions regarding individual behavior as well as public policy.
- Support and expand a diverse, well-trained workforce that is literate in the ecological and economic issues that impact coastal communities.

Introduction

The history of Chicago is, in part, a story of expansive growth and productivity with the region's water resources playing a key role in the city's successes. Lake Michigan and the rivers that wind through the city and surrounding Illinois and Indiana communities have helped the region become a transportation hub and business and manufacturing center, as well as a tourist mecca.

Looking back, the Great Chicago Fire may be the city's quintessential history lesson, but the reversing of the Chicago River illustrates the value of healthy waters and the importance of wisely managing water infrastructure in the face of growth and change. In 1901, in a feat of engineering, the river stopped flowing into Lake Michigan and was directed towards the Illinois and Mississippi rivers, and ultimately to the Gulf of Mexico. This greatly reduced the risk of wastewater contaminating Lake Michigan, helping prevent water-borne diseases from sickening the city's ever-growing population. It also shortened and improved what was an important shipping route.

In modern times this change is also considered in light of its drawbacks, for example the easy movement of invasive species from one basin to another. But protecting the city's drinking water helped the region grow and thrive. Today, the greater metropolitan Chicago region is the home of more than 9.4 million people and managing water resources is as critical to success and resiliency as it has been historically.

Water Resource Challenges

Some water concerns that loom in the region today are inherited from the past and some pose new threats. For example, with more and more buildings and sidewalks, hard surfaces increase the need for more effective stormwater management. And larger storms are happening more frequently throughout the Midwest.

Chicago's long history of being a leader in commodities trading is a reflection of the rich Illinois and Indiana farmland that covers in much of the two states. But wastewater that flows from the metropolitan area down towards the Mississippi River joins runoff from croplands, bringing too much nitrogen and phosphorus to the Gulf of Mexico, contributing to its Dead Zone.

In northwest Indiana, legacy pollution from steel and other industries has left waterways contaminated long after most of the businesses are gone. Cleaning up these rivers is key to rejuvenating these economically depressed communities.

Concerns also loom for water supplies. Lake Michigan provides drinking water to 8.5 million people, but a proactive commitment to water conservation will be necessary in the region to accommodate increased water demands due to projected population growth and land use changes. Plus, groundwater withdrawals from the deep-bedrock aquifer have generally been shown to exceed the recharge rate.

Chicago is also a transportation center, which fuels businesses and jobs in the region and beyond, and facilitates moving people and cargo along to their destinations. Behind that though are millions of barrels of crude oil being piped, trucked, freighted, and shipped throughout the Great Lakes and particularly to the southern Lake Michigan region, where refineries are plentiful and tanks are ready for a refill.

Going Forward

Communities of the future need to be increasingly resilient to balance societal, environmental and economic goals. The value of thriving aquatic ecosystems, improved water quality, and effective water infrastructure systems goes well beyond human health issues or quality of life. Indeed, tourism provides just one easy illustration of economic benefits from healthy water resources in the Chicago area. In 2015, the city hosted a record 52 million visitors. Tourists accounted for \$14.9 billion in 2015, and an increase of 15,000 Chicago jobs since 2010. The beautiful southern Lake Michigan shoreline is a significant draw, as is the busy metropolis. In Indiana, visitors to the state and national parks' dunes and beaches contribute more than \$350 million to the local economy each year.

Investing in the two states' water resources will help grow economic and environmental resiliency for the region's future. Fostering healthy aquatic ecosystems, preventing flooding, planning for future water supplies, and reducing pollution help establish fertile ground for growth. Resilient communities are better able to adapt and to thoughtfully prepare for contingencies that may arise from an ever-changing world.

Resilient communities recognize that we all need water – to drink, for recreation, to make our city grow. In the southern Lake Michigan region that means we encourage everyone to become stewards of clean water and healthy aquatic ecosystems.

The National Sea Grant Program

Sea Grant was created by the U.S. Congress in 1966 to be a highly-leveraged federal and state partnership to harness the intellectual capacity of the nation's universities to solve coastal problems along our oceans, Great Lakes, and islands. The National Sea Grant College Program engages citizens, communities, scientists, organizations, and governments to sustain and enhance the vitality, value, and wise use of the nation's coastal resources. Administered and supported by NOAA, and implemented through leading research universities, Sea Grant provides unique access to scientific expertise and to new discoveries. Through its scientists and communication, education, extension, and legal specialists, Sea Grant generates, translates, and delivers cutting-edge, unbiased, science-based information to address complex issues.

Sea Grant is a national network of 33 university-based state programs, the National Sea Grant Advisory Board, the National Sea Grant Law Center, the National Sea Grant Library, and hundreds of participating institutions. The Sea Grant network enables NOAA and the nation to tap the best science, technology, and expertise to balance human and environmental needs in coastal communities.

Illinois-Indiana Sea Grant

Illinois-Indiana Sea Grant (IISG) is focused on the southern Lake Michigan region—104 miles of heavily urbanized and industrialized shoreline in the two states. One third of the population of the Great Lakes lives along the shore of Lake Michigan between Milwaukee, Wisconsin and Michigan City, Indiana.

The program is administered at the University of Illinois and Purdue University, but IISG also works in partnerships with key organizations, institutions, and agencies in the region to reach more audiences and multiply opportunities for success. IISG brings together scientists, educators, policy makers, community decision makers, outreach specialists, business leaders, and the general public to work towards a healthy environment and economy.

Our commitment to partnerships is reflected in our annual \$3 million-plus budget. About one quarter of that funding is through the Sea Grant omnibus. A full half is due to multiple grants, as well as matching funds provided by the two universities. The final quarter comes from a long-term partnership with the U.S. Environmental Protection Agency Great Lakes National Program Office (EPA GLNPO). Through this funding, IISG uses EPA GLNPO data to engage in research and outreach that supports Great Lakes communities.

IISG includes 30 employees with the equivalent of 25 fulltime employees dedicated to Sea Grant work. The program omnibus funds 7.5 staff members, with the rest supported through leveraged funds.

The Strategic Planning Process

Strategic planning is an ongoing process for IISG. Our specialists and management team continually listen to user needs, challenges, and goals and incorporate those into our programmatic needs. That said, this strategic planning process officially started in April 2016 when we brought our user advisory committee together with our specialists to explore emerging issues, challenges, and untapped needs. From that conversation, and subsequent ones, we continued to discuss needs and priorities with project partners, researchers, and university administrators. Coupling local feedback and survey input with more overarching ideas, specialist started defining their programmatic goals and objectives.

Our official strategic planning process began with conversations. We engaged with stakeholders, collaborators, researchers, federal and state agency professionals, and people at our workshops and via a survey to help us understand their concerns and needs. We looked for commonalities and outliers and coupled those with our core mission, vision, and values to identify the topics that our program should focus on in 2018-2023.

Using both the National Strategic Plan as a guiding document and the individual goals and smart objectives of IISG specialists, we outlined the Goals and Outcomes in each of the Sea Grant focus areas presented in this document.

Cross Cutting Principles: Partnerships, Organization Excellence, and Diversity and Inclusion

To make informed decisions about critical issues in the region and the role our program can and should play, IISG relies on input from a cross section of people and perspectives. To this end, our specialists work with over 300 national, state, local, non-profit, industry, and international partners.

To ensure that the views of those groups are represented in our planning and programming, IISG activities are guided by two advisory committees.

Administrative Advisory Committee

The administrative advisory committee brings together representatives from the respective colleges and universities that govern IISG to provide oversight regarding strategic matters. These include: policy considerations that affect the priorities and long-term directions of the program; guidance in the involvement of partnering institutions, stakeholders, and the various advisory groups; sources of matching funds; and a communication strategy for engaging local, state, and federal government entities. The administrative advisory committee meets 2-4 times per year. In addition, IISG's director communicates with advisory committee members individually or collectively as administrative issues arise. Committee members are named based on their university position. When a member leaves that position, their replacement joins this committee.

User Advisory Committee

The user advisory committee is comprised of industry, conservation, community, and agency leaders representing the bi-state region and represents our local partners and users. The committee aids in defining IISG's strategic goals, including providing guidance throughout the strategic planning process. The group helps position IISG and host institutions assume a vital role in the science and practice of coastal restoration and management in our region. The committee convenes once per year and interacts via conference call and email as needed.

Program Administration

Administratively, IISG is located at Purdue University and the University of Illinois with personnel and management duties split between the two universities. At Purdue, the program is housed in the Department of Forestry and Natural Resources where IISG's director, assistant director, research coordinator, and communications coordinator are located. IISG's associate director, program leader, education coordinator, and strategic communication coordinator are situated at Illinois. The IISG management team is comprised of members from each of the chief functional areas—research, outreach and education.

Diversity and Inclusion Values

The people of IISG value diversity, equity, and inclusion in both our organization and the communities we serve. Therefore, we strive to make access to research, outreach, education, and employment opportunities available to everyone, regardless of race, color, religion, place of origin, gender, sexual orientation, age, socio-economic status, disability, or veteran status.

The ways in which people interact with natural resources are a function of their beliefs, values, and life experiences. By explicitly incorporating diverse perspectives and inclusively collaborating across stakeholder groups, we can foster more equitable and sustainable natural resource management.

We work to:

- Help communities address critical natural resources issues, ranging from climate change adaptation to pollution prevention to safe recreation.
- Provide accessible, free, or reduced-cost programming to diverse audiences, including via ADA-compliant and multi-lingual publications.
- Expand access to our research grants, fellowships, and internships to include underrepresented and non-traditional groups and individuals.
- Be a leader in equal employment opportunity practices and offering employee training on diversity, equity, and inclusion issues.

This commitment to diversity, equity, and inclusion has shaped our beliefs and practices as we interact with others. Specifically, we:

- Strive to create a welcoming environment, so that each person feels accepted, valued, and safe.
- Insist on respectful behavior because words and actions, or the lack thereof, have powerful meaning.
- Encourage the open expression of ideas.

We recognize that natural resources issues affect everyone, though they do not affect everyone equally. At IISG, we celebrate the diversity of both people and nature as well as the complex interactions between them.

Illinois-Indiana Sea Grant Focus Areas, Goals, and Outcomes

In 2018-2023, IISG will direct its efforts in four National Sea Grant focus areas: Healthy Coastal Ecosystems, Resilient Communities and Economies, and Environmental Literacy and Workforce Development, and Sustainable Fisheries and Aquaculture. Through these focus areas we will bring information, tools, training, and other resources to decision makers and residents to help foster a healthy and resilient economy and environment.

Estimated Level of Effort by Focus Area

Healthy Coastal Ecosystems	Resilient Communities & Economies	Environmental Literacy & Workforce Development	Sustainable Fisheries & Aquaculture
35%	35%	20%	10%

Focus Area: Healthy Coastal Ecosystems

The health of the region is intrinsically tied to the health of the Great Lakes themselves. When the lakes and nearby waterways become degraded by contaminants or invasive species, the toll is taken not just on fragile food webs, but also on communities that depend on these resources for drinking water, shipping, recreation, and quality of life.

Legacy contaminants from industry and other activities along Great Lakes waterways have left many lakes and rivers impaired. While most manufacturers have moved on, they left behind PCBs, mercury, and other toxic pollutants that impair the health of the waterway as well as adjacent communities. At the same time, emerging contaminants, such as pharmaceuticals and microplastics, pose new threats to Great Lakes ecosystems. IISG research has detected a cocktail of medicines, as well as plastic microfibers, in southern Lake Michigan waters.

Perhaps the most significant threat to the Great Lakes food web is aquatic invasive species (AIS). These species have caused major disturbances affecting the integrity and stability of the lake ecosystems as well as those of inland waterways.

IISG is engaged in addressing these ecosystem threats from a variety of approaches. As the Great Lakes Legacy Act provides support for cleaning up Great Lakes Areas of Concern, IISG is working with EPA GLNPO to keep residents engaged throughout the process. Armed with the latest scientific research, IISG's Pollution Prevention program is creating an educated public—one that makes decisions that consider the potential environmental and societal impacts of aquatic pollution. And IISG's AIS team is the go-to group for natural resource managers as well as water gardeners and other audiences for information and tools on preventing the spread of AIS.

IISG is working with EPA GLNPO to develop products, tools, and strategies to provide access to Great Lakes research findings from offshore water quality sampling. We are also engaged in initiatives to improve the effectiveness of monitoring programs by developing ways to make Great Lakes data collection and analysis more efficient, dependable, and precise. The program is also leading efforts to coordinate agency and university scientists as they come together to study the Great Lakes in a systematic and comprehensive fashion.

Finally, in partnership with Wisconsin Sea Grant, the programs have led an ambitious research initiative to understand the nearshore food web in Lake Michigan. This collection of studies has been assessing the impact of invasive species in these relatively undocumented lake habitats.

GOAL: Habitat, ecosystems, and the services they provide are protected, enhanced, and/or restored.

Outcomes

- Scientific understanding and technological solutions inform and improve conservation and the management of natural resources.
- Ecosystem science and conservation priorities developed through stakeholder participation are addressed.
- Greater awareness and understanding of ecosystem functions and services they provide improves stewardship efforts.
- Declining biodiversity, habitats, and ecosystem functions and services are restored and sustained.
- Improved collaborative planning and decision-making leads to enhanced stewardship.

GOAL: Land, water, and living resources are managed by applying sound science, tools, and services to sustain ecosystems.

Outcomes

- Communities have access to sound science, data, tools, and the training to be effective in planning and decision-making processes.
- Citizen science initiatives are engaged and contribute to improving our knowledge with respect to coastal communities and ecosystems.
- Residents, resource managers, and businesses understand the effects of human activities and environmental change on Great Lakes resources.
- Businesses, communities, researchers, and resource managers use information, tools, and services to implement actions that protect Great Lakes resources.

Performance Measures

1,800 resource managers will use ecosystem-based approaches in the management of land, water, and living resources as a result of Sea Grant activities.

37 Sea Grant tools, technologies and information services will be used by our partners/customers to improve ecosystem-based management.

75,000 people will engage in Sea Grant-supported informal education programs.

Focus Area: Resilient Communities and Economies

Many communities face the struggle of embracing growth while also ensuring resilience and sustainability. Knowing what is at stake, what is of value, and what is necessary are key to successful planning. And, while we can all do our part to protect water resources, many actions are more effective and efficient taken on as a community choice. Indeed, some can only take place on a community level.

As local decision makers plan for the future in cities around the Midwest, larger storms are happening more frequently, leaving storm pipes potentially insufficient to manage rainfall. And in northeastern Illinois, ensuring an adequate supply of drinking water will require bringing together a variety of stakeholders and creating a combination of strategies.

IISG will continue to provide local decision makers with expertise and tools to help protect natural resources and plan for economic development as they strive for resilience going forward. For example, local planners can use a web-based decision support system to explore policy and management options that can keep aquatic ecosystems from reaching critical tipping points that threaten sustainability in their watershed.

IISG has many data-to-decision tools to help local decision makers manage their resources. For instance, communities and critical facilities can assess their particular vulnerabilities to flooding and make necessary corrections. And in Indiana, a community planning program helps local officials in small and large towns collect data on community assets and plan improvements to public spaces.

IISG also brings stakeholders together to develop solutions and strategies, and to be trained in new approaches to develop sustainable land use plans, manage drinking water supplies, address stormwater management, assess crude oil movement, or to evaluate ecosystem services. For example, our rain garden programing is training conservation professionals about using green infrastructure to reduce flooding and protect water quality.

Chicago's greater metropolitan region supports the economic, social, and recreational needs of 12 million people. And the city and its lakefront are a magnet for tourists. IISG's buoys and other resources help inform residents and tourists about ecological as well as weather conditions so they can make wise choices about their outdoor activities, especially with regards to Lake Michigan.

GOAL: Coastal communities use their knowledge of changing conditions and risks to become resilient to extreme events, economic disruptions, and other threats to community well-being.

Outcomes

- Existing and innovative training programs improve local stakeholders' understanding of changing conditions in their communities and help them implement adaptive strategies to improve resilience and sustainability.
- Communities, including underserved members, have access to information, tools, and services about how economic activities and trends will impact environmental and community well-being.
- Communities use information, tools, services, and technologies to develop action plans to adapt and grow resilient economies.

GOAL: Water resources are sustained and protected to meet existing and emerging needs of the communities, economies, and ecosystems that depend on them.

Outcomes

- Community members understand watershed functions and the services they provide that support communities and economies.
- Community members have access to sound science, data, tools, and services that help them understand how actions will impact water quality and quantity and are able to make informed decisions.

Goal: Tourism and recreation are supported and enhanced through new and improved resources.

Outcomes

- Residents and tourists will use tools and resources that monitor current weather and wave conditions to make informed outdoor recreation decisions.
- Fishery managers and recreational fishers will understand the dynamics of wild fish populations and food web conditions.

Performance Measures

150 communities will adopt/implement sustainable economic and environmental development practices and policies as a result of Sea Grant activities.

4 communities will adopt/implement hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events as a result of Sea Grant activities

Focus Area: Environmental Literacy and Workforce Development

The Great Lakes face many threats—invasive species, pollutants, and climate change, among others. Decision makers, managing a large ecosystem, may come to the task under-prepared. They, along with the general public, may not have a good grasp of the characteristics, functioning, and value of these waterbodies.

These lakes are also woefully underrepresented in school textbooks and other educational resources. A more Great Lakes-literate public could better contribute to the environmental, economic, and social sustainability of the Great Lakes.

Sea Grant's strength is in translating and delivering cutting-edge, science-based information to address complex issues and the program is well suited for filling this literacy gap. Increasing literacy across diverse audiences can be accomplished in many ways, though one of the most effective and efficient ways is through working with educators who bring new knowledge to their students. In turn, these students are often inspired to engage in community stewardship—helping improve their local environment and inform their neighbors. These efforts can also encourage young people to one day start their own sustainable enterprises, such as aquaculture businesses. Or, efforts may inspire future scientists who conduct aquatic research or resource managers who guide the responsible use and conservation of Great Lakes ecosystems.

What's more, IISG education efforts go beyond the classrooms, into museums, at fairs, and in workshops, where audiences of all ages learn about Great Lakes conditions and concerns.

Through program specialists and funded researchers, IISG provides opportunities for undergraduate and graduate students to get real experiences in labs, the field, or in communities. These students participate in research, project development, or problem-solving experiences.

Developing a workforce that can play a role in achieving sustainability and resilience in the region will provide multiple benefits. For example, the greater metropolitan Chicago region has experienced a slow recovery from the recession, particularly for lower-income southern communities. These communities also are the most prone to flooding impacts, so financial support is available to install green infrastructure.

IISG will help these communities leverage stormwater infrastructure investments to provide workforce and economic development opportunities and jobs. We will also train college students and community volunteers to understand local water resource issues. With this education, they can provide leadership in the community regarding watershed issues and at the same time, enhance their skills and employment opportunities.

In another example, the Midwest is the nation's food production hub and the region has the potential to grow in terms of its aquaculture industry. This will require a specialized workforce to support this sector. IISG will continue to train potential or current aquaculture or aquaponic producers to make the most of their production and marketing opportunities, while also being environmentally responsible.

GOAL: An environmentally literate public that is informed by lifelong formal and informal opportunities that reflect the range of diversity of our communities.

Outcomes

- Great Lakes residents and tourists will have a better understanding of Lake Michigan ecosystems and ecosystem threats.
- Teachers and students are better informed in science, technology, engineering, and mathematics fields and can employ their knowledge to support sustainable practices within their communities.

GOAL: A diverse and skilled workforce is engaged and enabled to address critical local, regional, and national needs.

Outcomes

- Community members are enabled to explore and pursue the variety of occupations that are essential to sustain the nation's coastal communities and ecosystems.
- College level courses and internships provide increased literacy, experience, and preparedness in areas of watershed, coastal, and marine ecosystems for students particularly those from underrepresented groups.
- The existing and future workforce, including in aquaculture and aquaponics, is able to adapt and thrive in changing environmental, social, and economic conditions.
- Undergraduate and graduate students particularly those from underrepresented groups, are supported and have access to formal and experiential learning, training, and research experiences.

Performance Measures

600 P-12 educators will be engaged in Sea Grant-supported education programs.

37 products will be used to advance environmental literacy and workforce development.

Focus Area: Sustainable Fisheries and Aquaculture

In the United States, seafood is the second-largest natural resources trade deficit behind oil. In Illinois and Indiana, as around much of the country, aquaculture producers compete for customers with suppliers of imported seafood, which comes at a much cheaper price.

Illinois and Indiana provide a great location for aquaculture due to the rich supply of raw materials of fish food and access to large markets. But, growing aquaculture in the two states entails enhancing the viability and profitability of these businesses. To that end, it is essential that aquaculture producers recognize marketing opportunities that sustain and grow their businesses. And that they make smart production choices in their efforts and investments, which means having the most up-to-date knowledge and technology.

IISG brings research-based production techniques and marketing recommendations to potential or established aquaculture and aquaponics producers to help them increase their profits. Whether it's connecting with restaurants, food hubs, or other niche markets, IISG helps fish farmers make the most of what their products offer to consumers—fresh, locally-grown seafood that are raised using environmentally-responsible practices.

From a regional standpoint, IISG is a partner in the Great Lake Aquaculture Collaborative (GLAC), bringing together six Great Lakes Sea Grant programs. The collaborative will identify barriers that inhibit industry growth and will provide science-based initiatives that support an environmentally responsible, competitive, and sustainable aquaculture industry.

Much of Illinois and Indiana aquaculture is focused on growing non-native fishes, but farmed fish with a local identity may be more successful in the marketplace. IISG has convened the Walleye Aquaculture Working Group (WAWG), bringing together researchers, producers, and extension personnel, to engage in dialogue about developing a farmed walleye market. Walleye has a strong association with the Midwest, is available in restaurants as a commercially caught species, and may be suitable for aquaculture.

While the Lake Michigan waters of Illinois and Indiana do not support a commercial fishing industry, angling is an economically, environmentally, and socially important pastime there. In the past few decades, the Lake Michigan ecosystem has been changing due to invasive species and habitat changes, which has led to changes in fish populations and fisheries. Scientists and managers are working to understand and mitigate for changes that anglers are experiencing firsthand.

IISG brings together anglers, scientists, reporters, and resource managers in the southern Lake Michigan region to discuss fisheries and the factors impacting them. Through workshops, publications, and two fisheries data websites, anglers and others can stay informed on Lake Michigan issues. From another angle, IISG will help small Lake Michigan fishery businesses be more resilient in the face of economic burdens by connecting them to available resources.

Goal: Fisheries, aquaculture and other coastal and freshwater natural resources supply food, jobs and economic and cultural benefits.

Outcomes

- Increased understanding and technological solutions aid aquaculture management and production.
- Partnerships enable the aquaculture industry to adapt and acquire innovative technologies.
- The fishing and aquaculture industries employ technologies and reinforce strategies to ensure safe and sustainable seafood and products.
- The fishing and aquaculture industries employ strategies that balance economic, community, cultural and conservation goals.

Goal: Natural resources are sustained to support fishing communities and industries, including commercial, recreational, subsistence fisheries and aquaculture.

Outcomes

- Charter captains, recreational fishers, and aquaculturists are knowledgeable about efficient, sustainable, and responsible tools, techniques and uses of coastal and freshwater resources.
- Resource managers and fishing and aquaculture communities have access to science and tools to increase their capability to adapt to future resource management needs.
- Consumers understand the health benefits of seafood and purchase/harvest safe and sustainable products.

Performance Measure

90 fishermen, charter captains, seafood processing or aquaculture industry personnel will modify their practices using knowledge gained as a result of Sea Grant activities.