

two great states caring for one great lake





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#### Dear Friends,

For over 35 years, Illinois-Indiana Sea Grant (IISG) has been working to foster a healthy environment and economy in the southern Lake Michigan region. We have a long record of leading research, outreach, and education in areas such as aquatic invasive species and pollution prevention. We have developed decision tools for communities and their residents, helped communities adopt green infrastructure to reduce stormwater runoff, and have helped bring the Great Lakes to students.

We did this work with the support and collaboration of our partners. IISG is administratively housed in and shares positions with University of Illinois Extension, Purdue Extension, and Purdue University academic departments, including the Department of Forestry and Natural Resources. We share positions with the U of I Prairie Research Institute, Midwest Regional Climate Center, Illinois Water Resources Center, and Purdue University Northwest.

The U.S. EPA Great Lakes National Program Office provides support, with assistance from the U.S. Geological Survey, for specialists and educators who help bring EPA science to the public. The Chicago Metropolitan Agency for Planning, Chicago Botanic Garden, McHenry County Extension, and Loyola University Chicago provide office space and administrative support for our specialists as well. Our successes would not be possible without these and many other partners.

This publication describes some of our 2017 impacts, which include supporting quagga mussel research that led to a \$1 million in new federal funding, informing water supply planning in the greater Chicago region, and supporting medicine collection programs as they reach a significant milestone. As the new IISG director, I am pleased to share them with you.

We look forward to carrying on with our long-term projects addressing critical coastal issues. And, as IISG moves forward with new faces and ideas, we are poised to tackle emerging issues and opportunities in the region.

Sincerely,

In No.

**Tomas Höök** Director



## Sea Grant quagga mussel research leads to \$1 million in NSF funding

#### Relevance

Quagga mussels have colonized vast expanses of the Lake Michigan bottom, reaching densities as high as roughly 35,000 mussels per square meter and having major economic and ecological impacts. Each one filters up to four liters of water per day and the mussels seems unaffected by population control efforts. Resource managers need to make decisions based on the lake's current conditions as well as how key components of Lake Michigan's food web may change in the future. This includes understanding the role of quagga mussels in deep understudied areas of the lake.

#### Response

Illinois-Indiana Sea Grant and Wisconsin Sea Grant researchers studied the effects quagga mussels had on plankton abundance and the phosphorus cycle in the deep parts of Lake Michigan. The team also assessed the impact mussels have on water movement as they filter it—sucking in water and spitting it out.

#### Results

This collaborative research project has led to new funding from the National Science Foundation for more than \$1 million. In the original IISG-funded project, the team discovered that quagga mussels are changing the phosphorus cycle in Lake Michigan, but not affecting turbulence on a large scale. In the new project, researchers are looking at how plankton move through the water column and are expanding their study of water movement. The new results are expected to be useful for understanding conditions in other large lakes and coastal areas.



#### Green Infrastructure training helps build a workforce and protect water quality

#### Relevance

As the Chicago region adapts to more rain and urban flooding due to a changing climate, balancing needs becomes critical. How can we address stormwater issues while improving community wellbeing, protecting the environment, and benefiting local economies? Increasingly, green infrastructure has become part of the solution because it can reduce local flooding while providing habitat for pollinators, improving aesthetics, and creating jobs.

#### Response

Illinois-Indiana Sea Grant joined with partners to assess and meet the market demand for green infrastructure installation and maintenance expertise. With funding from the Illinois Department of Natural Resources Coastal Management Program, project partners developed a green infrastructure workforce curriculum, and compiled a wellresearched needs assessment of landscape and ecological industry standards, including additional job training skills. The group also installed a quarter acre of native landscaping.

#### Results

The needs assessment has improved understanding of green infrastructure training needs and the curriculum is used by several Chicago environmental training and hiring programs. Green Corp, which has high placement and retention rates, is now equipping ex-convicts re-entering the job market with green infrastructure installation and maintenance skills. Through the High Bridge program, seven acres of green infrastructure were installed in the Calumet region in 2017, which will lead to an estimated 200,000 gallons of stormwater soaking into the ground each year—reducing the risks of flooding or degraded water quality.



## Proactive strategies will ensure future water supplies in the Chicago region

#### Relevance

While the Chicago region is water-wealthy compared to other locations, the region does not enjoy an unlimited supply of fresh water. Use of Lake Michigan water is limited by a permitting system, and the communities that rely on groundwater are facing potential water shortages. Some private wells are already going dry. As the heavily populated Chicago region continues to grow, proactive planning is necessary to maintain water supplies while sustaining economic prosperity.

#### Response

Illinois-Indiana Sea Grant assisted the Chicago Metropolitan Agency for Planning in developing the *Water Resources ON TO 2050* strategy paper. Released in 2017, the paper outlines recommendations to ensure an adequate water supply for the greater Chicago metropolitan area.

#### Results

The water supply strategy paper has informed the development of the regional comprehensive plan—seven counties and 284 communities have this resource for managing regional water supplies, benefiting over 8 million residents. Regional, county, and municipal decision makers can also incorporate these water strategy recommendations into land use and comprehensive planning. Water supply strategies will then help guide land use development decisions.

![](_page_11_Picture_0.jpeg)

## Rain garden training and installations reduce runoff by 175,000 gallons per year

#### Relevance

When rainwater hits pavement it quickly flows into drains and then on to rivers, streams, or lakes. This runoff takes with it valuable soil as well as pollutants, like pesticides or motor oil. On the other hand, rainwater that is slowly absorbed into the soil through a rain garden doesn't take that quick ride. It soaks into the ground and pollutants are filtered by plant roots.

#### Response

Illinois-Indiana Sea Grant continues to collaborate with Purdue Extension on the Rainscaping Education Program. This program includes a peer-reviewed and pilottested curriculum, a host guide, workshops, and the creation of a demonstration rain garden with community partners in a public space. In 2017, team members conducted a community training program in Peoria, Illinois for 25 participants, an introductory workshop in South Bend, Indiana for 27 participants, and a train-the-trainer workshop for 15 Purdue University and University of Illinois Extension educators.

#### Results

Participants are using program resources to launch rain garden education programs in their communities that include rain garden installations, tours, and exhibitor booths. The Rainscaping team has supported and participated in seven community efforts, engaging 320 participants. Using a calculation that factors in average rainfall and rain garden area, the gardens installed as part of training workshops have the capacity to reduce runoff by a conservative estimate of 175,500 gallons per year. Rain gardens designed, facilitated, or installed by participants or their partners will reduce even more runoff. This reduction in flow and associated nutrients can improve water quality.

![](_page_13_Picture_0.jpeg)

![](_page_14_Picture_0.jpeg)

#### Over 200,000 lbs. of medicine disposed of through Illinois-Indiana Sea Grantsupported community collection programs

#### Relevance

How we choose to use and dispose of pharmaceuticals and personal care products impacts water quality, including the water we drink, bathe in, and use for recreation. Most of us do not use all of the medication we buy. Using the toilet or trash, however, to dispose of medicine can put people, animals, and the environment at risk.

#### Response

Since 2008, Illinois-Indiana Sea Grant has helped communities establish medicine collection programs. IISG provides financial and technical support, including a toolkit of information, ideas, and resources to a network of new and on-going community single-day and permanent collection programs.

#### Results

Altogether, IISG has helped establish 52 permanent medicine collection programs (with 50 still in operation). The 22,370 pounds of unwanted medicine collected in 2017 bring the total amount to a whopping 203,923 pounds or over 100 tons of incinerated medicines.

![](_page_15_Picture_0.jpeg)

#### Limno Loan program brings Great Lakes aquatic science equipment to 27 classrooms and 1,920 students

#### Relevance

Learning science through real-world experience provides students with an opportunity to do what scientists do—collect data, analyze it, and interpret the results. Students who are able to do this with actual equipment used by scientists in the field can get a rich sense of the scientific experience. Exposing students to aquatic science, technology, and science careers is an important step in creating a Great Lakes literate population.

#### Response

In partnership with U.S. EPA Great Lakes National Program Office, Illinois-Indiana Sea Grant has coordinated the Limno Loan program for six years. Through this program, educators from across the basin can borrow Hydrolabs, which are water-quality monitoring equipment used by scientists, for classroom and field use. Along with the equipment, they have access to training and online resources at limnoloan.org.

#### Results

In 2017, 27 educators borrowed the Hydrolab, reaching around 1,920 students. Some educators created a new Hydrolab classroom lesson or enhanced an existing lesson. And 11 educators spent extra time teaching about aquatic science because they were using the Hydrolab—ranging from two days to three weeks. One Ohio teacher commented," The students all love using the Hydrolab and it makes them feel like "real" scientists since they are using similar equipment that the EPA would use. It has really connected them to the water resources and environmental issues in our local watershed. It also gives me the opportunity to have them collect and analyze data that is meaningful to them!"

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#### Shipboard Science workshop turns 15 educators into Great Lakes scientists

#### Relevance

The Great Lakes are under-represented in school textbooks and other educational resources. In addition, due to a lack of experience or exposure, many educators are neither comfortable with, nor confident in, teaching about the Great Lakes and aquatic science or about the scientific method. Teachers who have a good understanding of these topics are more likely to integrate Great Lakes and water quality information into their lesson plans.

#### Response

The Center for Great Lakes Literacy (CGLL), a consortium of seven Sea Grant programs, conducts the annual weeklong Shipboard Science workshop that provides educators an opportunity to work side-by-side with scientists on the U.S. EPA *R/V Lake Guardian*. Teachers explore lake ecology, geology, geography, and chemistry. They learn about resources to help bring Great Lakes and ocean literacy activities to their classroom, and build networks with educators and scientists. Illinois-Indian Sea Grant is a part of the CGLL planning team, helping provide continuity each year and passing along lessons learned to make each workshop better than before.

#### Results

In 2017, 15 educators from across the region participated in the Lake Huron workshop. They all reported gaining new knowledge and increased confidence about Great Lakes concepts that they would bring back to their 1,750 students. In follow up, educators described organizing field trips (including Lake Guardian tours), connecting students and scientists through videocalls, adding new curriculum, and bringing real-world Great Lakes issues to the classroom. IISG supported an educator from the 2014 Lake Michigan workshop as she created a Lake Michigan course — complete with expert speakers — at Lake Forest College, which, thus far, has reached 28 students.

![](_page_19_Picture_0.jpeg)

#### Chicago-area students reach out to inform their community about invasive species and engage in local stewardship

#### Relevance

Preventing the spread of aquatic invasive species (AIS) is about behavior change. People can be pathways of introduction and spread when organisms purchased for water gardens or aquariums are released into local waterways. Because classrooms are a frequent setting for aquariums, teachers need to be equipped to educate students about how to prevent the introduction and establishment of AIS across the Great Lakes region.

#### Response

Illinois-Indiana Sea Grant led a teacher workshop at Brookfield Zoo near Chicago, sharing information about AIS introductions via four pathways: aquarist, water gardeners, teachers or students, and anglers. Teachers explored *Stop Aquatic Hitchhikers*!<sup>™</sup> and Habitattitude<sup>™</sup> resources, *Nab the Aquatic Invader*! website activities, Be a Hero-Release Zero<sup>™</sup> and sample stewardship projects. These resources incorporate problem-based learning about invasive species and help to empower students as stewards to prevent new invasions.

#### Results

The 14 participating teachers were encouraged to incorporate what they learned in the workshop into their classroom instruction and to facilitate stewardship projects with their students. Chicago-area teachers and students developed five stewardship projects in collaboration with community partners. These included: joining in a litter cleanup as part of a restoration project in LaBagh Woods in Chicago; engaging in citizen science in Flint Creek in Barrington, Illinois; and raising awareness about invasive species by creating posters and brochures and distributing or displaying them at public buildings and community events.

![](_page_21_Picture_0.jpeg)

#### Illinois-Indiana Sea Grant's 33 summer interns experienced invaluable workingworld opportunities

#### Relevance

It is often difficult for undergraduates to get experience that both helps build their resumes and provides real world knowledge. Students also aren't always aware of job possibilities beyond traditional academic research.

#### Response

Illinois-Indiana Sea Grant established a summer internship program six years ago for undergraduate students to work closely with program specialists on their ongoing projects with a focus on providing experience related to environmental management and outreach.

#### Results

In 2017, five interns worked directly with IISG specialists in fisheries, sustainable communities, green infrastructure, microplastics, and Great Lakes communication. These interns were engaged in research and outreach, including compiling case studies, developing toolkits, writing reports, and creating graphics. All 33 IISG interns have expressed that their experience has been invaluable. One 2015 intern who described working with Sea Grant as "really a launching point for me," is now a research assistant at the NOAA Great Lakes Environmental Research Lab.

![](_page_23_Picture_0.jpeg)

#### Nine marinas along southern Lake Michigan are certified through the Illinois Clean Marina Program

#### Relevance

Daily marina operations and boater activities produce contaminants that degrade both air and water quality. With more than 15 marinas lining Illinois' compact coastline, even small amounts of pollution from marinas can have a significant impact on the lake and the millions of people who rely on it for drinking water and recreation.

#### Response

Illinois-Indiana Sea Grant joined with the state's Coastal Management Program and numerous Chicago-area organizations to develop the Illinois Clean Marina Program. For its part, IISG led the development of the *Illinois Clean Marina Guidebook*, which provides marina operators with simple best management practices for making operations more efficient and environmentally friendly.

#### Results

Two more Illinois harbors along Lake Michigan were certified as clean marinas in 2017, bringing the total to nine. Diversey Harbor, home to as many as 719 boats, and Jackson Park Inner Harbor, home to 150, are both along Chicago's busy lakefront. These harbors have pledged to take action that safeguards Lake Michigan's water quality by adopting best management practices laid out in the Illinois guidebook.

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# IMPACTS 2017

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Illinois-Indiana Sea Grant is one of more than 33 programs of the National Sea Grant College Program created by Congress in 1966. Sea Grant is a partnership of universities, government, business, and industry that addresses marine and Great Lakes needs to enhance sustainable coastal economic development.