

GREAT LAKES NEWS FROM  
MICHIGAN SEA GRANT COLLEGE PROGRAM

# upwellings

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## Protecting Great Lakes Resources

*Michigan Sea Grant College Program*

*Annual Report 2002*

# upwellings

*Upwellings* reports on Great Lakes research and education. For a subscription, call (734) 764-1118 or visit the Michigan Sea Grant Web site: [www.miseagrants.umich.edu](http://www.miseagrants.umich.edu)

Joyce Daniels, Managing Editor  
Dave Brenner, Senior Graphic Artist  
Elizabeth LaPorte, Communications Director

Editorial Suggestions  
Please direct suggestions for articles or editorial correspondence to: Joyce Daniels,  
Email: [joydan@umich.edu](mailto:joydan@umich.edu), Phone: (734) 647-0766



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## Upwellings

Michigan Sea Grant College Program  
401 E. Liberty, Suite 330  
Ann Arbor, MI 48104-2298

## Michigan Sea Grant Management Team

**George Carignan**, Interim Director  
Phone: (734) 615-4084  
Email: [carignan@umich.edu](mailto:carignan@umich.edu)

**William Taylor**, Associate Director  
Phone: (517) 353-0647  
Email: [taylorw@msu.edu](mailto:taylorw@msu.edu)

**Jennifer Read**, Assistant Director  
Phone: (734) 936-3622  
Email: [jenread@umich.edu](mailto:jenread@umich.edu)

**John Schwartz**, Extension Program Leader  
Phone: (517) 355-9637  
Email: [schwartzj@msue.msu.edu](mailto:schwartzj@msue.msu.edu)

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## Michigan Faces Great Lakes Challenges

For this first issue of *Upwellings* in 2003, we take the opportunity to highlight notable program achievements during the past year in relation to some of Michigan's most pressing Great Lakes and coastal challenges. Among them:

**Sustainable coastal communities:** Six of the 10 fastest growing counties in Michigan are located on the Great Lakes shoreline, according to U.S. Census Bureau data for 1990-2000. Growing coastal populations combined with vulnerable natural resources have made sound land-use planning more important than ever in coastal urban areas, tourist communities and remote shoreline villages.

**Aquatic nuisance species:** The invasive zebra mussel has lived in the Great Lakes for more than a decade, and its ecosystem impacts are still unfolding. Anglers continue to catch the exotic round goby, and the invasive sea lamprey requires an ongoing and costly management program. All of this is taking place while the exotic Asian Carp has established itself in waterways less than 50 miles from Lake Michigan.

**Great Lakes fisheries and trophic change:** A healthy Great Lakes fishery with a diversity of native species is an ecological and

economic priority. Whitefish, yellow perch, walleye and many other native organisms depend on one another for food. Ecosystem disruptions caused by aquatic nuisance species, industrial contaminants, excess nutrients and runoff continue to jeopardize this important resource.

Michigan Sea Grant addresses these and many other issues through the work of top researchers and a network of Extension agents and Communicators who transfer science-based knowledge to resource-users and the public. This document provides selected program accomplishments for the period March 1, 2002 through February 28, 2003.

In the coming year, we look forward to broadening our scientific understanding of current challenges and fostering cooperation as we work to protect and enhance our shared Great Lakes resources.



George Carignan  
Michigan Sea Grant Interim Director

## About Michigan Sea Grant

Michigan Sea Grant is dedicated to the protection and sustainable use of Great Lakes and coastal resources. The program supports academic research, education and outreach projects related to Great Lakes coastal issues. Sea Grant researchers, at universities across the state, focus on resource management and sustainable coastal development in Michigan. Outreach staff members, including extension agents, communicators and educators, work cooperatively to transfer science-based knowledge to Great Lakes coastal resource users and the public.

Michigan Sea Grant College Program is part of the National Sea Grant College Program, a network of 30 university-based programs across the U.S., supported by the National Oceanic and Atmospheric Administration. Michigan Sea Grant was founded in 1969 at the University of Michigan and in 1977 entered into partnership with Michigan State University. For more than 30 years, Michigan Sea Grant has directed community, academic and professional resources toward an advanced understanding of the Great Lakes.





*Detroit River and Detroit skyline*

## Sustainable Coastal Communities

Michigan's 3,000-mile Great Lakes shoreline poses one of the state's greatest challenges. Coastal populations are growing rapidly, and an estimated 300 shoreline communities must make sound land-use decisions that protect valuable natural resources, revitalize degraded urban areas and enhance economic opportunity. Michigan Sea Grant plays a unique role in bringing together diverse partners to develop new visions and work toward common solutions.

### **Detroit River Renaissance**

The 32-mile Detroit River is undergoing a transformation. Long used for industrial purposes, the river is being rediscovered as a valued environmental resource, recreational asset and economic stimulus. The Detroit River is one of only 14 rivers nationwide honored with a presidential designation as an American Heritage River. That designation led to development of the Greater Detroit American Heritage River (AHR) Initiative; Michigan Sea Grant Extension chairs the steering committee.

*"The AHR Initiative has helped leverage more than \$13 million in projects ranging from developing riverfront greenways to remediating contaminated sites."*

*Mark Breederland  
Michigan Sea Grant Extension Agent  
Steering Committee Chair, Greater Detroit AHR Initiative*



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Grand Haven, Michigan

## Coastal Community Survey

More than 200 of Michigan's coastal communities responded to a survey conducted by Michigan Sea Grant in 2002 to gauge the status of land-use planning tools and resources in shoreline communities. Among the findings, survey results show an increase in the number of coastal communities that have adopted comprehensive master plans, an increase in the use of Geographic Information Systems (GIS), and an increase in professional planning and zoning staff since 1994. The results will allow Sea Grant to assist coastal communities as they face land-use challenges.

With its partners, the Greater Detroit AHR Initiative has helped plan, secure funding and implement a range of projects. Among them:

- A system of riverfront greenways connecting 18 projects including boardwalks, trails, marinas and other amenities;
- Eleven soft engineering projects on the Detroit River that use ecological principles and practices to stabilize shorelines;
- Six projects to help restore Belle Isle, a 980-

acre historic island park in the heart of downtown Detroit;

- Three projects to help restore historic Fort Wayne on the lower Detroit River.

These accomplishments were highlighted in October 2002 at the National Conference on American Heritage Rivers, coordinated in part by Michigan Sea Grant, and attended by more than 150 people representing the 14 American Heritage Rivers.

## Great Lakes Fisheries/Trophic Change

Understanding the changing biology of the Great Lakes is critical for successful fishery management. Michigan Sea Grant works to develop and disseminate research-based information to anticipate ecosystem changes and aid in resource decision-making.

### Fisheries Modeling

Many fisheries management decisions, particularly those related to stocking and allocation, are based upon sophisticated computer models. Michigan Sea Grant researchers, led by Jim Bence at Michigan State University, are testing the effectiveness of state-of-the-art, statistical catch-age models in predicting fisheries population changes in Lakes Michigan, Huron and Superior.

Bence and his team have led a workshop on Model Builder software in 2002 for the National Marine Fisheries Society at the Northwest Fishery Science Center in Seattle, Washington. In the

Great Lakes, resource agencies use this fisheries modeling data to predict top predator and prey populations—knowledge that significantly affects management decisions.

### Satellite Technology

Using remotely-sensed imagery, researchers led by Judy Budd at Michigan Technological University are enhancing our understanding of the physical and biological processes taking place in Lake Superior. The research is part of ongoing field studies for KITES (Keweenaw Interdisciplinary Transport Experiment in Superior) and EEGLE (Episodic Events-Great Lakes Experiment) in southern Lake Michigan.

Preliminary project results have shown how large lake processes impact seasonal nutrient levels and aquatic food-web dynamics. These factors can affect the population and distribution of important commercial and recreational fish species in the Great Lakes.

### Regional Fisheries Meetings

Communicating fisheries news to stakeholders is an important part of Michigan Sea Grant activities. In 2002, Extension staff conducted regional fisheries meetings in several locations around the state, bringing together diverse stakeholders and management representatives. For example, seventy-five participants attended a single event at Cabela's in southeastern Michigan in April 2002, learning the status of Lake Erie water levels, exotic species and sportfishing.

### Fisheries Leadership Institute

Plans for the first annual Great Lakes Fisheries Leadership Institute emerged in 2002. The goal of the certificate program is to provide citizen fisheries leaders with the knowledge and skills to interact effectively with Great Lakes fishery management organizations for the benefit of the fishery and its stakeholders.

The Institute will promote an awareness of the economic importance of Great Lakes fisheries; create a network of experts from a variety of backgrounds; and enhance understanding of the complexities of Great Lakes fishery-related institutional arrangements, history and science.

### Don't Get Trapped!

To enhance boating safety on the Great Lakes, Michigan Sea Grant produced and distributed more than 700 copies of the brochure *Don't Get Trapped! What Recreational Anglers and Boaters Should Know About Commercial Fishing Trap Nets*. The full-color brochure, produced in partnership with Michigan's boating and fishing organizations, provides practical tips on how to identify and avoid commercial fishing trap nets.

### Web of Life

A special issue of *Upwellings* in Summer 2002 was devoted to Great Lakes fishery issues, explaining the ecological effects of changing food web dynamics, potential causes and current research.



Lake Sturgeon

### Fisheries Research

**Developing and Communicating Improved Methods of Fish Stock Assessment**  
(Extended from FY 2001)  
James Bence, Michigan State University

**Ecosystem Mosaics: Modeling Pattern and Process Using Remotely Sensed Imagery**  
\$105,345\*  
Judith Wells Budd, Michigan Technological University

**An Environmental Monitoring Network for Lake St. Clair**  
\$151,998\*  
Guy Meadows, University of Michigan

**Overwinter Mortality of Age-0 Lake Herring in Relation to Body Size, Physiological Condition and Water Temperature**  
\$25,669\*  
Trent Sutton, Purdue Research Foundation

**Whitefish Marketing**  
\$20,000\*  
John Schwartz, Michigan State University

\*Combined federal and matching funds.

*“As a non-regulatory organization, Michigan Sea Grant plays an important role in bringing together diverse fisheries stakeholders.”*

Chuck Pistis  
Michigan Sea Grant Extension Agent, Southwest District  
Director, Ottawa County Extension





*"Michigan has the most extensive system of coastal wetlands of any Great Lakes state. They're an invaluable part of the Great Lakes coastal zone."*

*Walter Hoagman  
Michigan Sea Grant Extension Agent, Northeast District  
Author, Great Lakes Wetlands: A Field Guide*



# Great Lakes Coastal Wetlands

Connected to the Great Lakes, coastal wetlands are unique habitats that are integrally tied to the health and diversity of the Great Lakes ecosystem.

Coastal wetlands improve water quality by filtering nutrients and sediments, protect against erosion and provide critical wildlife habitat and fish spawning areas. Michigan Sea Grant supports research to understand coastal wetland processes and educate Michigan residents about their value.

## Valuing Coastal Wetlands

In order to reflect the true worth of Great Lakes coastal wetlands, resource economists led by Michael Kaplowitz at Michigan State University conducted a series of focus groups in 2002 and a random survey of 1,000 Michigan residents to identify what people know and value about wetlands. Researchers are using this qualitative research to design and conduct a scientifically valid and reliable survey to gauge the value of non-market services associated with coastal wetlands—or those values not reflected in current land prices—such as ecological functions, wildlife habitat, and recreational, educational and aesthetic value. In this way,

communities will have more accurate knowledge of the true economic value of wetlands as they face planning and development decisions.

## Treasures of the Great Lakes

A special edition of Michigan Sea Grant's newsletter *Upwellings* was devoted to Great Lakes coastal wetlands in Fall 2002. Combined with a full-color poster insert, the issue was distributed to more than 2,600 Michigan residents. As a result of this issue of *Upwellings*, Michigan Sea Grant was asked to facilitate a multi-party task force to investigate the issue of emergent wetlands in the Saginaw Bay area.

## Wetlands Research

### Effects of Great Lakes Marsh Fragmentation on Fish Assemblages

\$107,553\*  
Paul Webb, University of Michigan

### Estimating Non-Market Values for Great Lakes Coastal Wetlands

\$106,617\*  
Michael Kaplowitz, Michigan State University

### Sedimentation and Emergent Plant Decay in Coastal Wetlands

\$112,758\*  
Robert Neely, Eastern Michigan University  
Robert Sinsabaugh, University of Toledo

# Aquatic Nuisance Species

More than 160 non-native species have entered the Great Lakes. Of these, some 10 percent are considered nuisance species due to their damaging impact. Zebra mussels, round gobies, sea lamprey, Eurasian watermilfoil and purple loosestrife are among the most invasive organisms, permanently altering the Great Lakes aquatic ecosystem.

Michigan Sea Grant engages researchers, resource agencies, educators, the media and citizens in understanding and reducing the impact of aquatic nuisance species (ANS) and preventing future invasions.

## Aquatic Nuisance Species Research

### The Economics of Policy Options for Controlling the Introduction and Spread of ANS in the Great Lakes

\$66,373\*  
Richard Horan, Michigan State University

### Ballast Water Treatment and Management: A Paradigm Shift in Ballasting: The Possibility of a Ballast-Free Ship

\$125,839\*  
Michael Parsons, University of Michigan

\*Combined federal and matching funds



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Butterfly on Purple Loosestrife

### Impacts, Barriers, and Control of Round and Tubenose Gobies in the Great Lakes

\$251,000\*

David Jude,  
University of Michigan  
Ohio EPA  
Ohio Division of Wildlife  
University of Wisconsin-  
Milwaukee

### A National Training Initiative for Federal, State, and Tribal Stocking Programs and Private Aquaculturalists and Baitfish Industries Using an ANS-HACCP Approach from the Great Lakes

\$47,012\*

Michael Klepinger,  
Michigan State University

### Aquatic Nuisance Species Attack Pack

\$6,447\*

Michael Klepinger,  
Michigan State University

### Escape From Exotics: Break Out of Your Classroom Routine by Exploring the Interesting World of Exotic Species

\$20,761\*

Michael Klepinger,  
Michigan State University

### Using Mass Media to Inform Anglers About Invasive Species

\$21,901\*

Michael Klepinger,  
Michigan State University

\*Combined federal and matching funds

### Purple Loosestrife Project

Purple loosestrife is a flowering wetland plant that dominates native vegetation and reduces food and habitat for wildlife. In 1997, Michigan Sea Grant Extension partnered with entomologists at Michigan State University to develop the Purple Loosestrife Project, an innovative biological control program that engages Michigan citizens in reducing purple loosestrife.

By raising and releasing the plant's natural enemy—*Galerucella* beetles—students, teachers and naturalists around the state help restore the biodiversity of Michigan's wetlands. More than 200 trained "cooperators," many of them K-12 teachers and their students, participated in the Purple Loosestrife Project in 2002, releasing beetles at more than 100 sites around Michigan. Significant reduction of the aggressive plant has occurred in the majority of closely monitored locations, notably in the Saginaw Bay and Lake St. Clair regions.

The project's Purple Pages web site, redesigned in 2002, receives more than 10,000 visitors per month, ranking it among the most popular sections on the program web site. (See: [www.miseagrants.umich.edu/pp](http://www.miseagrants.umich.edu/pp))

### Zebra Mussel Citizen Monitoring

Lakefront property owners play an important role in tracking the spread of zebra mussels in Michigan's inland lakes. Citizen monitors discovered new populations of zebra mussels in 11 lakes in 2002, bringing the total number of colonized lakes to 177. The reports increase scientists' knowledge of how invading organisms spread. Michigan Sea Grant, in cooperation with the Michigan Lake and Stream Associations, maintains a record of inland lakes monitored and confirmed infestations.

### Economics of ANS Management

Researchers, led by Richard Horan at Michigan State University, are investigating and assessing a range of economic methods that may be used to prevent and control the introduction of aquatic nuisance species. Potential options



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Round goby

include economic incentives, technology regulations, market-based systems, education and voluntary programs. Project investigators organized a principle paper session on The Economics of Invasive Species Management for the 2002 meeting of the American Association of Agricultural Economists.

### Food-Web Disruption Partnership

Michigan Sea Grant continued its partnership with other Great Lakes Sea Grant programs, the Great Lakes Fishery Commission and the Great Lakes Fishery Trust to understand Great Lakes food-web disruptions caused by ANS and its impact on our fisheries.

(See: [www.foodwebdisruption.org](http://www.foodwebdisruption.org))

### Spreading the Word About ANS

Michigan educators from around the state participated in the 2002 Exotic Species Day Camp conducted by Michigan Sea Grant Extension. Participants learned about exotic species educational materials and developed classroom activities that introduced students to the causes and impacts of exotic species in the Great Lakes.

A new ANS resource, completed in 2002, features ten of the most invasive aquatic nuisance species in the Great Lakes in a special section of Michigan Sea Grant web site. Michigan Sea Grant Communications developed the educational pages to coincide with a special online edition of *Upwellings* devoted to the problem of ANS and current research. (See: [www.miseagrants.umich.edu/ans](http://www.miseagrants.umich.edu/ans))





## Great Lakes Education

By educating students, teachers and residents of all ages about the Great Lakes, Michigan Sea Grant works to build a knowledgeable public and promote the principles of natural resource stewardship.

### Great Lakes Education Program

More than 7,000 fourth-grade students, teachers and volunteers participated in the popular Great Lakes Education Program (GLEP) in 2002, bringing the total number of participants to more than 39,000 since 1991. Coordinated by Michigan Sea Grant Extension, GLEP introduces Michigan's fourth-grade students to freshwater concepts in the classroom and provides hands-on learning via educational cruises on the Clinton River, Lake St. Clair and the Detroit River in Southeast Michigan.

Traditionally underrepresented populations, including 1,787 minority students and 964 adults, participated in GLEP in 2002.

Partnerships with the Huron-Clinton Metropolitan Authority (Lake Erie Metropark, Metro Beach Metropark), Downriver Career Technical Consortium, the United Parcel Services Foundation, and Wayne County Parks Department contributed significant support for the GLEP program, leveraging an estimated \$65,000.

GLEP Summer Discovery Cruises debuted in 2002, offering vessel-based education for the general public on a pilot basis. Summer Discovery Cruises, conducted in partnership with Lake Erie Metropark, were very positively received and represent an opportunity for program growth.

*Michigan Sea Grant Extension Agent Steve Stewart demonstrates water quality concepts during a Great Lakes Education Program cruise.*

*“GLEP gives students a learning experience that has proven to be both enjoyable and effective.”*

*Steve Stewart  
Michigan Sea Grant Extension Agent,  
Urban Southeast District*



LAPORTE

*Congressman John Dingell (D-MI) passes out awards to students from Port Hope High School, winners of the 2003 Midwest Regional National Ocean Sciences Bowl.*

### Research Assistants

Graduate student education is an important part of the Michigan Sea Grant mission. In 2002, Michigan Sea Grant supported 28 student research assistants who worked on projects ranging from state-of-the-art fisheries modeling to remote sensing on Lake Superior to natural resource economics.

### National Ocean Sciences Bowl

Eleven high-school teams from Michigan and Ohio competed in February at the Sixth Midwest Regional Competition of the National Ocean Sciences Bowl, sponsored in part by Michigan Sea Grant. The event is one of 24 regional competitions held around the nation designed to promote literacy in science and mathematics through improved understanding of the world's oceans and Great Lakes.

### Great Lakes Natural Resources Camp

First-hand experience is a key element of the Great Lakes Natural Resources Camp, sponsored in part by Michigan Sea Grant. Thirty-nine students, ages 13-15, attended the week-long camp in 2002, learning about Great Lakes coastal processes, fisheries, wetlands, and many other Great Lakes topics. The camp has been

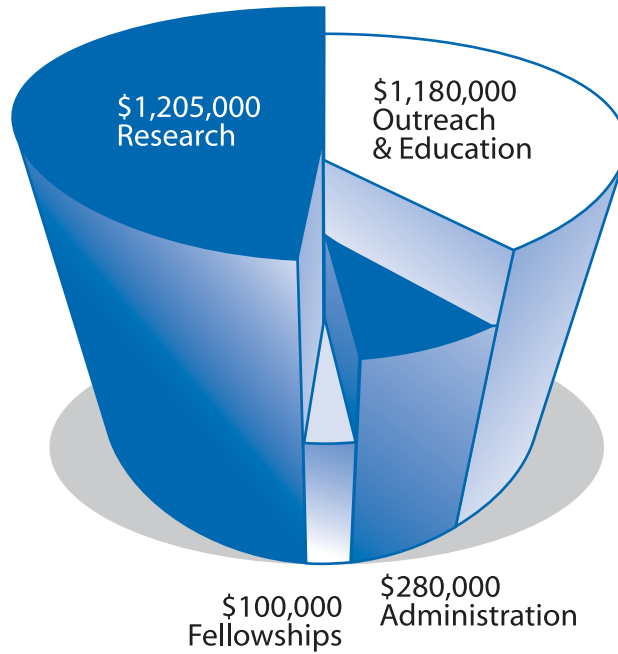
shown to increase students' awareness and understanding of natural resources ecology and management, foster leadership skills and stimulate career interests. The camp is held in northern Michigan, with educational support from Michigan Sea Grant Extension.

### Knauss Marine Policy Fellowship

Two students recommended by Michigan Sea Grant received Knauss Marine Policy Fellowships in 2002. The prestigious fellowship, sponsored by the National Sea Grant College Program, enables top students from around the nation to work on Great Lakes and marine policy issues in Washington, D.C. for one year. In 2002, Michigan's Knauss Fellows worked for the Senate Commerce Committee, Subcommittee on Oceans and Fisheries, and in the office of Representative Frank Pallone, Jr. (D-NJ).

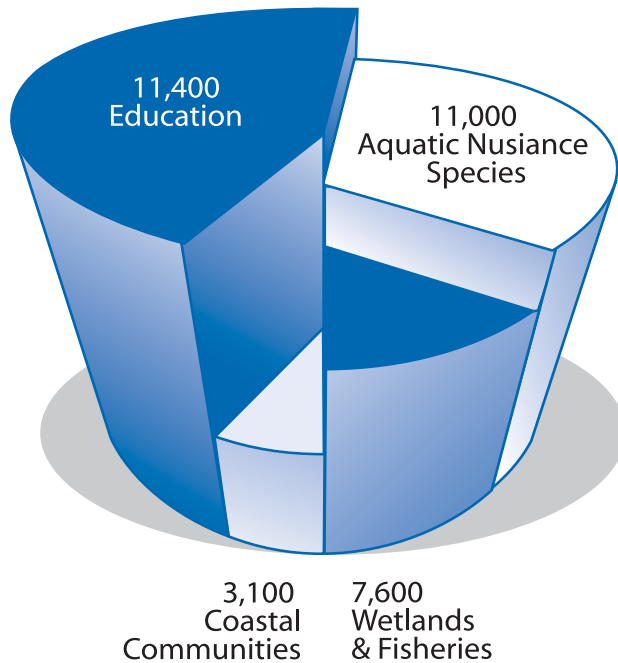


## Michigan Sea Grant Annual Program Funding March 2002 - February 2003



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**Total Publications Distributed: 33,100**

## contact us

Michigan Sea Grant ([www.miseagrant.umich.edu](http://www.miseagrant.umich.edu)) is dedicated to the protection and sustainable use of Great Lakes and coastal resources. A cooperative program of Michigan State University and the University of Michigan, we utilize community, academic and professional resources to advance understanding of the Great Lakes.

**Upper Peninsula:** Ron Kinnunen  
email: [kinnunen@msue.msu.edu](mailto:kinnunen@msue.msu.edu)  
(906) 228-4830

**Northwest:** John McKinney  
email: [mckinney@msue.msu.edu](mailto:mckinney@msue.msu.edu)  
(231) 922-4628

**Associate:** Mike Klepinger  
email: [klep@msu.edu](mailto:klep@msu.edu)  
(517) 353-5508

**GLERL:** Rochelle Sturtevant  
email: [sturtevant@glerl.noaa.gov](mailto:sturtevant@glerl.noaa.gov)  
(734) 741-2287

**Southeast:** Mark Brederland  
email: [brederm@msue.msu.edu](mailto:brederm@msue.msu.edu)  
(810) 989-6323

**Southeast Urban:** Steve Stewart  
email: [stewart@msue.msu.edu](mailto:stewart@msue.msu.edu)  
(586) 469-7431

**Southwest:** Chuck Pistis  
email: [pistis@msue.msu.edu](mailto:pistis@msue.msu.edu)  
(616) 846-8250

**Northeast:** Walt Hoagman  
email: [hoagman@msue.msu.edu](mailto:hoagman@msue.msu.edu)  
(989) 984-1056

Michigan State University  
334 Natural Resources Bldg.  
East Lansing, MI 48824-1222  
(517) 353-9568

University of Michigan  
401 E. Liberty, Suite 330  
Ann Arbor, MI 48104-2298  
(734) 763-1437





Michigan Sea Grant's administrative and communications offices in Ann Arbor, Michigan have moved to a new location adjacent to the University of Michigan's Central Campus. The new address is:

401 E. Liberty, Suite 330  
Ann Arbor, MI 48104-2298

Phone: (734) 763-1437  
[www.miseagrant.umich.edu](http://www.miseagrant.umich.edu)



Michigan Sea Grant College Program  
401 E. Liberty, Suite 330  
Ann Arbor, MI 48104-2298

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