

GREAT LAKES NEWS FROM
MICHIGAN SEA GRANT COLLEGE PROGRAM

upwellings

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Michigan Sea Grant
College Program



upwellings

An upwelling occurs in a lake or ocean when strong, steady winds push warm in-shore surface water away from shore causing colder, nutrient-rich water to rise.

Upwellings is published quarterly by the Michigan Sea Grant College Program. Michigan Sea Grant, a cooperative program of the University of Michigan and Michigan State University, supports understanding and stewardship of the Great Lakes through research, outreach and education.

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MICHU-05-800

Front and back cover: University of Michigan students participate in field research. Photos by Dave Brenner.

Passion and Pride Serve Sea Grant Partners

In late October, I had the privilege and pleasure of chairing the quadrennial Performance Assessment of the Michigan Sea Grant Program.

Listening to more than 40 speakers who took part in the program review, one couldn't help but notice a striking commonality—passion. Whether presenters were academic researchers, outreach partners, educators or Sea Grant staff, all shared a positive outlook that was enthusiastic, if not inspiring. Each took great pride in detailing the importance and success of their programs and initiatives, and conveyed a firm belief that their work enhances the Great Lakes and quality of life for its citizens.

From Great Lakes education to commercial fishing initiatives to Detroit waterfront renewal, stakeholders praised Michigan Sea Grant's staff and programmatic efforts. In turn, the "service attitude" of the extension agents has clearly produced a responsive and relevant program. Many of the outreach programs are based upon sound research, and involve multiple and varied partners that include government agencies, industry and interest groups. The result is an effective education effort with documented impacts.

Throughout the four-day review period, I was also impressed with Sea Grant's research, both the written documentation and the many presentations from researchers from several universities.

Michigan Sea Grant consistently recruits and builds teams of the best talent available to address important Great Lakes and coastal issues.

I was especially pleased with Michigan Sea Grant's outstanding response to the 1999 program review, particularly with its expanded focus on partnerships and education, resulting in highly effective programs in metropolitan Detroit, especially urban areas, and other efforts around the state.

The cooperative spirit and effective management within this UM/MSU jointly managed program, along with significant leadership of senior University officials on the Policy Committee is impressive.

Overall, the assessment team gave very high marks to Michigan Sea Grant. The National Sea Grant office will take these results and those of other Sea Grant program reviews into consideration over the next few years. I hope that additional support will be forthcoming to enhance the many successful initiatives already underway in Michigan.



Dr. Elbert W. (Joe) Friday, Jr.
Sea Grant National Review Panel



Michigan Sea Grant is funded by the National Oceanic and Atmospheric Administration and the State of Michigan. Michigan State University and the University of Michigan are equal opportunity/affirmative action institutions.



Sleeping Bear Dunes National Lakeshore

High Marks for Michigan Sea Grant

Michigan Sea Grant's four-year Program Assessment Team (PAT) review took place October 24-28, 2004, with sessions held in Detroit, East Lansing and Ann Arbor.

Two observers and a six-member review team from National Sea Grant spent an intensive four days examining all aspects of the Michigan Sea Grant program. These reviews, while they put the program through its paces every four to five years, are valuable ways to highlight program initiatives and accomplishments as well as areas for improvement. In the end, the result is a program better prepared to serve Michigan and the Great Lakes.

The review team focused on how well Michigan Sea Grant met evaluation criteria and performance benchmarks in the following four areas:

- organizing and managing the program;
- connecting Sea Grant with users;
- effective and aggressive long-range planning; and
- producing significant results.

Each of these four main areas contain several sub-categories, totaling 14. Overall, Michigan Sea Grant received 10 ratings of Highest Performance and 4 ratings of Exceeds Benchmark.

"I am very pleased with the results of our review," said Michigan Sea Grant Director Don Scavia. "As the new Director, I was most pleased to see that my predecessors have built such a strong program focused on bringing the best science and technology to Michigan and the Great Lakes. I anticipate a bigger and even better program in the future."

Partner Participation

Michigan Sea Grant's program review was divided into five sessions covering research, outreach, and education initiatives impacting Michigan's coastal communities and economies, Great Lakes literacy, aquatic invasive species, coastal wetlands, and Great Lakes fisheries, which included a panel discussion involving industry representatives. Sessions featured a total of 37 presentations by partners, collaborators,

and researchers in addition to Sea Grant staff. *See page 14 for a list of speakers and topics.*

As part of its review, the assessment team highlighted several program initiatives as Best Management Practices that might be useful to other Sea Grant programs. These include the CoastWatch Web site, a collaborative effort with the Great Lakes Environmental Research Laboratory, the Purple Loosestrife Project, a collaboration with Michigan State University, and the Great Lakes Education Program.

Many program initiatives addressed during the review are covered on the following pages of Michigan Sea Grant's 2004 annual report. Highlights are presented in Great Lakes Education, Sustainable Coastal Communities, Great Lakes Fisheries, Aquatic Invasive Species, and Great Lakes Wetlands.

Contact: Don Scavia, scavia@umich.edu, (734) 615-4084.

See: www.miseagrant.umich.edu/PAT2004.html

GERRY WYKES



The century old Detroit River Light, located at the mouth of the river at Lake Erie, is the focus of the Flow of Ideas art cruise, one of three Summer Discovery Cruises to be offered this summer.

Summer Discovery Cruises

Many people who live near the Detroit River may not know that a roller coaster once graced the shores of Sugar Island... or that extensive beds of wild celery thrive in the river's murky bottom. And chances are, many people may never have seen the Detroit River Light up close.

But that's just a sample of what people learn and see after taking a Summer

Discovery Cruise, sponsored by Michigan Sea Grant and Lake Erie Metropark. The two-hour cruises take visitors on a unique tour of the Detroit River, highlighting its natural, cultural and aesthetic features.

"Growing up with the river doesn't mean you necessarily know as much about it as you'd like to," says Gerry Wykes of Lake Erie Metropark, who recalls those who

participated in 2004. "Some were boaters and wanted to get the story behind the sights. Many others were not. For both groups, it was a chance to get out on the river and let someone else do the driving."

Wykes and co-worker Paul Cypher led the 2004 cruises with educator Steve Stewart of Michigan Sea Grant. Three types of cruises focus on the river's natural history (Eagle's Eye), cultural history (River of Time), and aesthetic quality (Flow of Ideas). The latter is an art cruise that offers participants the opportunity to draw, paint and take photos.

Coordinators conducted 12 cruises in 2004, with 301 people participating. This year's expanded program will offer a greater number of cruises, which are tentatively scheduled for July and August.

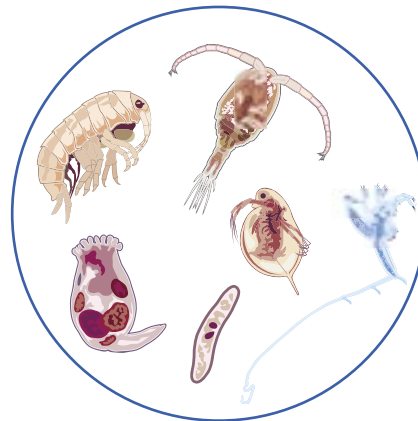
Contact: Steve Stewart, stew@msu.edu, (586) 469-7431.

Students and Science Go with the FLOW

When it comes to teaching science, most educators know that it takes more than textbooks and lectures to stimulate student minds. Active participation and interesting content are key elements.

Both concepts are part of a new online education project underway at Michigan Sea Grant. With support from the Great Lakes Fishery Trust, the project will feature 15 online lessons based upon the peer-reviewed Great Lakes Education Program curriculum.

"These lessons fill a gap in online education about the Great Lakes," says Michigan Sea Grant education program co-leader Elizabeth LaPorte. "Each lesson includes field-tested, hands-on activities for kids, and the online



component is visually appealing and accessible for teachers. "

Project FLOW—Fisheries Learning on the Web—features three educational modules, geared toward upper elementary and middle school students. Combined with research-based background information for educators, the lessons will cover

the Great Lakes food web and aquatic invasive species, building toward fisheries sustainability and stewardship concepts.

One important objective of Project FLOW is to ensure that the lessons meet state and national educational standards and benchmarks. University of Michigan environmental education specialist Anna Switzer has identified 10-15 social, scientific and process-oriented standards and benchmarks for each series of lessons.

Project FLOW is scheduled for completion in October 2005.

Contact: Elizabeth LaPorte, elzblap@umich.edu, (734) 647-0767.

Great Lakes Education Program

A Teacher's Perspective

Like any teacher, Kathy Bouren not only cares what her students think but also what their parents think. Both viewpoints help her to plan upcoming field trips, which often require special fundraising.

This year, Bouren already knows that she and her fourth-graders—and many of their parents—will participate in the Great Lakes Education Program, sponsored by Michigan Sea Grant. Known as GLEP, the program introduces students to freshwater concepts in the classroom and provides hands-on learning via educational “schoolship” cruises on the Clinton River, Lake St. Clair, and the Detroit River.

“The kids love being on the boat,” says Bouren, who teaches at Ritter Elementary in Rockford, “and the reaction from parents is that it’s one of the best—an outstanding field trip.”

Preparations for the educational boat cruise actually begin well in advance, says Bouren, who uses the GLEP curriculum to teach a number of Great Lakes concepts in the classroom. Educational cruises then take place, in spring or fall, followed by post-cruise activities.

Michigan Sea Grant’s Steve Stewart coordinates the Great Lakes Education Program each year, with the help of many



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Aboard ship, students test water clarity, collect plankton samples, practice marine knot tying, and determine their location on a navigation chart, among other hands-on activities.

volunteers. In 2004, 84 fourth-grade classes participated in the program on Lake St. Clair, involving 2,843 students, teachers and chaperones. Another 84 classes participated in the lower Detroit River GLEP, representing 2,940 students, teachers and adult chaperones.

For her part, Bouren encourages parents to attend, “because it’s such a memorable event” not only in terms of what the

students learn—but also in time spent together with parents and as a class.

More than 42,000 fourth-grade students from Macomb, Wayne and adjacent counties have participated in the program since 1991.

Contact: Steve Stewart, stew@msu.edu, (586) 469-7431.

See: www.miseagrant.umich.edu/glep



LAPORTE

ShoreLines

More than 250 educators received the first issue of *ShoreLines* in 2004, an email-based newsletter developed by Michigan Sea Grant. The periodic newsletter is designed for people interested in using Great Lakes and marine resource topics in their educational efforts. Recent issues have highlighted National Estuaries Day and EstuaryLive, an interactive, web-based field trip to estuaries around the country. If you’re interested in receiving *Shorelines*, email Steve Stewart at stew@msu.edu

Detroit River Renewal Continues

Michigan Sea Grant continues to play an active role in the Greater Detroit American Heritage River Initiative with partners including the Metropolitan Affairs Coalition, U.S. Fish and Wildlife Service and Bristol Technical Consulting. Sea Grant extension educator Barry Murray represents Sea Grant in this important ongoing initiative. The initiative provides an essential role in setting priorities, partnering, facilitating and securing funding for various environmental, community development, greenways and educational programs related to the Detroit River community.

Contact: Barry Murray, murrayba@msu.edu, (313) 961-2270.

Black Lagoon

Following decades of debate, a process facilitated by the Greater Detroit American Heritage River Initiative and Michigan Sea Grant has resulted in a new partnership of federal, state and local agencies, and private property owners to clean up the Black Lagoon, one of the most contaminated sites on the Detroit River.

The Black Lagoon site, located in the downriver community of Trenton, received the first grant from the federal Great Lakes Legacy Act through the U.S. Environmental Protection Agency, in tandem with funds from the Clean Michigan Initiative supplied by the Michigan Department of Environmental Quality. The clean-up process began in fall of 2004 and will be complete in early 2005. More than \$6.5 million will aid in removing in excess of 100,000 cubic yards of contaminated sediment from the Detroit River.

Contact: Barry Murray, murrayba@msu.edu, (313) 961-2270.



COURTESY OF JJR LLC, AND THE CITY OF TRENTON

Clean-up of the Detroit River's Black Lagoon will allow an overall brownfield redevelopment strategy for the former McLouth Steel Mill and adjacent sites to proceed. The redevelopment vision for Trenton riverfront (above) will productively transform nearly 400 acres of land into modern mixed use development.

Detroit River Sturgeon Habitat

When lake sturgeon look for the best place to spawn this spring, more than a few scientists will be keeping a close eye on the Detroit River.

Preparations have been in place since June 2004 with the construction of three spawning reefs in the waters off Belle Isle. Made of broken limestone, fieldstone and coal cinders respectively, the spawning reefs are part of an effort to rehabilitate lake sturgeon, a state-threatened fish species.

According to biologist Bruce Manny of the USGS Great Lakes Science Center in Ann Arbor, mats to collect sturgeon eggs will be anchored on the reefs in 24 feet of water in March 2005.

"We're going to be out there literally right after ice-out to examine the egg mats," says Manny, which he and others will retrieve from the water's surface.

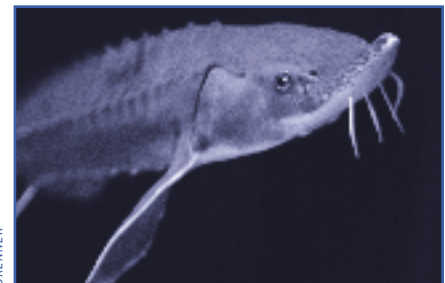
While scientists hope to find sturgeon eggs, evidence of other fish is also likely. According to Manny, egg mats at the same location last year provided the first

documented evidence of walleye spawning in the Detroit River. In the first six weeks after the reefs were in place, smallmouth bass also appeared. The reefs are already providing additional habitat for these two important sport fish. "Even if sturgeon don't use the reefs right away," says Manny, "other sport fish probably will."

The reefs are one component of a sturgeon habitat, monitoring and education project, managed by Michigan Sea Grant, and funded by grants from NOAA's Great Lakes Coastal Restoration Program, through the Michigan Coastal Zone Management Program, and the Great Lakes Fishery Trust with additional support from multiple partners.

Contact: Jennifer Read, jenread@umich.edu, (734) 936-3622.

See: www.miseagrant.umich.edu/sturgeon



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Lake Sturgeon

International Wildlife Refuge

The Detroit River International Wildlife Refuge, the only international refuge in the nation, continues to build on the successes of designation and land acquisition over the past several years. During 2004, John Hartig, former Detroit Heritage River Navigator, joined the U.S. Fish and Wildlife Service (USFWS) and became the Refuge Manager. Michigan Sea Grant continues to work closely with USFWS, Wayne County and many local partners and stakeholders in the development and programming of the Refuge Center and related environmental and shoreline habitat. As the Refuge matures, Sea Grant will have an ongoing outreach, education and programming role, showcasing the unique and spectacular features of the Detroit River ecosystem.

Contact: Barry Murray, murrayba@msu.edu, (313) 961-2270.

Coastal Land Use in Michigan's 'Thumb'

With Sea Grant assistance, officials in Huron County's Lake Township are pursuing sustainable solutions for coastal community growth and development. Located at the tip of Michigan's thumb, Lake Township is one of many Michigan communities balancing the sustainability of tourism and agriculture in a lakeside setting.

As larger vacation and year-round homes replace small lakefront cottages, new and longtime residents are grappling with land use, zoning, impaired vistas and lakefront access issues. Simultaneously, agricultural operations provide competing uses that must be addressed at the local, county and state levels.

Sea Grant specialist Mike Klepinger and extension educator Barry Murray are working with township officials to address

these types of coastal land use issues. The township has begun to develop a process and ideas for providing regulatory and design guidelines to encourage sustainable solutions.

Contact: Mike Klepinger, klep@msu.edu, (517) 353-5508 or Barry Murray, murrayba@msu.edu, (313) 961-2270.

Rip Currents

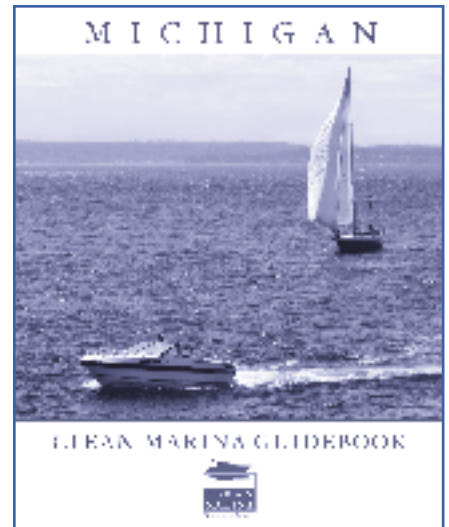
Michigan Sea Grant extension educators and communicators joined forces with state, regional and national organizations in 2004 to raise awareness of rip currents in the oceans and Great Lakes. Michigan Sea Grant designed rip current brochures and beach signs, which are now in use by the program and its partners in coastal areas throughout the nation. More than 35 signs have been posted along Great Lakes beaches in Michigan, Wisconsin and Minnesota, warning swimmers of the dangers of rip currents and how to escape them. More than 110,000 copies of the brochure have been printed and distributed.

This partnership with the NOAA-National Weather Service, NOAA-National Sea Grant, and the U.S. Life Saving Association has had a positive impact on the development of consistent beach safety messages—a critical aspect of public outreach.

Michigan Sea Grant sponsored a conference on rip currents in April 2004 in St. Ignace, attended by more than 70 people from around the region. Michigan Sea Grant staff members continue to participate in the Mackinac County Water Safety Review Team and the Great Lakes Beach and Pier Safety Task Force.

This year, a conference on Great Lakes rip currents is scheduled for Thursday, June 2, 2005 at Ludington State Park.

Contact: Mark Breederland, breederl@msu.edu, (231) 922-4628.



Michigan Clean Marina Program

Thirty-nine Michigan marinas participated in Clean Marina workshops held in 2004. The workshops focused on best management practices for controlling pollutants associated with recreational boating operation, maintenance and storage. The forum also provided an overview of relevant environmental laws and regulations. Several marina operators are now preparing for the site inspection process, a requirement of program certification.

The Michigan Clean Marina Program is sponsored by Michigan Sea Grant, Michigan Boating Industries Association (MBIA) and the Michigan Department of Environmental Quality (MDEQ).

Contact: Chuck Pistis, pistis@msu.edu, (616) 846-8250.

See: www.miseagrant.umich.edu/cmp

Michigan Sea Grant's Chuck Pistis, Jeff Spencer of the MDEQ and Steve Remias of the MBIA Board, were among those honored in December 2004 with the Michigan Boating Industries "Lighthouse Award" for contributions to the development of the Michigan Clean Marina Program.



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New marketing strategies promote consumer awareness of the quality and freshness of Michigan's Great Lakes whitefish.

Seafood HACCP

The U.S. Food and Drug Administration's Hazard Analysis and Critical Control Point (HACCP) standards provide a way to monitor critical points in a process in order to minimize potential hazards associated with a given industrial process.

From 1997 to 2004, Sea Grant and other partners conducted 13 Seafood HACCP workshops, 10 of them on tribal reservations, and trained 288 commercial fisheries, processors, and aquaculturists. Participants came from Great lakes states and from as far away as Florida, Maryland, Nebraska and California. Michigan Sea Grant's certified HACCP trainer Ron Kinnunen works with industry representatives in the Great Lakes region to develop and assess individual HACCP plans.

Contact: Ron Kinnunen, kinnune1@msu.edu, (906) 226-3687.

A HACCP training course is planned for March 29-31, 2005 at Bay Mills Community College in Bay Mills, Michigan.

Select Michigan Whitefish

Michigan's agriculture industry has long known that promoting Michigan-grown fruits and vegetables is a successful marketing strategy. Now, Michigan's commercial fishing industry is following suit.

Seventeen industry representatives from state- and tribe-licensed operations met in St. Ignace in October 2004 to develop a multi-faceted action plan that will create marketing opportunities for Michigan Great Lakes whitefish. Michigan Sea Grant Extension educators Ron Kinnunen and Chuck Pistis facilitated the industry steering committee meeting.

In a five-year project, Michigan Sea Grant is working with industry stakeholders to assess the Michigan whitefish market, identify and cultivate new markets, enhance consumer awareness and create a brand identity for whitefish products. The efforts are in response to multiple factors that threaten the viability of Michigan's commercial fishing industry including loss of traditional markets, foreign competition, new regulatory requirements, and ecological change.

Some of the efforts underway include identifying producers and processors to participate in the Select Michigan Whitefish campaign, a promotional partnership with the Michigan Department of Agriculture. The campaign promotes the purchase of

Michigan-grown products by Michigan consumers. The whitefish portion of the program would emphasize selection of Michigan whitefish to ensure food safety, quality, taste and freshness, and to support the local economy, strengthen Michigan's commercial fishery and preserve the state's rich fishery heritage.

The food and travel show *A Fork in the Road* featured the attributes of Michigan whitefish and its connection to Michigan's cultural heritage in segments that aired on 12 PBS stations in January 2005, reaching over 3.7 million households.

Contact: Ron Kinnunen, kinnune1@msu.edu, (906) 226-3687 or Chuck Pistis, pistis@msu.edu, (616) 846-8250.

Fisheries Publications Available Online

Trout Aquaculture

Michigan Sea Grant's Ron Kinnunen, Jeff Hinshaw of North Carolina State University, and Gary Fornshell of the University of Idaho, recently completed the following report, *A Profile of the Aquaculture of Trout in the United States*, available online.

See: www.agecon.msstate.edu/Aquaculture/pubs/Trout_Profile.pdf

Fish Waste Composting

The following report, authored by Ron Kinnunen, M. Charles Gould of MSU Extension, and Peter Cambier of Northern Initiatives, is also available online: *Composting Commercial Fish Processing Waste from Fish Caught in the Michigan Waters of the Great Lakes*.

See: <http://web2.msue.msu.edu/compost/17.pdf>



Camp counselor Chris Rees and campers examine a steelhead and Chinook salmon, caught on a charter fishing trip. Sea lampreys were attached to both fish.

Great Lakes Camp

Great Lakes fisheries education is an important part of the annual Great Lakes and Natural Resources Camp for high school students, co-sponsored by Sea Grant, 4-H and Michigan State University Extension. Fifty-nine teens, ages 13-15, from 25 Michigan counties participated in the camp in August 2004. The week long camp is held in northern Michigan and provides an opportunity to learn about Great Lakes fisheries, coastal processes, wetlands and many other topics. To date, more than 900 students have participated in the camp. More than one-third of the participants rated the camp experience as very helpful in developing career goals and personal interest in natural resources ecology and management.

Students interested in applying for this year's camp should contact their local MSU county extension office.

Contact: Brandon Schroeder,
schroe45@msu.edu, (989) 984-1056.

See: www.miseagrant.umich.edu/greatlakescamp



Sea lamprey barriers, like this one on Michigan's Little Carp River, prevent lamprey from reaching spawning grounds to reproduce.

Fisheries Management

Researchers led by Michael Jones of Michigan State University employed decision analysis techniques to refine fisheries management for several Great Lakes fisheries through better consideration of the effects of uncertainty. Researchers developed and presented decision analysis models for case studies addressing salmonine stocking in Lake Michigan and sea lamprey control in the St. Marys River.

For the sea lamprey case study, researchers developed models of sea lamprey population dynamics and the effects of different control actions to explore the probabilities of outcomes of different control scenarios. These results were combined with estimates of the costs of these different management options and the range of possible effects on lake trout populations and their restoration in Lake Huron.

Based on the results, the Great Lakes Fishery Commission will pursue a strategy that integrates lampricides with non-chemical alternative methods, including trapping and sterile-male release programs.

The combination offers the most cost-effective solution and a high probability of healthy lake trout and other fish populations in Lake Huron, according to the Fishery Commission.

Success with these case studies has led to additional applications of the research involving whitefish, yellow perch, and walleye. Recently, project researchers have used decision analysis to assist the Lake Erie Committee in developing a harvest management policy for Lake Erie walleye, one of the most important commercial and recreational fisheries in the Great Lakes.

Contact: Michael Jones, jonesm30@msu.edu, (517) 432-0465.



JERRY BIELICKI

Vessels from foreign ports are a major vector of AIS introduction into the Great Lakes.

Exotic Species Teacher Day Camp

Twenty-four Michigan educators participated in Sea Grant's Exotic Species Teacher Day Camp in August 2004, conducted in cooperation with the Detroit Zoological Foundation.

Held at the Detroit Belle Isle Aquarium and Zoo, this one-day professional development opportunity is designed for teachers interested in adding exotic species information to their classrooms, particularly from Sea Grant's ESCAPE compendium. Michigan Sea Grant extension educator Steve Stewart introduced participants to Sea Grant's aquatic invasive species educational materials, and educators have the opportunity to contribute activities to other Sea Grant curriculum materials.

Evaluation results from last year's camp yielded an overall rating by teachers of 3.48 on a 4-point scale. "It was great, very hands-on..." noted one participant. "I wish more workshops were like this."

To apply for this year's camp, contact Steve Stewart, stew@msu.edu, (586) 469-7431.

MSU Great Lakes Conference 2005

Aquatic invasive species have troubled the Great Lakes ecosystem for decades. Developing options for preventing and managing them is the theme of the 2005 Great Lakes Conference, Tuesday, March 8, during Michigan State University's Agriculture and Natural Resources Week. The one-day event is scheduled to begin at 9 am at the Kellogg Center on the MSU campus in East Lansing and is co-sponsored by Michigan Sea Grant.

Contact: Carol Swinehart, cys@msu.edu, (517) 353-9723.

See: www.iwr.msu.edu/events/ANRWeek

Zebra Mussels Found in 12 Additional Lakes

The count of Michigan's inland lakes infested with zebra mussels grew to more than 200 last year, according to reports compiled by Michigan Sea Grant. In 2004, infestations were confirmed in 12 more lakes, bringing the total to 204.

The invasive mollusks were found for the first time last year in the following lakes: Marion (Charlevoix County), Spider (Grand Traverse County), Long (Hillsdale County), Indian (Kalamazoo County), Runyan (Livingston County), Gunn (Mason County), Corey, Fisher, Palmer, Sturgeon and Wahbememe (St. Joseph County), and Tamarack (Washtenaw County).

Zebra mussels have now been found in 47 of Michigan's 83 counties.

All of the 2004 reports came from lakefront property owners and resource managers who found adult colonies of the mussels clinging to surfaces such as boats, docks, rocks, dams and water pumps. Reports from citizens become part of the Zebra Mussel Infestation Monitoring Program maintained by Michigan Sea Grant.

Contact: Mike Klepinger, klep@msu.edu, (517) 353-5508.

See: www.miseagrant.umich.edu/ais/lakes.html

Zebra Mussels and Blue-Green Algae

Zebra mussels have been associated with a wide range of changes to inland lake ecosystems. Sea Grant research led by Orlando Sarnelle of Michigan State University has shown that lakes colonized by zebra mussels have, on average, three times higher levels of a species of blue-green algae known as *Microcystis*. Those same lakes also have about three times greater levels of microcystins, a toxin produced by the algae that has been associated with animal deaths and is believed to cause liver damage in humans.

Contact: Orlando Sarnelle, sarnelle@msu.edu, (517) 353-4819.

Controlling AIS from a Policy Perspective

Most aquatic invasive species arrive from foreign ports, harbored in the ballast tanks of ocean-going vessels. While scientists explore shipboard mechanisms to limit these introductions, two researchers at Michigan State University are investigating policies to promote their use.

With Michigan Sea Grant funding, MSU researchers led by natural resource economists Richard Horan and Frank Lupi investigated and assessed several economic methods, or policy options, that may be used to prevent and control the introduction of aquatic invasive species. Examples of policy options include economic incentives, technology regulations, and market-based systems.

Results of a quantitative model incorporating these alternative ballast water management options demonstrate how flexible, market-based policies can significantly reduce industry-wide ballast management costs, which differ substantially across vessels. The research recommends cost-effective ways that policy makers can use economic incentives to achieve greater environmental risk reductions.

Technical Publications

Horan, R.D. and F. Lupi. "Economic incentives for controlling trade-related biological invasions in the Great Lakes." *Agricultural and Resource Economics Review* (forthcoming May 2005).

Horan, R.D., and F. Lupi. "Tradeable risk permits to prevent future introductions of invasive alien species in the Great Lakes." *Ecological Economics* (forthcoming 2005).

Contact: Richard Horan, horan@msu.edu, (517) 355-1301.



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Getting the Word Out

Michigan Sea Grant works with partners to develop and promote educational materials to help a variety of audiences understand the problem of aquatic invasive species (AIS). In 2004, Michigan Sea Grant communicators collaborated with the Michigan Office of the Great Lakes to plan and promote the state's officially designated AIS Awareness Week.

As part of its statewide AIS outreach effort, Michigan Sea Grant distributed more than 35,000 AIS publications, fact sheets, brochures and identification cards from 1999-2004.

Materials currently in development include a Great Lakes AIS poster series specially designed for young audiences. Each poster will feature an invasive or potentially invasive plant or animal depicted by colorful illustrations created by Michigan Sea Grant. Poster text will highlight main characteristics of each species and explain why each is—or could become—a problem in the Great Lakes.

Contact: Elizabeth LaPorte, elzblap@umich.edu, (734) 647-0767.

See: www.miseagrant.umich.edu/ais

Rapid Response Plan for Hydrilla

The saying "no news is good news" is especially appropriate for members of Michigan's Hydrilla Task Force.

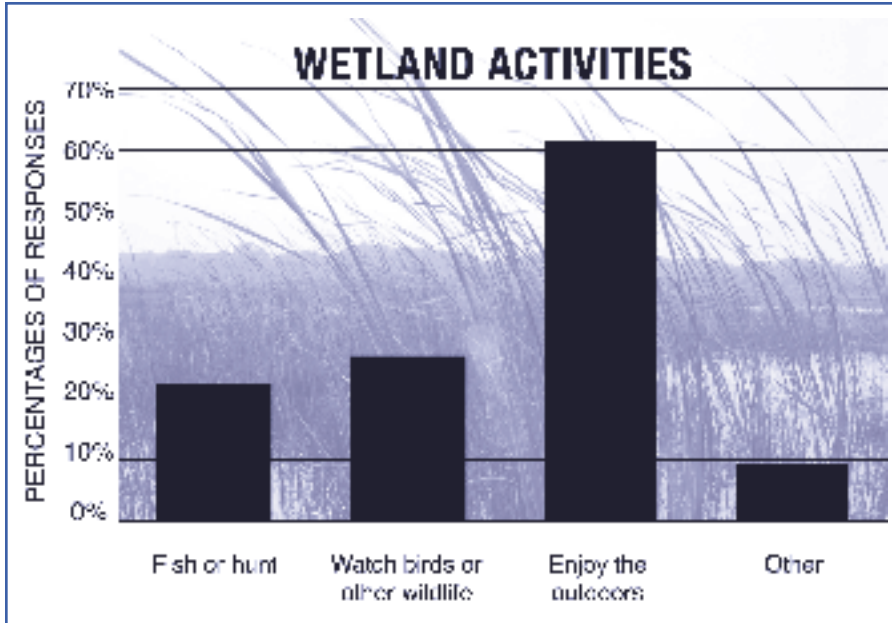
The group developed the state's first aquatic invasive species rapid response plan in 2004, to raise awareness of the potential for spread of invasive Hydrilla (*Hydrilla verticillata*) to Michigan waterways and to develop strategies to deal with it quickly if it is found here. The plant has clogged waterways in many southern states and has been identified as far north as Pennsylvania, Massachusetts and Maine.

Michigan Sea Grant representatives on the Hydrilla Task Force developed a volunteer Hydrilla Hunt program in 2004 to enlist citizen participation in detecting the invasive plant before it gains a foothold in Michigan. According to Sea Grant's

Carol Swinehart, none of the plant specimens submitted to Michigan Sea Grant Extension for identification in 2004 were hydrilla.

The campaign was conducted in collaboration with Michigan's Office of the Great Lakes and Michigan Lake and Stream Associations, with support from MSU Extension's Water Quality Area of Expertise. Partners developed and distributed several thousand Hydrilla Hunt identification cards, and an informational fact sheet, *Heading Off Hydrilla*, available online. The campaign was featured on the MSU Web site and on Michigan Radio. This year, Hydrilla information will be distributed to Michigan boaters through boat shows and other boating communication channels.

Contact: Carol Swinehart, cys@msu.edu, (517) 353-9723.



One objective of the MSU project is to find out how people use Great Lakes coastal wetlands. Approximately 60 percent of the 1,650 Michigan residents surveyed in 2004 said they valued coastal wetlands as a place to enjoy the outdoors. Another 25 percent valued wetlands as places for bird watching and observing other wildlife. The top two threats to Great Lakes wetlands, as identified by survey respondents, were shoreline development and urban expansion, both rated as extremely serious. The survey response rate was 44 percent.

Economic analyses will allow the researchers to identify the wetland characteristics viewed as top priorities, estimate “willingness to pay” and provide a sense of preferred protection program characteristics.

Understanding public support for various wetlands projects is critical information, particularly in the hands of policy-makers. Suppose, says Lupi, that you want to know which wetland preservation program most people would support: “You could use this information to help design that program.”

Researchers plan to implement phase three of the project in 2005, when an additional 645 people will be surveyed to determine estimates of willingness to pay.

Contact: Michael Kaplowitz, kaplowit@msu.edu, (517) 355-0101.



As natural resource economists, Michael Kaplowitz and Frank Lupi of Michigan State University study the choices people make—particularly the environmental trade-offs they’re willing to accept.

How Much is a Wetland Worth?

In order to protect wetlands, it helps to know what people are thinking. For instance: What do people generally know about wetlands and what features do they value?

Often, says researcher Michael Kaplowitz of Michigan State University, wetland assessment decisions are based on easily measured features such as acreage and water flows. Yet other traits, sometimes called ecological services, are typically more important to the average person.

“Wildlife habitat and biodiversity are examples of characteristics that are recognized as being highly valuable,” says Kaplowitz. “But they’re hard to put into a simple formula that allows decision makers to analyze a wetland project and say thumbs up or thumbs down.”

That could change in the coming year. Kaplowitz, and researchers Frank Lupi and John Hoehn, also of MSU, are conducting a specially designed survey on Great Lakes coastal wetlands. Funded by Michigan Sea Grant and other partners, the survey draws upon several years of research and numerous focus groups and will be mailed to more than 3,800 Michigan residents in

three phases. Ultimately, the researchers hope to identify how people value Michigan’s coastal wetlands and the protection programs they’re willing to support.

“Here, the context is on programs to preserve and restore wetlands as opposed to wetland mitigation [or replacement] projects,” says Lupi, who explains that this is partly due to the ecological complexity of coastal wetlands.

Mirroring this complexity, the survey requires participants to make tough choices. Respondents surveyed in 2004 weighed issues such as biodiversity, open space, improved water quality, fish habitat, waterfowl habitat and non-game species habitat. They were also asked to accept or reject a proposed coastal wetland protection program.

“We’re not just asking people what they like about wetlands,” says Kaplowitz. “We’re giving them a very structured program and varying the elements to allow us to better understand people’s preferences. We will be able to measure the trade-offs embedded in their choices.”



BRENNER

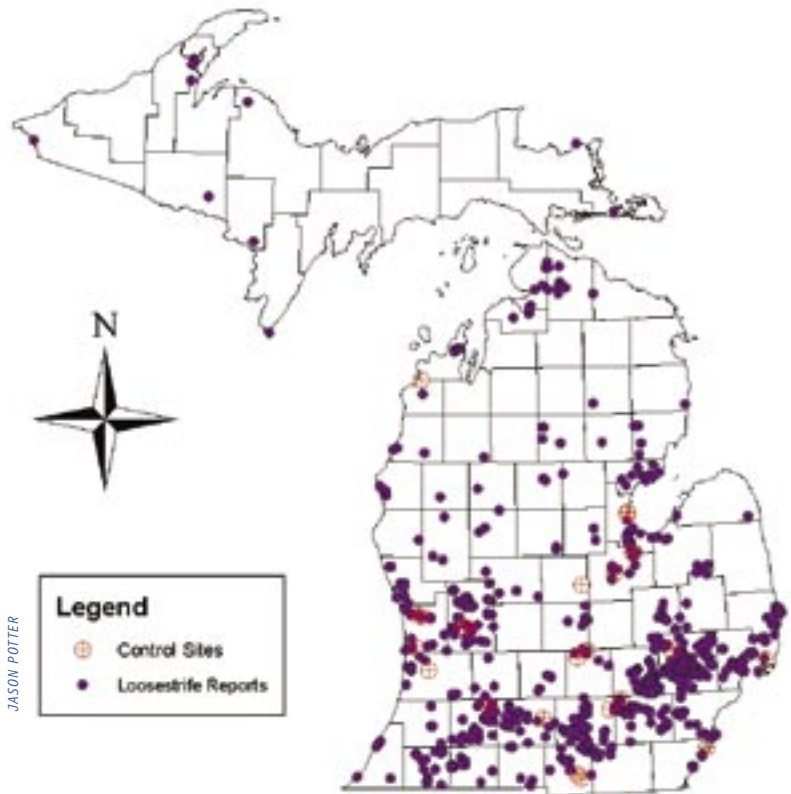
The Wood Lily (Lilium philadelphicum) is one of many color photos to be featured in a new coastal plants identification guide.

Coastal Plants Identification Guide

The Coastal Plants ID book is first in a Great Lakes guide series to be produced as a cooperative project between Michigan Sea Grant and University of Michigan Press. Michigan Sea Grant is working with the UM Press to produce publications for a variety of readers in the Great Lakes region and beyond.

Ellen Elliott Weatherbee, author of the Coastal Plants ID book, is an active botanist and teaches for the University of Michigan at Matthaei Botanical Gardens/ Nichols Arboretum. She is the former head of the Adult Education department. Now a private consultant, Ellen specializes in wetland delineations, threatened and endangered species surveys, natural features inventories, and court cases that involve plants and mushrooms. She also leads botanical trips that concentrate on areas of special botanical interest and has taught state wetland regulators at yearly training sessions since 1997.

Contact: Elizabeth LaPorte, elzblap@umich.edu, (734) 647-0767.



JASON POTTER

Each purple dot represents one square mile in which purple loosestrife has been reported.

Purple Loosestrife Project

As part of the Purple Loosestrife Project, volunteers help identify and control significant stands of purple loosestrife around the state. The invasive plant threatens the biodiversity and function of Michigan wetlands. Sponsored by Michigan Sea Grant and Michigan State University, the Purple Loosestrife Project began in 1997 and helped establish a network of volunteers to raise and release *Galerucella* beetles, which feed exclusively on purple loosestrife.

Since 1997, more than 250 people, including classroom teachers, naturalists, and volunteer leaders, have been trained in biological control techniques. An estimated 4,000 students have participated in the project by raising and releasing the beetles, and conducting site monitoring. Follow-up research confirms that *Galerucella* beetles have effectively controlled loosestrife within several miles of early release sites, allowing native vegetation to reemerge.

Contact: Mike Klepinger, klep@msu.edu, (517) 353-5508.

See: www.miseagrant.umich.edu/pp

IAGLR 2005 Great Lakes Ecosystem Forecasting: Improving Understanding and Prediction

More than 600 scientists will converge in Ann Arbor in May for the 48th Annual Conference on Great Lakes Research. Sponsored by the International Association for Great Lakes Research (IAGLR), the conference will be held at the University of Michigan, May 23-27, 2005.

This year's conference will recognize the increasingly important need for ecosystem-based research to address ever more complex resource protection and management issues. Organizers anticipate more than 500 talks and posters, distributed between 40 half-day sessions, and a featured plenary presentation to be given by Steve Chapra.

Hosts for the event include the Cooperative Institute for Limnology and Ecosystems Research, the University of Michigan, and NOAA Great Lakes Environmental Research Laboratory.

The International Association for Great Lakes Research is a scientific organization made up of researchers studying the Laurentian Great Lakes and other large lakes of the world as well as those with an interest in limnology and oceanography.

Contact: Tom Johengen,
johengen@umich.edu

See: www.iaglr.org

Names and Faces

Individuals from around the State participated in Michigan Sea Grant's program assessment review.

Coastal Communities and Economies

David Sanders

Metropolitan Affairs Coalition
Program Manager, Greater Detroit
AHR Initiative

John Kerr

Detroit/Wayne County Port Authority

Bruce Manny

USGS Great Lakes Science Center

Roberta Urbani

DTE Energy

Henry O. Allen

MSU Extension Southeast Regional Director

Dave Guenther

NOAA National Weather Service, Marquette

Van Snider, Jr.

Michigan Boating Industries Association

Great Lakes Education

Mike Reed

Detroit Zoological Institute

Shari Dann

MSU Dept. of Fisheries & Wildlife

Kathy Bouren

Ritter Elementary

Malin Wagner

Downriver Career Technical Consortium

Gerald Wykes

Huron Clinton Metropolitan Authority

Gary Williams

Extension 4H Natural Resources Educator,
Southeast Region

Aquatic Invasive Species

Doug Landis

MSU Dept. of Entomology

Gary Larsen

St. Johns High School

Orlando Sarnelle

MSU Dept. of Fisheries & Wildlife

Mohammed Faisal

MSU Dept. of Fisheries & Wildlife

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Great Lakes Coastal Wetlands

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Walter Gauthier

U.S. Army Corps of Engineers—
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Cathie Ballard

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MSU Dept. of Resource Development

Melissa Savard

MSU Dept. of Agricultural Economics

Fisheries and Trophic Change

Nathaniel Ostrom

MSU Dept. of Geological Science

James Bence

MSU Dept. of Fisheries & Wildlife

Mike Jones

MSU Dept. of Fisheries & Wildlife

Jim Thannum

Great Lakes Indian Fish & Wildlife
Commission

Denny Grinold

Michigan Charter Boat Association

Ken Merckel

Michigan Steelhead & Salmon
Fishermen's Association

Paul Jensen

Michigan Fish Producers Association

Ted Batterson

North Central Regional Aquaculture Center

Paul Seelbach

Fisheries Division
Michigan Dept. of Natural Resources

Jill Bentgen

Mackinac Fish Company

Jim Fenner

CoastWatch Steering Committee
Ludington Area Charter Boat Association

By the Numbers

Following is a list of significant statistics compiled as part of Michigan Sea Grant's program assessment review, covering the period from 1999-2003.

Research

- MSG funded 43 research projects that resulted in 104 peer-reviewed publications.
- 175 graduate and undergraduate students participated in Michigan Sea Grant research projects.

Education

- More than 42,000 students and adults in Southeast Michigan participated in the Great Lakes Education Program.
- More than 900 Michigan teenagers attended the annual 4-H Great Lakes and Natural Resources Camp.
- More than 200 teachers and 24 volunteer leaders are now trained in biological control techniques through the Purple Loosestrife Project.

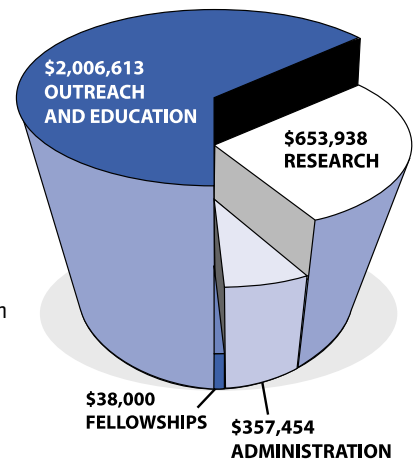
Outreach

- Sea Grant staff collaborated with more than 200 partner organizations, agencies, communities, school districts, and others.
- Sea Grant staff produced 118 publications and products related to the Great Lakes and contributed to an additional 50 produced by partners.
- Sea Grant staff distributed 105,000 publications and products.
- More than 3,000 people receive Michigan Sea Grant's quarterly newsletter.
- Michigan Sea Grant staff members received 37 awards for programs and products.

Michigan Sea Grant Annual Program Funding March 2004 - February 2005

Total Program Funding: \$3,056,005

Totals for research, outreach and administration include matching funds from non-federal sources. Fellowship funds supported a Michigan student selected for the Great Lakes Commission/Sea Grant Fellowship.



Unique visitors to www.miseagrant.umich.edu: 299,374
Publications distribution: 112,526 (30% increase from FY 03)

Most Popular Products, 2004

To order, visit: www.miseagrant.umich.edu



Life of the Lakes, Great Lakes Ecosystem

This poster features beautiful color illustrations, diagrams and photographs. Complements *Life of the Lakes: A Guide to the Great Lakes Fishery*.



Rip Currents: Break the Grip of the Rip

Brochure details the dangers of rip currents, how they occur and what to do if someone is caught in one.

Protect Our Waters

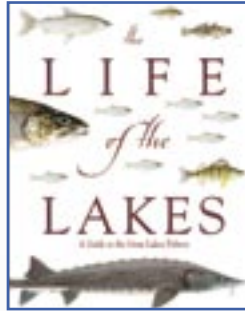
This full color brochure explains why aquatic hitchhikers cause problems in the Great Lakes and provides tips on how boaters and anglers can prevent their transport.



Where Land Meets Water

This informative poster addresses the various types of erosion and sedimentation that occur in the Great Lakes Basin.

MICHIGAN SEA GRANT ONLINE BOOKSTORE



Life of the Lakes, A Guide to the Great Lakes Fishery

Content focuses on economic, environmental and historical issues related to Great Lakes fisheries. Great for anglers, K-12 educators, natural resource managers, and anyone interested in Great Lakes issues.

Take Our Online Bookstore Survey

In an effort to serve you better, Michigan Sea Grant is conducting a survey of its products and services. The information you provide will be valuable in enhancing the bookstore and creating future publications.

Please visit: www.miseagrant.umich.edu



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