Questions
Sea Grant Testimony Informs Beach Grooming Debate

An important part of Sea Grant’s mission is to provide science-based information to decision makers at all levels of government. Most recently, we had the opportunity to inform upcoming legislative action governing beach grooming activities carried out on Great Lakes bottomlands.

In 2003, the Michigan legislature temporarily approved two amendments to the Natural Resources and Environmental Protection Act. Provisions contained in the two amendments exempted mowing and other beach maintenance activities from wetland protection requirements. The provisions also established two pilot areas, Grand Traverse Bay and Saginaw Bay, where removal of vegetation in Great Lakes coastal wetlands would be given expedited approval.

Those provisions are scheduled to sunset in November 2007 and June 2006, respectively, which provided a window of opportunity to evaluate their impacts. As part of the evaluation process, I provided testimony in May 2006 to the state Senate and House Committees with authority over this legislation. The testimony focused on an independent peer-review Sea Grant coordinated of two studies that the Department of Environmental Quality (DEQ) commissioned to assess the impact of grooming activities on the ecosystem.

We were pleased to share the results of the peer review: independent reviewers validated the conclusions of the studies and confirmed that they form a solid basis for assessing the environmental impacts of beach grooming.

Michigan Sea Grant’s independent review of the methods, results, and interpretation of the environmental studies justifies the legislators using them as a solid basis for understanding the environmental impacts of beach grooming. However, scientific information is not the sole basis for making policy. Social, economic, and equity issues are also very important – and policy makers need to juggle all of those issues, along with the scientific information in order to arrive at sound, socially acceptable decisions.

Donald Scavia
Michigan Sea Grant Director
New beach signs in English and Spanish warn swimmers to be aware of dangerous rip currents

Visitors to lakes Michigan and Superior this summer will notice new beach signs publicizing the dangers of rip currents—powerful currents that can develop in the Great Lakes and oceans.

Michigan Sea Grant purchased and is coordinating placement of the signs, produced in English and Spanish, in west Michigan and the Upper Peninsula. The new signs are designed to increase awareness of the dangers of rip currents by describing how to recognize them and how to escape if caught in a rip current.

“We want people to have a good time but be informed about the danger of rip currents,” says Chuck Pistis, one of three Michigan Sea Grant educators facilitating the distribution of the new signs before this coming swimming season.

Rip currents are narrow, fast-moving channels of water that move away from shore and are rarely more than 30 feet wide. They are powerful enough to sweep away even the strongest swimmers. Nationally, more than 100 people drown annually when caught in rip currents.

In addition to providing beach signs, Michigan Sea Grant distributes rip currents brochures and maintains a Web page with information about rip currents.

See: www.miseagrant.umich.edu/rip

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Experts believe a number of drownings in lakes Michigan and Superior probably happened because people panicked when a rip current pulled them from shore. Sea Grant, in cooperation with the NOAA National Weather Service, offers these tips to swimmers to break the grip of a rip current:

- Don’t fight the current
- Swim parallel to shore to get out of the current then head back to shore at an angle
- If you can’t escape, float calmly until the current slows after passing the sandbar
- Call or wave for assistance if you need help

A Great Lakes rip current conference is scheduled for June 6, 2006 in Manitowoc, Wisconsin. The conference will cover rip current science, case studies and prediction and highlight current education and outreach efforts.

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Rip currents typically form at breaks in sandbars and also near structures, such as piers, regardless of weather conditions. Warning signs of rip currents may include:

- A channel of churning choppy water
- A difference in water color
- A break in the incoming wave pattern
- Foam or debris moving away from shore
Expansion of Quagga Mussels in Lake Michigan Adds to Food Web Uncertainties

During spring sampling in southern Lake Michigan, University of Michigan biologist David Jude unexpectedly hauled in several trawl nets filled with invasive quagga mussels (*Dreissena bugensis*). A 10-minute trawl at a depth of 100 meters near Muskegon resulted in 11 tubs of the small mussels weighing an estimated 315 pounds.

At another location 30 miles offshore, underwater cameras allowed Jude and colleagues aboard the R/V *Laurentian* to see firsthand how the invasive mussels have multiplied there since 1999, when none were present. “It was just astounding,” says Jude. “It was a complete carpet of quagga mussels as far as you could see.”

Quagga mussels, a close relative of zebra mussels, have gradually increased in Lake Michigan over the past five years and have expanded their range to deep, offshore waters uninhabited by zebra mussels. Their abundance and expansion raises concerns about long-term effects on the lake's deepwater food web.

Like zebra mussels, each quagga mussel filters about 1 liter of water per day, removing vast amounts of phytoplankton (mostly algae) and depleting the food supply for native zooplankton and bottom-dwelling organisms, which in turn provide food for many species of fish.

Denizens of the Deep

Quagga mussels can tolerate colder water than zebra mussels and are found more frequently in softer sediments. These qualities have allowed quagga mussels to expand their range, and they’ve been found at depths of 150 meters (450 feet), according to scientist Tom Nalepa of the NOAA Great Lakes Environmental Research Laboratory (GLERL).

Nalepa recently finished quantifying mussels collected in 2005. He notes that out of 160 sites sampled, quagga mussels were dominant at every location where mussels were found. Nalepa estimates that 98 percent of mussels collected in 2000 were zebra mussels; by 2005, 98 percent were quagga mussels. “It was a complete switch,” he says. “They’ve virtually replaced zebra mussels. For them to be that dominant over the entire lake is surprising.”
Their dominance may be due in part to several traits. Quagga mussels appear to have bioenergetic and reproductive advantages over zebra mussels. They have a lower metabolic rate and thinner shells. Scientists suspect they’re able to direct more energy toward growth and reproduction, allowing them to outcompete zebra mussels.

The explosion of quagga mussels comes at a time when the Lake Michigan food web is already stressed. With the introduction of zebra mussels in the early 1990s came a sharp decline in the shrimp-like organism *Diporeia*, a nutritious food source for many fish. The average abundance of *Diporeia* dropped from about 5,200 per square meter in 1994/95 to 1,800 by 2000.

Nalepa, who has been monitoring the decline of *Diporeia* as part of long-term lake wide studies conducted by GLERL, notes that the decline in 2005 is even more dramatic. The average abundance in 2005 is now only 300 per square meter. With quagga mussels becoming more abundant, says Nalepa, *Diporeia* has declined in deeper waters, and areas of the lake with no *Diporeia* have expanded greatly.

**Food for Thought**

Due in part to the disappearance of *Diporeia*, some fish species have switched to alternate food sources. According to Jude, two important Lake Michigan forage fish, slimy and deepwater sculpin, have shifted their diets from mostly *Diporeia* toward more fish eggs, insects and *Mysis* (opossum shrimp).

With Michigan Sea Grant funding, Jude is examining the food web impacts on sculpin in relation to the decline in *Diporeia*, which began following the introduction of zebra mussels. Jude also reports that slimy sculpin, usually found in waters less than 50 meters deep, are now being found in the deepest parts of the southern Lake Michigan basin.

Commercially important lake whitefish are also consuming alternate food sources, primarily *Mysis*, *chironomids* (larval insects), and shelled prey including zebra mussels and now quagga mussels, according to GLERL ecologist Steve Pothoven. He notes that approximately 40 percent of the diet of lake whitefish in southern Lake Michigan is now composed of quagga mussels. Energetically, says Pothoven, quagga mussels are not any worse than zebra mussels, but “neither is good.”

Pothoven, who has been monitoring a decline in the physical condition of whitefish for several years, says that smaller, thinner fish may be due in part to sustained high numbers of whitefish and increased competition for food.

Impacts of quagga mussels on other fish species, particularly larval life stages that depend on a healthy zooplankton population, are still unfolding.

“It’s important now to keep an eye on offshore productivity. We now have a filter feeder offshore that wasn’t there before,” says Pothoven. “We need to see how it affects the lower food web.”
As boating season begins, newly trained volunteers are gearing up to help boaters inspect equipment for aquatic invasive species. They’ll be sporting blue t-shirts and stationed at selected launch sites around the state.

The activities are part of the pilot program, Clean Boats, Clean Waters, being conducted this year by Michigan Sea Grant with support from the Michigan Department of Environmental Quality. Specifically, volunteers will talk with boaters about the importance of preventing the spread of invasive plants and animals from one body of water to another.

“Boaters really play a key role in stopping the spread of harmful species such as Eurasian water-milfoil and zebra mussels by inspecting their equipment and taking some simple actions,” says Carol Swinehart, who coordinates the program for Michigan Sea Grant.

If boaters are receptive, the Clean Boats, Clean Waters volunteers will conduct a quick demonstration showing how to inspect boat hulls, live wells, props and other equipment for invasive species and describing what to do if any are found.

The program kicked off in April with workshops in Pontiac and Big Rapids. About 30 participants learned about the ecological damage caused by aquatic invasive species in Michigan—plants such as Eurasian water-milfoil, fish such as round gobies, animals such as zebra mussels and microscopic zooplankton such as water fleas—all of which can disrupt aquatic ecosystems.

Boaters Play Key Role

Michigan has nearly 39,000 square miles of Great Lakes waters and more than 11,000 inland lakes larger than five acres. Boating is one of the most popular recreational activities in the state, with more than 900,000 watercraft registered.

As popular as boating is, the activity is a major avenue enabling invasive species to travel from one water body to another. Plants and animals can easily hitch a ride on hulls, props and other boating and angling equipment.

If a plant such as Eurasian water-milfoil is found tangled in a boat prop, volunteers with the Clean Boats, Clean Waters program will remove the plant, seal it in plastic and send it to Michigan Sea Grant Extension for identification and recording. They’ll also encourage boaters to inspect their own equipment before leaving the area.

“Research has found that many Michigan boaters are aware of aquatic invasive species, especially zebra mussels, and that some are already taking action. Others have said they weren’t sure what to do,” says Swinehart.

“We expect that boaters will do their best to act once they receive the Stop Aquatic Hitchhikers!™ sticker about the four simple steps to take and the Clean Boats, Clean Waters card that illustrates checkpoints on a boat and trailer.”

“Michigan has been known for years as a water wonderland,” Swinehart adds, “and we think boaters will want to keep it that way.”

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Sturgeon Confirmed at Detroit River Spawning Reefs

A five-foot male lake sturgeon turned up at spawning reefs in the Detroit River this spring, raising scientists’ hopes that the ancient species will find the habitat suitable for spawning.

A team led by Bruce Manny of the US Geological Survey Great Lakes Science Center caught and released the 45-pound fish in mid May after implanting a transmitter to monitor its movements. After release, the fish remained in the vicinity of the reefs near Belle Isle.

“This is an excellent sign,” says Manny. “The sturgeon is in spawning-ready condition and waiting for females.”

Typical pre-spawning behavior for lake sturgeon is for the males to congregate at good spawning sites until water reaches optimal temperatures and females arrive.

The reefs were constructed in 2004 to provide suitable spawning habitat for lake sturgeon, which once thrived in the Detroit River.

Lake Whitefish Return

Nine other native fish species have been documented spawning at the reefs, among them walleye, yellow perch, and lake whitefish. Scientists collected the first lake whitefish eggs ever found on the river bottom near Belle Isle in 2006. The finding confirms that lake whitefish spawned at the location in the fall of 2005, Manny says, marking an event that hasn’t been documented since 1916.

According to Manny, the return of lake sturgeon and spawning lake whitefish to the Detroit River may indicate that remedial actions over the past 25 years have improved environmental conditions for fish on spawning grounds in the river. Other confirmed species at the reefs include northern hogsucker, troutperch, silver Redhorse, shorthead Redhorse, white sucker, and white bass. Invasive round gobies and white perch have also been found at the site.

The Detroit River Sturgeon Spawning Habitat Project, managed by Michigan Sea Grant, was funded by the Michigan Coastal Management Program (DEQ), the Great Lakes Fishery Trust, and DTE Energy, with support from the US Geological Survey and numerous collaborating agencies.

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Bohling Chosen as Extension Educator for Southeast Michigan

Mary E. Bohling joined Michigan Sea Grant June 1 as Extension Educator for southeastern Michigan, a seven county district that covers Tuscola, Huron, Sanilac, St. Clair, Macomb, Wayne, and Monroe counties. Bohling brings six years’ experience in environmental planning to the district with shoreline along Lake Huron, the St. Clair River, Lake St. Clair, the Detroit River and Lake Erie.

As an environmental planner for DTE Energy, Bohling coordinated voluntary environmental efforts of the company, including wildlife habitat enhancements, invasive species management, and collaborative environmental education and outreach activities. She also co-chaired the Downriver Linked Greenways initiative, served as interim facilitator for the International Wildlife Refuge Alliance and is a member of the steering committee for the Detroit Heritage Water Trail.

“I’m very excited about joining the Michigan Sea Grant Extension team. I hope to further the riverfront revitalization efforts currently underway in the region and foster a deeper appreciation of how these coastal waterways can enhance economic growth.”

Mary has a master’s degree in environmental science from the University of Michigan-Dearborn, a bachelor’s degree in environmental science, environmental studies and anthropology from UM-Dearborn and an associate’s degree in criminal justice from Henry Ford Community College. Bohling is currently based in Detroit and can be reached at (313) 833-3275.
RESOURCES FOR GREAT LAKES
EDUCATION AND RESEARCH

Rip Currents brochures
These illustrated brochures explain what rip currents are, why they’re dangerous, and how to escape them. Available in Spanish and English, the brochures are appropriate for anyone visiting Michigan beaches this summer.
MICHU-04-702

Where Land Meets Water
This full-color poster depicts various land uses that occur in a typical Great Lakes Basin watershed. Text highlights best management practices for reducing erosion and sedimentation. Produced by Michigan Sea Grant and the Great Lakes Commission.
MICHU-03-700

To order these products, please visit Michigan Sea Grant’s online bookstore:
www.miseagrant.umich.edu

Summer Workshops
The first Lake Exploration Workshop sponsored by COSEE Great Lakes is scheduled for July 29 – August 4, along the shore of Lake Superior. In addition, the Tropical Marine Ecology Workshop, will be in Central America from August 12-19, 2006. See the complete listing of COSEE-sponsored and COSEE-partner events online at www.coseegreatlakes.net, or contact Steve Stewart, stew@msu.edu.

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