

Lake Superior Ballast Water Research

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Intro: This is Superior Science News. Today's program explores ballast water research in Lake Superior.

NAT SOUND: waves

Invasive species have been getting a lot of attention with the spread of spiny waterfleas and round gobies to name a few. People outside the scientific community are now realizing the impacts that these foreign invaders have on the Lake Superior. Many groups are combining efforts to prevent the spread of invasive species, especially through the ballast water of ocean-going ships. Minnesota Sea Grant Associate Director Jeff Gunderson says zebra mussels act as a poster child in this respect.

"Back in 1988 when zebra mussels were first found in the Great Lakes--and that was found in Lake Saint Clair -- it didn't take long before they were found in Lake Superior--in the St. Louis River. The following year, we found a couple in the St. Louis River. It was quite unique though -- in many other areas of the Great Lakes, the zebra mussels exploded in numbers . . . The way that they spread throughout the Great Lakes and then out of the Great Lakes really brought attention to the ballast water vector for bringing in invasive species."

Gunderson says the spread of invasives through ballast water poses many challenges to both the shipping and scientific communities.

"One is we have the vector from the salties coming from overseas that could bring invasive species into the Great Lakes, and then we have the lakera and recreational boaters and others that can spread them further once they get into the Great Lakes. The real challenge is trying to prevent them from getting in here to begin with, and then, secondarily, it's also very difficult to prevent their spread once they've gotten in here."

But that is no easy task according to Dale Bergeron, Minnesota Sea Grant's maritime transportation educator. He says officials are working at state, federal, and international levels to address the problem.

"There are three levels of activity right now. One is at the international level and was through the International Maritime Organization, which is part of the U.N. In 2004, a standard was set for the control and management of ships' ballast water, and the convention will require that 30 nations or 35 percent of the world's ocean-going commercial tonnage agree to the standards and sign on. But, to date, only 10 nations have signed on, representing only 3.4 percent of the tonnage of the world fleet."

Currently, there is no federal standard for ballast water management. States like California are suggesting more stringent standards than at the international level, but Bergeron says varying state standards can lead to chaos for the shipping community. Both Bergeron and Gunderson agree a standard must be set to help lakers and salties understand their responsibilities in managing ballast emissions. Gunderson says two things need to happen in the meantime.

"One has already happened and is happening -- the salties have the mid-ocean exchange. They have the exchange of the 'no ballast on board' ships that research shows greatly reduces risk of spreading invasives species. Within in the Great Lakes, we also have some procedures that some of the lakers have engaged in to help minimize the risk of moving invasive species from the lower lakes into Lake Superior. Then, there are treatments. That is what the ballast water treatment facility is looking at developing. There's a whole variety of approaches, and we just need something that works, that's economical, and that's safe for the shipping vessels."

Mary Balcer, Director of the Lake Superior Research Institute, says it's difficult to tell whether they'll find a viable treatment method to manage invasive species in the next few years.

"That's what we hope to be able to do. We hope to put ourselves out of business quite rapidly. But, ballast water treatment is a quite complex problem because you're working with a whole array of organisms. Something might be effective on viruses, but it might not be effective on multicellular organisms. Vice versa, something might filter out and kill the larger organisms and not be quite as effective on the younger ones or the smaller ones. It's going to take awhile to find something that works for everything."

Bergeron says that's part of the reason why developing a standard is so important.

"The question is what's reasonable. So, the next question is once we get a standard , is there any technology out there that can meet it? Currently, not only is there no certified ballast treatment system to meet the IMO standards, but there's certainly nothing that can meet much more stringent standards. There are approximately 30 vendors who have ballast water management treatment systems that they would like to sell. They are in various design and testing stages, and yet none of these would meet the needs of the current regulations as set by California."

Balcer says many countries around the world are looking for different types of treatment systems that will work.

"Some of them are already being tested on boats in other parts of the country. Our whole business in the next two to three years is that we find something that will work effectively, and, most importantly, it has to be able to work under actual nautical conditions. Something that works in the lab or even at a test facility may

not in all the water qualities you'll encounter around the world."

Bergeron says once they discover an effective treatment system, ships will have to invest significant amounts of money to install them.

"One of the big issues is the retro-fits, which may cost anywhere from several hundred thousand to over a million dollars per vessel. Even taking a vessel out of service to put this equipment on board costs money. So, that's an additional burden on the shippers. We really need to think of their importance on our economy. They transport--the lake carriers for example are transporting the major amount of steel for our economy--our major manufacturing industries. So there's commodity movement that really is essential and couldn't easily be replaced."

Balcer says they've already tested one treatment system called SeaKleen at Superior's freshwater ballast testing facility, and they'll continue to examine others as time goes on.

"There are two more treatments that have been selected for testing this winter. So, they will be getting us more information on those as they award the contract. It looks like from January to May our lab is going to be doing at least two to three chemicals looking at how much is toxic, how fast does it degrade, and what concentration is safe to discharge. Then come spring, we should be ready to go with another test out at the facility with one of those chemicals hopefully will have made it through to that level."

Bergeron says cooperation is key to moving ballast water research full speed ahead.

"It is going to be an interdisciplinary, collaborative, multi-agency effort to come up with any viable solution. We have to get the industry involved. We have to get the agencies educated. We have to get science involved, and it has to all be balanced. If we would do that, then we would not be coming up with all different standards and methods of treatment that only address certain issues. We'd start to get an overview and a strategy that might blossom out into a real solution. I profoundly believe that all of us are smarter than any of us. So, we really need to work together."

For Superior Science News, I'm Marie Zhuikov.

Outcue: (waves) This is a production of Minnesota Sea Grant and KUWS radio.