

NPLSF Ballast Treatment Projects for AIS Prevention

The introduction of aquatic invasive species (AIS), including alewives, zebra mussels, and sea lamprey, have had a dramatic, negative impact on the Great Lakes. They have harmed fisheries, ruined beaches, and cost a significant amount of money in trying to control them. AIS potentially pose huge problems for all of our Lake Superior National Parks. AIS introductions can come from a number of different paths including canals (like the Chicago sanitary diversion), bait and aquarium releases, attachment to boat hulls, and ballast water releases. NPLSF has attempted to address the principal means of potential introduction to Lake Superior - releases through ballast water. Great Lakes freighters and other bulk carrier ships take in and discharge large quantities of ballast water to maintain ship stability and safety. This action potentially introduces new species to Lake Superior and can extend the range of existing aquatic organisms around the lake.

The Foundation has been working with Superintendent Phyllis Green at Isle Royale National Park to bring new ballast water treatment technologies to ships that ply Lake Superior and the other Great Lakes. NPLSF has secured funding for three separate projects related to the study, design, and installation of a promising new ballast water treatment technology using sodium hydroxide (NaOH). NaOH raises the pH of the water which kills all of the potential AIS in the ballast tanks. It can then be neutralized and the water safely returned to the lake. Beyond developing the treatment technology, the work of NPLSF has helped foster important relationships between the shipping industry, regulators, academia, and others - hopefully leading to an effective solution to the threat of AIS in ballast water.

NPLSF has worked with many different people in successfully completing these projects. The following people in particular are giving tremendous effort:

- Phyllis Green, Superintendent, Isle Royale National Park
- Barnaby Watten, Fishery Biologist, USGS Leetown Science Center
- Scott Smith, Supervisory Research Biologist, USGS Western Fisheries Research Center
- Noel Bassett, Vice-President, American Steamship Company

Project Descriptions:

Emergency Response System – NPLSF received a Great Lakes Fishery Trust grant of \$185,000 for this project. Preventing AIS introductions via ballast during emergencies or quarantines requires effective mixing of biocides in full and empty ballast tanks. Defining an effective delivery system to treat ballast tanks during short timelines was the focus for this applied research for use in emergency situations, or as a basis for interim treatment. This project evaluated novel approaches to chemical delivery system issues, and through shipboard testing developed the critical technology to deliver any liquid biocide into the ballast tank to disinfectant ships with a high risk for releasing AIS during emergency situations such as groundings. This project led to the development of practical, field tested Guidelines for emergency responders managing grounded NOBOB Ships or ships pulling in ballast in a contaminated port.

NaOH Practicality Study – NPLSF received a Great Lakes Fishery Trust grant of \$78,200 for this project. Great Lakes freighters (Lakers) have particular challenges in terms of treating ballast water to prevent aquatic nuisance species introductions. Specifically, they ballast and de-ballast frequently, pump large volumes of ballast very quickly, and their ballast tanks are frequently untreated and subject to corrosion from common ballast treatment systems. The project evaluated and determined the practicality of a sodium hydroxide (NaOH) biocide delivery system for Lakers. The project created a naval architect's documentation for a system specific to Lakers' unique design and needs. It helped accelerate installation of ballast treatment systems, answer industry questions regarding ballast treatment, and will inform the Coast Guard rulemaking process.

NaOH Shipboard Trials – NPLSF received a \$776,320 grant from the Great Lakes Restoration Initiative through the U.S. Fish & Wildlife Service for this project that builds on the NaOH practicality study, and will design and test a NaOH ballast treatment system on one of the largest Great Lakes freighters (Lakers), the *M/V Indiana Harbor* during the summer of 2011. This project is underway currently.



A Great Lakes freighter near Isle Royale National Park in Lake Superior.



Inside a ballast tank on the M/V Indiana Harbor





