

# Environment and Natural Resources Trust Fund 2009 Phase 2 Request for Proposals (RFP)

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**LCCMR ID: 074-C1**

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**Project Title:** Ballast Water Sampling Method Development and Treatment Technology

**Total Project Budget:** \$ \$400,000

**Proposed Project Time Period for the Funding Requested:** Two Years – July 2009 to June 2011

**Other Non-State Funds:** \$ \$350,000.00

**Priority:** C1. Aquatic and Terrestrial Invasive Species

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**Last Name:** Fenske

**Sponsoring Organization:** MPCA

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**Region:**

NE

**County Name:**

Cook, Lake, St. Louis

**City / Township:**

Duluth and Others

**Summary:** Provide foundation for the MPCA to conduct monitoring for aquatic invasive species in ballast water discharges to Minnesota waters of Lake Superior and test effectiveness of ballast water treatment systems.

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**Main Proposal:** 1008-2-024-proposal-LCCMR Proposal 9 26 08 B.doc

**Project Budget:** 1008-2-024-budget-RFP\_2009\_Project%20Budget(1) B.xls

**Qualifications:** 1008-2-024-qualifications-PROJECT MANAGER QUALIFICATIONS.doc

**Map:** 1008-2-024-maps-Ballast Water Project MAP.pdf

**Letter of Resolution:**

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# MAIN PROPOSAL

## PROJECT TITLE: Ballast Water Sampling Method Development and New Treatment Technology Evaluation for Minnesota-Bound Ships

### I. PROJECT STATEMENT

Ballast water discharges from ships have introduced aquatic invasive species, such as zebra mussels, spiny waterfleas and round gobies into Lake Superior and the Duluth harbor and continue to introduce and spread more invasive species. Shipboard treatment of ballast water is generally regarded as the solution to this problem.

Under its state authority and pursuant to recently enacted Minnesota legislation, the Minnesota Pollution Control Agency (MPCA) has issued a new ballast water discharge general permit to limit future ship-mediated invasive species introductions into Minnesota waters. To allow the MPCA to implement the permit more effectively, it is necessary to address the following gaps in current scientific knowledge.

- Scientifically credible and operationally feasible ballast water monitoring mechanisms and procedures will be critical to the assessment of the problem and methods for abating it.
- **Part 1 of this project will identify sampling devices and methods to reliably measure invasive species in the ballast water discharge of Minnesota-bound ships and provide initial data on levels of organisms in ballast water from a range of ship types which travel Minnesota waters.**
- Nearly 30 different types of ballast water treatment systems are being developed by companies worldwide, primarily for seawater application. These treatment systems use a variety of mechanisms to kill organisms, e.g. ultraviolet light, chlorination, and deoxygenation. The effectiveness of a particular treatment method may differ in fresh water.
- None of these treatments has been validated in the United States or in fresh water, and near-term incentives are lacking to test treatment performance in fresh water.
- **Part 2 of this project will verify in fresh water the performance of up to three ballast treatment technologies that have been proven effective in seawater to expedite their implementation in ships traveling through Minnesota waters.**

### II. DESCRIPTION OF PROJECT RESULTS

**Part 1: Build the state's capacity to monitor ships' discharges into Minnesota ports (Duluth, Two Harbors, Taconite Harbor, Silver Bay) for invasive species. Budget: \$ 175,000**

The primary purpose of this project part is to design and trial credible, effective and operationally feasible sampling methods for relevant vessel types, building upon existing international and federal guidelines. The secondary purpose is to design and further populate a database to document levels of invasive species carried in ballast water by ships discharging to Minnesota's ports. The project will contract with the Great Ships Initiative (GSI) to develop and implement on a limited number of vessels a ballast discharge sampling methodology that is representative and repeatable for different kinds of aquatic species categories.

#### Deliverable

#### Completion Date

- |   |               |
|---|---------------|
| 1. Protocol for Ballast Discharge Sampling and Analysis in Minnesota  | April 1, 2010 |
| 2. Initial baseline data entries from at least five vessels within each of the three classes of ships that comprise the majority of saltwater and laker visits to Minnesota ports | July 1, 2011  |

**Part 2. Accelerate verification of ballast water treatment systems for fresh water application**  
**Budget: \$ 225,000**

The Great Ships Initiative (GSI) has the only fresh water testing facility in the world, located in the Duluth/Superior Harbor. To expedite implementation of treatment systems that are effective and safe in fresh water and to establish the degree to which other testing facilities may be providing findings predictive under the circumstances of Minnesota waters, the project will contract with GSI to test three treatment systems that have received final approval under international guidelines and agree to be tested at the GSI facility.

<b>Deliverable</b>	<b>Completion Date</b>
1. Evaluation of up to three ballast water treatment technologies	July 1, 2011

**III. PROJECT STRATEGY AND TIMELINE**

**A. Project Partners**

This project's primary partners are:

**Minnesota Department of Natural Resources** Jay Rendall, with the Invasive Species Program, will provide expertise on aquatic invasive species.

**Great Ships Initiative (GSI)** Allegra Cangelosi, of the Northeast-Midwest Institute (NEMWI), leads the GSI, and will be project principal. NEMWI and GSI bring the following collaborators and expertise:

Organization	Name	Contribution	Matching Funds or In-Kind?	Getting Funds?
Duluth Seaway Port Authority	A. Ojaard	(GSI Advisory Board Chair.) Provide shipping industry expertise and facilitate project testing in St. Louis Harbor.	Expertise	No
Natural Resources Research Institute and University Of Minnesota- Duluth	E. Reavie, D. Branstrator and R. Hicks	(Research team members of the GSI or a related NEMWI project.) Advise on experimental design and assist with sampling analysis.	Lab space	Yes \$50,000
Lake Superior Research Institute	M. Balcer	(Senior GSI team member.) Assist with sampling analysis.	Lab space	Yes \$100,000
USGS	J. Winton	(GSI/ NEMWI Project research team members.) Advise on experimental design, sampling and organism analysis.	Expertise	No
Cornell University	J. Casey			
Old Dominion U	F. Dobbs			
Maritime Env. Research Center	M. Tamburri	(Director of MD ballast treatment facility.) Provide expertise on sampling methods.	Expertise	No
USGS	S. Smith	Advise on project implementation	Expertise	No
US DOT Maritime Administration	C. Junemann	Matching funding for design and testing of shipboard monitoring mechanisms and procedures	\$350,000/ engineering	No

**B. Project Impact**

This project will provide a new and needed foundation for the MPCA to conduct credible and operationally feasible monitoring for aquatic invasive species in ballast water discharges to Minnesota waters of Lake Superior and provide initial baseline data on their levels. This project will also expedite fresh water testing of ballast water treatment systems, and ultimately their installation on Great Lakes vessels, as incentives to conduct fresh water testing in the next few years are lacking.

**C. Time**

The total amount requested for this project is \$400,000. Once funding is secured, the implementation period for the project is estimated to be 18-24 months.

**D. Long-Term Strategy**

This project will provide necessary research to help prepare for the MPCA's implementation of its new ballast water discharge permit by providing information on sampling methods that is currently lacking. New information gained on treatment technology performance in fresh water will assist the MPCA in approving technologies between 2011 and 2016. In addition, this project will likely influence federal and other Great Lakes states efforts to prevent the introduction and spread of invasive species.

## Project Budget

### Ballast Water Sampling Method Development and New Treatment Technology Evaluation for Minnesota-Bound Ships

#### IV. TOTAL PROJECT REQUEST BUDGET

<u>BUDGET ITEM</u>	<u>AMOUNT</u>	
<b>Contracts:</b>		
Great Ships Initiative (GSI)/Northeast Midwest Institute (NEMWI): overall project management and subcontracting	\$ 400,000	
GSI/NEMI \$100,000 for project management		
Subcontract: AMI Engineers (Duluth) \$150,000 for engineering and installation		
Subcontract: Lake Superior Research Institute (UWS) \$100,000 for field biology/analysis		
Subcontract: Natural Resources Research Institute (UMD) \$50,000 for field biology/ analysis		
<b>TOTAL PROJECT BUDGET REQUEST TO LCCMR</b>	<b>\$ 400,000</b>	

#### V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>Other Non-State \$ Being Leveraged During Project Period:</b> Maritime Administration (Federal Funding). For purchase and installation of ship sampling devices, data analysis and write-up	\$ 350,000	<i>Secured (federal funding)</i>
<b>In-kind Services During Project Period:</b>		
NEMWI/City of Superior for use of land-based test facility site and equipment for treatment testing	\$ 75,000	<i>Secured</i>
UMD and UWS for use of laboratory space and equipment	\$ 5,000	<i>Secured</i>
Duluth Port Authority for marine engineering advice	\$ 25,000	<i>Secured</i>
Carrier companies for access and support during design and implementation of sampling exercises	\$ 25,000	<i>Pending</i>
Treatment system developers for access to prototype systems for testing	To be determined	<i>Pending</i>
GSI expert advisors from USGS, Cornell University, Old Dominion U, Maritime Environmental Research Center	\$ 10,000	<i>Secured</i>
MPCA for expertise/coordination supplied by Jeff Udd, Mary Jean Fenske	\$ 10,000	<i>Secured</i>
MN DNR for expertise supplied by Jay Rendall's time	\$ 5,000	<i>Secured</i>
<b>TOTAL: Other Funds/ In-Kind Service Value</b>	<b>\$ 505,000</b>	
<b>Past Spending:</b>	To be determined	

# PROJECT MANAGER QUALIFICATIONS AND ORGANIZATION DESCRIPTION

## **Ballast Water Sampling Method Development and New Treatment Technology Evaluation for Minnesota-Bound Ships**

### **I. Mary Jean Fenske, P.E., Minnesota Pollution Control Agency (MPCA)**

The Project's manager is Mary Jean Fenske, the MPCA's vessel discharge program coordinator. She has over 12 years of experience managing projects for the MPCA, including acting as contract manager for five projects. Most recently, she coordinated the development of the MPCA's recently issued ballast water discharge general permit. She is currently the state's alternate member on the Great Lakes Panel on aquatic nuisance species.

Ms. Fenske has a B.S. degree in Metallurgical Engineering from the University of Wisconsin-Madison, a M.S. degree in Civil Engineering from the University of Minnesota- Twin Cities, and is a licensed Professional Engineer.

The MPCA was established as a state agency in 1967 to protect the air, waters and land of Minnesota. The Project supports the MPCA's mission to work with Minnesotans to protect, conserve and improve our environment and enhance our quality of life by launching needed work to help prevent and reduce the spread of new aquatic invasive species.

### **II. Jay Rendall, Minnesota Department of Natural Resources (DNR)**

Jay Rendall is currently the Invasive Species Prevention Coordinator at Minnesota DNR. He was the Invasive Species Program Coordinator from 1991 to 2007. His responsibilities at DNR include state invasive species policy, public awareness, and coordination with regional and national invasive species activities. He has been a member of several state, regional, and national committees related to invasive species including chairing both the Great Lakes and Mississippi River Basin panels on aquatic nuisance species. He is currently the Co-chair of the Minnesota Invasive Species Advisory Council.

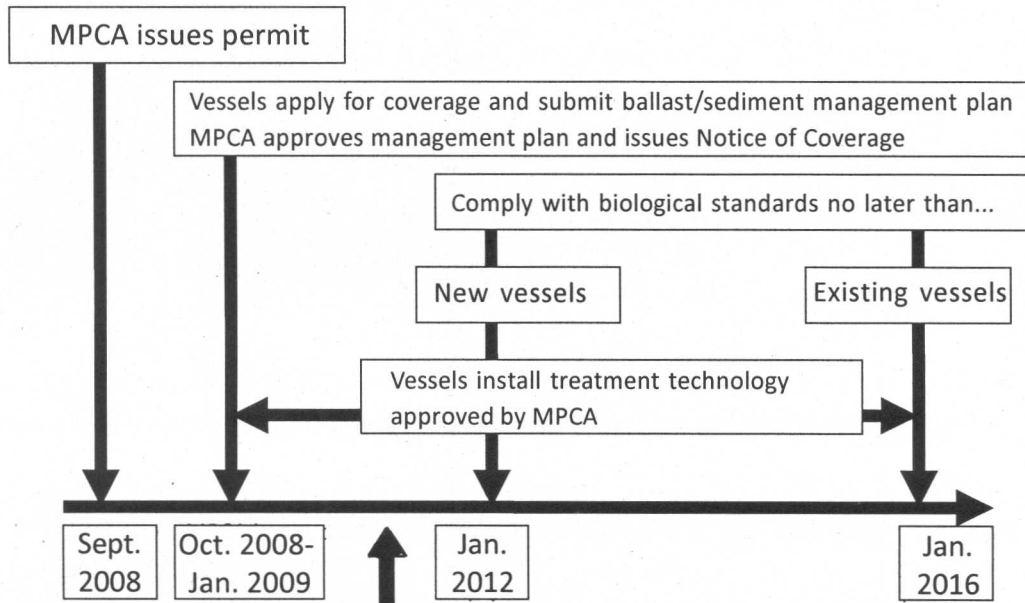
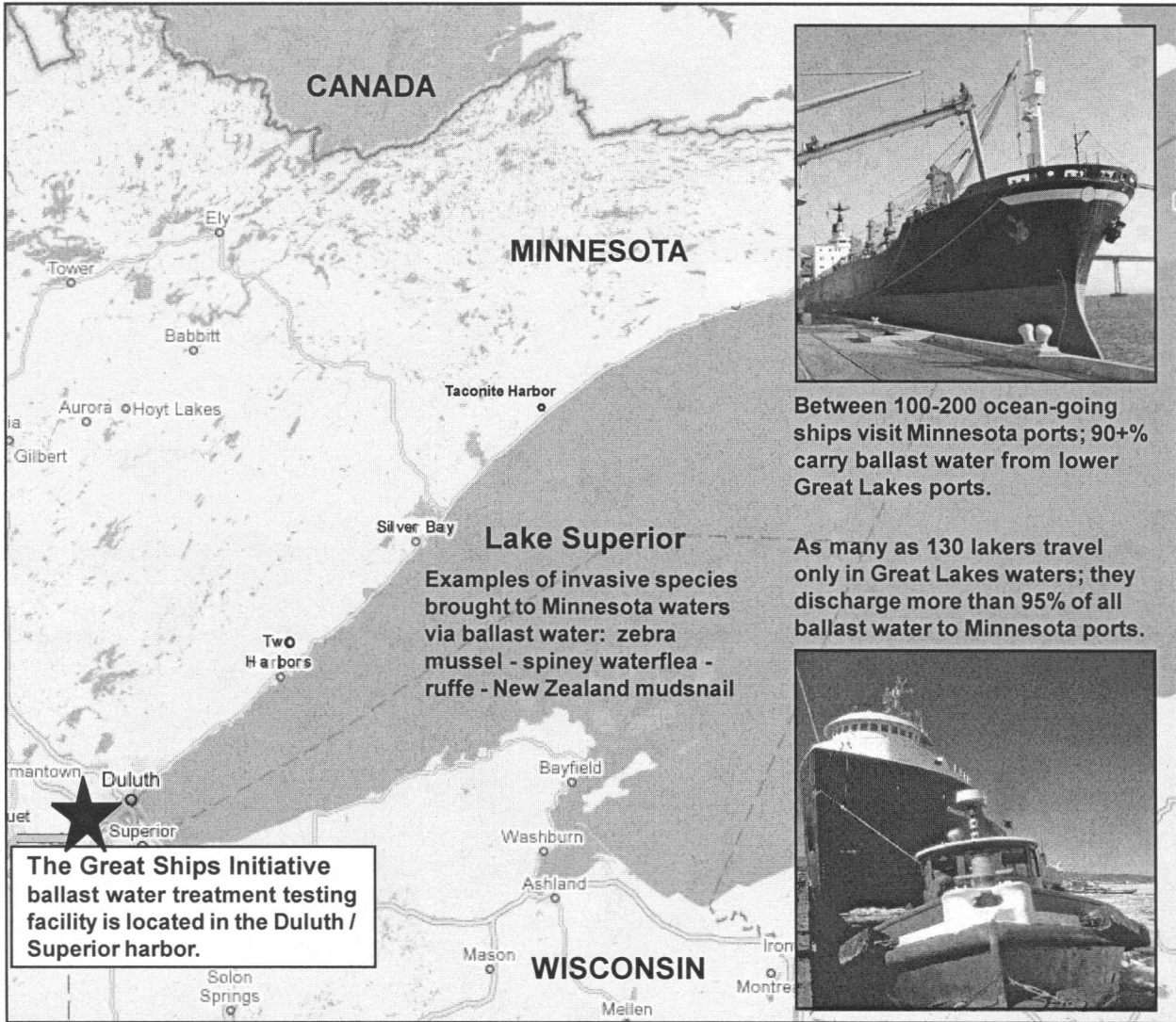
Mr. Rendall has been project manager of past LCMR recommended projects: DNR Purple Loosestrife Program (1987-1988) and Ballast Water Technology Demonstration for Exotic Species Control (1997 to 2000). He was also a member of the Steering Committee for Great Lakes Region Ballast Demonstration Project (1996-2001).

### **III. Allegra Cangelosi, Great Ships Initiative (GSI) and Northeast-Midwest Institute (NEMWI)**

The project principal for the MPCA's proposed contract with GSI/NEMWI will be Allegra Cangelosi. Ms. Cangelosi has a unique combination of skills involving the both the policy and technical aspects of aquatic invasive species prevention and management. Specifically, she has direct experience with shipboard sampling and understanding of treatment technologies to assess their effectiveness. Ms. Cangelosi has experience as project principal on numerous ballast water-related projects.

Ms. Cangelosi leads the Great Ships Initiative. GSI is a collaborative effort with the overarching goal to end the problem of ship-mediated invasive species in the Great Lakes, as quickly, effectively, and economically as possible, in cooperation with prevailing regulatory regimes. The GSI has established research capabilities at a facility in the Duluth/Superior harbor at three scales: bench, pilot, and shipboard scales. It is the only such facility on fresh water in the world. More information about the GSI can be found at [www.greatshipsinitiative.org](http://www.greatshipsinitiative.org).

NEMWI is a private, non-profit, and non-partisan research organization dedicated to economic vitality, environmental quality, and regional equity for Northeast and Midwest states. More information about the Institute can be found at: [www.nemw.org](http://www.nemw.org).



This graph indicates the implementation timeline for the MPCA's ballast water permit. If the LCCMR proposal is accepted, the timeline to implement it would run from July 2009 to July 2011.