

# Moving to Ballast Treatment: The Great Ships Initiative



*Making a Great Lake Superior Conference*

Aquatic Invasive Species Session

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AMERICAN GREAT LAKES PORTS ASSOCIATION

# Presentation Overview

- GSI objective and its four program elements
- Focus on Technology Incubation element
  - Research Services
    - Bench-scale testing
    - Shore-based testing facility
    - Shipboard testing options
- GSI Relevancy
- GSI Management & Implementation
- Timeline



# GSI Objective

To end ship mediated introductions  
of aquatic invasive species into the  
Great Lakes



# GSI Program Elements



Technology incubation

Harbor monitoring

Installation assistance / financing

Post installation monitoring / assistance

# Technology Incubation

- Solicit applications by interested vendors of ballast water treatment systems
- Review applications for potential to perform effectively on Seaway-sized ships
- Offer “research services” to assist the R and D process
  - Proof of concept testing
  - Test to determine operational/biological performance status
  - Tests in support of verification/approval?



# Research Services at Three Scales

- Bench-Scale Services
  - Eco-toxicity
  - Dose effectiveness
  - Mechanism of action
- Shore-Based Services
  - Scale effects
  - Ambient assemblage
  - Operational issues
- Shipboard Services
  - Multiple salinities
  - Ship effects
  - STEP applications



# Bench-Scale Testing Facilities

## University of Wisconsin-Superior

- Bench-scale tests involving zooplankton and bacteria
- Non-time sensitive zooplankton and microbial analysis for shore-based and ship-scale

## University of Minnesota-Duluth

- Bench-scale tests involving phytoplankton
- Non-time sensitive phytoplankton analysis for shore-based and ship-scale

Others, as needed



# Shore-Based Testing Facility



# Shore-Based Testing Facility

- Located in Superior, WI
- Infrastructure consistent with IMO guidelines for shore-based testing of BWT equipment
- Freshwater estuary with plentiful aquatic life
- Option to conduct in-line and in-tank sampling and/or spiking
- Up to 341 m<sup>3</sup> per hour
- Simultaneous filling of matched 200 m<sup>3</sup> treatment and control retention tanks
- Capacity to retain and evaluate water following discharge treatment
- On-site laboratory



Lake Superior

Duluth Harbor / Superior Bay

N

Superior, WI



# Shore-Based Test Facility Location














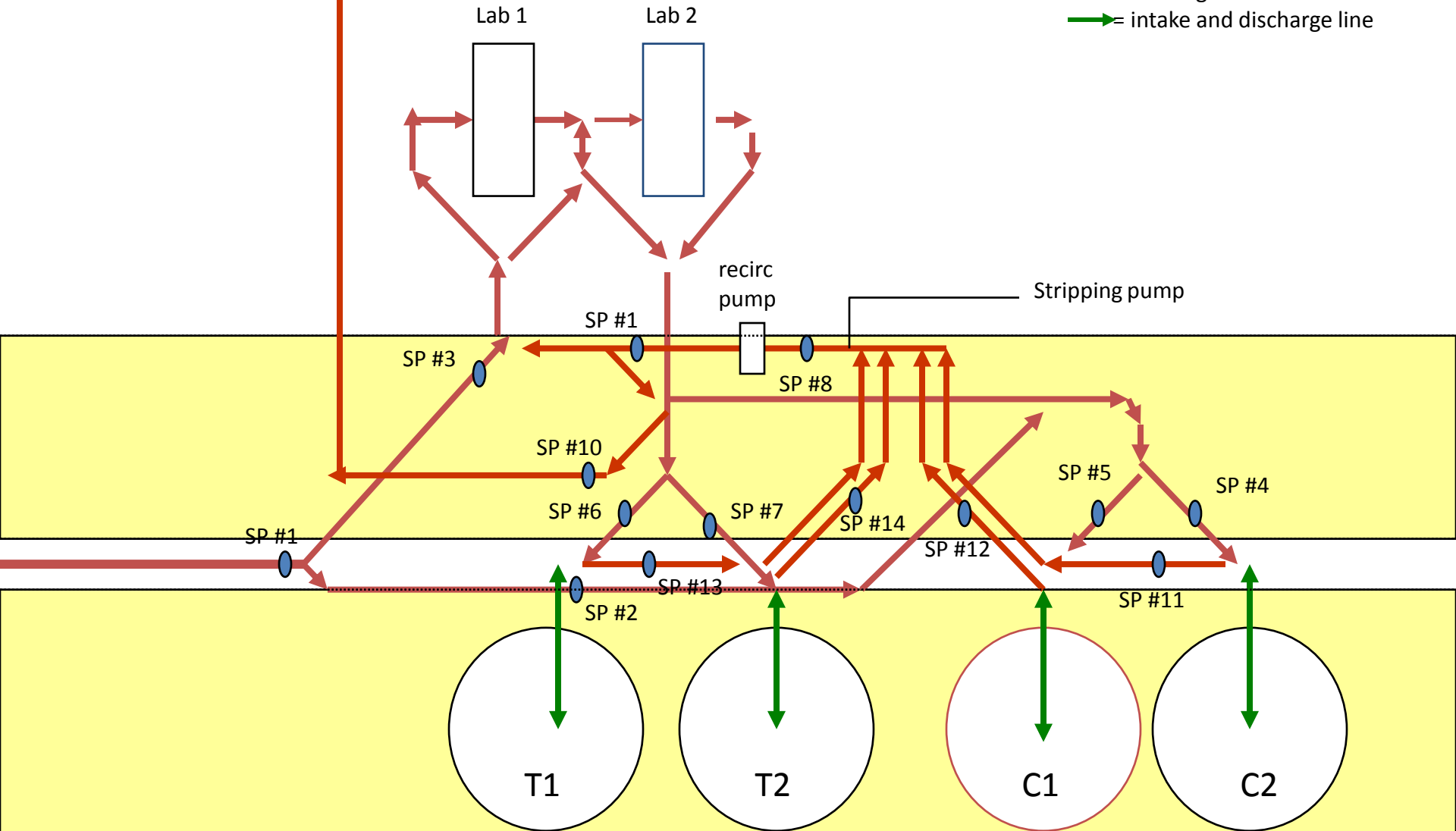




# SHORE-BASED TEST PLATFORM

## Simplified Drawing

- Sp = sampling point
-  = intake line
-  = discharge line
-  = intake and discharge line



# On-Site Laboratory Facilities



- Viability analysis of zooplankton
- Viability analysis of phytoplankton
- Microbial analysis for ship tests







# Shipboard Platforms



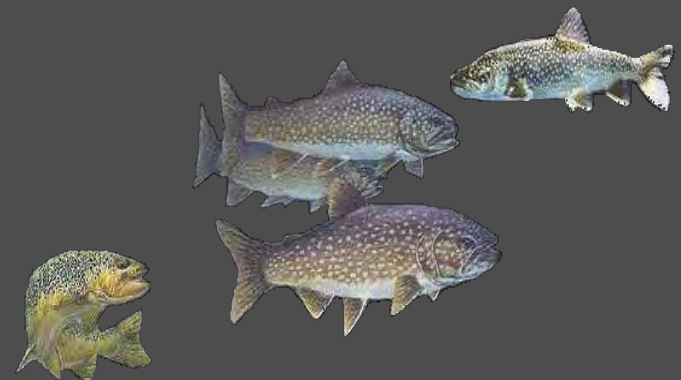
- Canadian Lakers



- Salty Vessels

# GSI Relevancy

- Conduct incubation services with output as relevant as possible to IMO/domestic regulatory processes
- Communicate output to national and international agencies to help inform decisions
- Provide model for other efforts
- Collaborate with other testing programs globally through GloBallast



# GSI Executive Committee

- U.S. and Canadian GLSLSS Ports
- Carriers
- Government agencies
- States/Cities
- Shippers?
- Environmental organizations



# GSI Implementation Team

- Managing Entity
  - Northeast-Midwest Institute
- Fiduciary:
  - National Fish and Wildlife Foundation
- Research Activities
  - Northeast-Midwest Institute
  - University of Wisconsin-Superior
  - University of Minnesota-Duluth
  - Other universities/consultants
- Industry outreach
  - American Great Lakes Ports Association



# GSI Advisors

- Federal Agencies
- Professional Societies
- Classification Societies
- International Experts
  - Process Engineering
  - Biological Sciences
  - Marine Engineering/Naval Architecture



# Funders to Date

- Canadian and U.S. Great Lakes Ports
- City of Superior (in kind)
- St. Lawrence Seaway Organizations (U.S. and Canada)
- U.S. Maritime Administration
- U.S. Department of Transportation
- NOAA
- University of Wisconsin-Superior (in-kind)
- University of Minnesota-Duluth (in-kind)
- Great Lakes Maritime Research Institute



# Start-Up Timeline

- Summer 2007
  - IMO Consistent Facility Construction Complete
  - Preliminary Scientific Protocols Complete
  - First Solicitation Issued for Treatments to be Tested
  - Facility Calibration/Vetting
  - Facility Modifications as Needed
- Fall 2007
  - Preliminary Tests at Bench/Pilot Scale
  - First Full RFP Issued



# GREAT SHIPS INITIATIVE



### QUICK LINKS:

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- » [Organization/People](#)
- » [Services](#)
- » [Facilities](#)
- » [Protocols](#)
- » [Documents](#)
- » [News](#)
- » [Calendar](#)
- » [Links](#)
- » [Contacts](#)
- » [Site Map](#)

The **Great Ships Initiative (GSI)** is a collaborative effort focusing resources and expertise on the problem of ship-mediated invasive species in the Great Lakes.

To that end, the GSI has established a Research, Development and Technology Evaluation (RDTE) facility in Superior, Wisconsin to provide intensive testing services to vendors of ballast treatment prospects suitable to Seaway-sized vessels. [More...](#)



GSI RDTE Facility - Superior, Wisconsin

### LATEST NEWS:

**Public website:** The GSI has launched its public website (March 2007). [More...](#)

**Pilot facility:** The GSI's RDTE pilot facility in Superior, WI is nearing completion (March 2007). [More...](#)

**Protocols:** The GSI's bench, pilot and shipboard protocols have been released (March 2007). [More...](#)

**Report:** Great Ships for the Great Lakes? Commercial Vessels Free Of Invasive Species in the Great Lakes St. Lawrence Seaway System (May 2006). [More...](#)

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