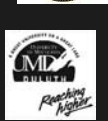
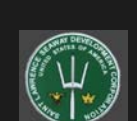
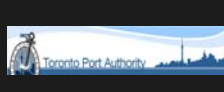


Great Ships Initiative



A collaborative effort to end ship-mediated introductions of invasive species in the Great Lakes - St. Lawrence Seaway System through providing no-cost, Independent, and IMO consistent ballast treatment performance evaluations in fresh and cold water systems.

Managed by the Northeast-Midwest Institute, and supported by the following entities, the GSI's immediate objective is to accelerate the identification, verification and use of effective ballast treatment systems.



For more information contact: Allegra Cangelosi, GSI Principal Investigator and Project Manager.
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www.greatshipsinitiative.org



Bench-Scale Facilities:

Laboratory space within the University of Wisconsin-Superior and University of Minnesota-Duluth is utilized to meet GSI bench-scale test objectives, as well as for non-time sensitive analysis of samples from the land-based and shipboard scale tests.

Land-Based Testing Facility:

GSI's land-based tests occur at a state-of-the-art land-based test facility with infrastructure and protocols that are IMO and ETV consistent. It is located in Duluth-Superior Harbor of Lake Superior. The facility offers:

- 4 x 200 m³ matched retention tanks for experimental water;
- Matched control and treatment intake flows of up to 341 m³/hour;
- Highly automated flow and pressure control, monitoring and data logging;
- A freshwater estuary with plentiful aquatic life as a water intake source;
- Capacity to amend intake water to intensify challenge conditions;
- Automated and validated facility sanitation between trials;
- High quality in-line or in-tank sampling and/or spiking;
- On-site laboratory space for live analysis;
- Capacity to test treatment systems that operate on intake, discharge, in-tank, or combinations thereof;
- Whole effluent toxicity (WET) testing; and
- Easy plug-in connections for treatment systems.

Shipboard Testing:

GSI undertakes shipboard in-situ testing of treatment equipment to "ship-truth" highly promising technology performance exhibited at the land-based scale, or for certification testing. Ship platforms available to the GSI comprise ships in three distinct trades: Canadian Lakers, U.S. Lakers, and transoceanic vessels.

Bench-Scale Services

Proof of concept testing, including:

- Range finding for effective treatment dose against diverse freshwater taxa and water quality conditions;
- Generation of freshwater relevant chemical degradation curves; and
- Estimation of residual toxicity given diverse freshwater taxa and water quality conditions.



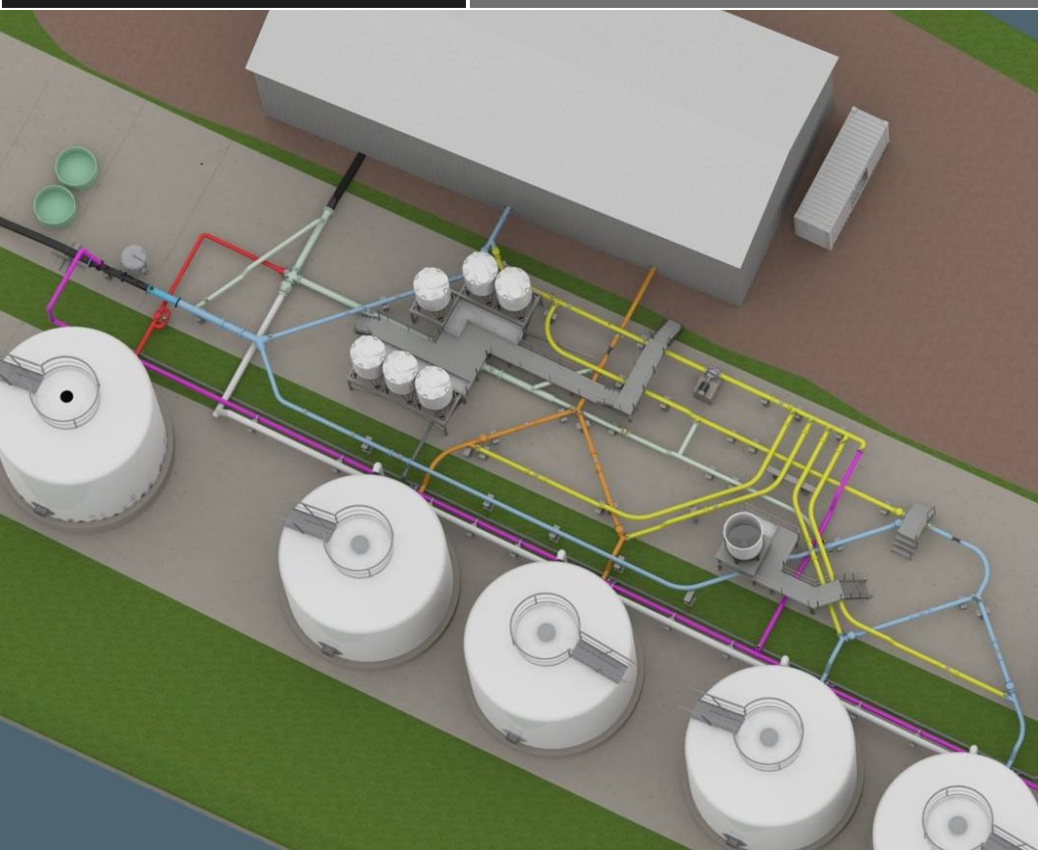
Shipboard Services

- Confirmation of biological and operational treatment performance as expected in the ship environment;
- U.S. Coast Guard Shipboard Technology Evaluation Program (STEP) testing;
- Shipboard type approval testing;
- Ship discharge monitoring; and
- Methods development.



Land-Based Services

- Pre-Certification Testing: Operational and biological performance (including residual toxicity) status testing given scale-up and a range of challenge conditions; and
- Certification/Verification Testing: Meeting all requirements for testing to formally assess performance against IMO and other discharge standards.



Great Ships Initiative

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