

Request for Applications (RFA) through the *Great Lakes Ballast Water Research and Development Plan*

Land-Based Evaluation of the Effectiveness of IMO Compliant and U.S. Coast Guard Type
Approved Ballast Water Management Systems (BWMS) or Components of BWMS in
Great Lakes Water

RFA Opening Date: 21 November 2022

RFA Closing Date: 03 February 2023 by 5:00 pm Central Standard Time

Estimated Number of Awards: Maximum of 2

Funding Amount: \$1,000,000 total

RFA Issued by:

University of Wisconsin-Superior
Lake Superior Research Institute

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I. PURPOSE

The purpose of this Request for Applications (RFA) is to solicit submissions from ballast water management system (BWMS) manufacturers who may be interested in partnering with the [Lake Superior Research Institute \(LSRI\)](#) - [Great Waters Research Collaborative \(GWRC\)](#) and the [U.S. Department of Transportation Maritime Administration \(MARAD\)](#) to provide solutions to mitigate ballast-borne aquatic nuisance species (ANS) and refine their technologies for installation onboard Great Lakes vessels. Testing of market-available and type approved BWMS or components of BWMS will occur during the 2023 season (May – October 2023) at the [Montreal Pier Facility](#) in Superior, Wisconsin, USA. Biological efficacy, in terms of propagule reduction, will be measured against the current U.S. ballast water discharge standard during a maximum of five test trials. Data gathered during this portion of the *R&D Plan* implementation may lead to the formation of a Great Lakes-adapted, “ETV-like” protocol for evaluation of BWMS.

II. BACKGROUND/INTRODUCTION

The U.S. Vessel Incidental Discharge Act of 2018 (VIDA) established the Great Lakes and Lake Champlain Invasive Species Program (GLLCISP). The GLLCISP has several stated purposes related to ballast water management including developing, achieving type approval for, and piloting BWMS applicable to commercial vessels operating solely within the Great Lakes and Lake Champlain Systems. The GWRC, in collaboration with MARAD, has prepared a [Great Lakes Ballast Water Research and Development Plan \(R&D Plan\)](#), that meets some of the stated purposes of GLLCISP. The primary goal of the *R&D Plan* is to identify approaches, methods, and best available technologies that are effective at reducing propagules in Great Lakes ballast water, thereby decreasing the environmental risk associated with the ballast water vector from vessels operating within the Great Lakes System. In many cases, environmental risk (i.e., reduction of propagules) associated with the ballast water vector can be substantially reduced through installation and operation of a BWMS, with the observed protective effect established globally through a numeric discharge standard (2013 VGP, 33 CFR Part 151, IMO D-2 Standard). However, Great Lakes water quality (e.g., low salinity, low temperature, high turbidity) and the unique operations of Laker vessels (e.g., high ballast flow rates, large ballast volumes, uncoated pipes and tanks, short voyage times) have proven difficult obstacles to overcome in the development of effective and practicable BWMS for use on Laker vessels. Given these difficulties, an important first question of our *R&D plan* is whether market-available BWMS or BWMS components can treat Great Lakes ballast water to meet the current discharge standard, either using existing test methods or a method adjusted to reflect the different environmental conditions of the Great Lakes and the operational realities of Laker vessels.

Research Area 1 – Project 2 of the *R&D Plan* describes the *Land-Based Evaluation of the Effectiveness of IMO Compliant and U.S. Coast Guard Type Approved BWMS in Great Lakes Water (Land-Based BWMS Evaluation Project)*, a five-year project designed to gather data on the biological effectiveness of market-available BWMS using existing test methods (i.e., *Generic Protocol for the Verification of Ballast Water Treatment Technology (ETV Protocol)*; U.S. Environmental Protection Agency, 2010). Federal funding is provided by the United States Environmental Protection Agency’s Great Lakes Restoration Initiative via MARAD, and supports obtaining BWMS for testing, BWMS transportation costs, consumables required

for BWMS operation, and GWRC personnel and supply costs associated with land-based BWMS evaluation.

III. PARTNERSHIP BENEFITS

The North American Great Lakes, a unique freshwater ecosystem, have been substantially impacted by introduction and rapid spread of ANS. This project is being conducted to address the lack of large-scale BWMS evaluation data within the Great Lakes System, a system that has been identified as particularly challenging for BWMS treatment (along with other freshwater ports, globally). BWMS manufacturer partnership with GWRC in this project begins to fill that gap and provides the data that Great Lakes vessel owner/operators would need to confidently select a BWMS to install onboard their vessel. This project will also provide critical data to inform future regulations within the U.S. As a partner on this project, the BWMS manufacturer would receive a Great Lakes, land-based evaluation of their BWMS at minimal cost. This evaluation allows BWMS manufacturers an opportunity to fine tune their technology for use within the Great Lakes System and, importantly, within other challenging freshwater ports worldwide. Further, it gives BWMS manufacturers insight into compatibility of their technology with the unique set of vessels that trade primarily within the Great Lakes System. As an added benefit of this partnership, GWRC will work with selected BWMS manufacturers to ensure the data needs of this project are met, while addressing any data needs that the manufacturer may have about their technology. Selected BWMS manufacturers will coordinate shipment of BWMS to Montreal Pier Facility, support and confirm proper installation of the BWMS, and provide training to GWRC staff on operation of the BWMS. Installation inspection and BWMS operation training could be done remotely.

IV. INSTRUCTIONS TO APPLICANTS

A. Eligibility

Manufacturers may apply for testing of a commercially available BWMS that is either a) type approved and compliant with the U.S. Coast Guard regulations and/or IMO Convention or b) non-type approved, fully assembled BWMS technology. Participation provides manufacturers an opportunity to fine tune their technology for use within the Great Lakes System and, importantly, within other challenging freshwater ports worldwide. The BWMS must be able to operate in freshwater with a very low salinity of <0.5 PSU. Table 1 shows historical water quality conditions at Montreal Pier Facility.

Table 1. Range of Water Quality Parameters at the Montreal Pier Facility during the Land-Based Testing Season (May – October) from 2007 - 2020. Parameters that are augmented to meet the ETV Protocol challenge condition requirements are marked with an asterisk ().*

Parameter	Montreal Pier Facility Historic Range
Temperature (°C)	7 – 23
Salinity (PSU)	0.07 – 0.10
Total Suspended Solids (mg/L)	<1.3 – 23.6*
Particulate Organic Matter (mg/L)	<1.3 – 22.3*

Mineral Matter (mg/L)	<1.0 – 21.0*
Dissolved Organic Carbon (mg/L)	4.8 – 38.5
Percent Transmittance, 254 nm	4.4 – 68.5

B. Structure and Content of Application

Applicants to this RFA must provide information on the availability of BWMS for land-based testing, willingness to partner with GWRC, compatibility of BWMS with Montreal Pier Facility operations, applicability of technology for use within the Great Lakes System, cost associated with leasing the BWMS, operation and maintenance expenses for the unit, and environmental health and safety concerns. Applicants may reference and/or share previous freshwater biological efficacy data if the data provide support of the technology’s eligibility for funding and justification for applicability to the protection of freshwater ecosystems. The following information must be included in the fillable-PDF application form:

1. Technical Information

1. Description of BWMS

- a. Manufacturer
- b. Manufacturer Point of Contact information
- c. Market-available models
- d. Has the technology achieved U.S. Coast Guard Type Approval and/or received final approval from an Administration for IMO compliance with the D-2 standard? If yes, please provide documentation.

2. Availability of BWMS for land-based testing from May – October 2023, and willingness to partner with GWRC to generate data on Great Lakes effectiveness.

- a. Is the technology available for land-based testing from May – October 2023?
- b. Is the manufacturer willing to partner with GWRC to fulfill the objectives of the *R&D Plan Land-Based BWMS Evaluation Project*?

3. Compatibility of BWMS model for testing at Montreal Pier Facility (Superior, WI, USA).

- a. Is there a market-available model that can treat a flow rate of 200 – 340 m³/hour?
- b. Does the BWMS have a market-available model that can meet the following pressure specifications?
 - i. Maximum 3.6 bar inlet pressure when ballasting
 - ii. Maximum 2.3 bar when deballasting
- c. Does the unit meet the following electrical specifications?
 - i. 100 Amp, 3 Phase at 480 Volts
 - ii. Note: Other arrangements can be supported using transformers

4. Applicability of BWMS for use in Great Lakes and onboard Great Lakes vessels.

- a. Has BWMS undergone independent testing (either land-based or shipboard) in salinity <1 PSU? If yes, please provide documentation.

- b. Has BWMS undergone independent testing (either land-based or shipboard) in freshwater temperatures <math><10^{\circ}\text{C}</math>? If yes, please provide documentation.
 - c. Is there a minimum hold time requirement?
 - d. Are there water quality limits of the BWMS specified by type approval certificates or other known water quality limitations?
- 5. Environmental health and safety procedures for BWMS operation and maintenance.**
- a. Are there any environmental or human health considerations to be aware of when operating and/or maintaining the BWMS?

2. Cost

- 1. Would the BWMS manufacturer provide a unit to evaluate at no cost?**
- 2. Would the BWMS manufacturer lease a unit to GWRC for freshwater evaluation?**
 - a. If yes, what is the estimated cost of leasing BWMS for land-based evaluation in 2023?
- 3. What consumables and supplies are necessary for operation and maintenance of the BWMS, and would the BWMS manufacturer provide GWRC with any of these supplies?**
 - a. If no, what is the estimated cost of consumables and supplies required for BWMS operation and maintenance?
- 4. Would the BWMS manufacturer be willing to pay for the cost of shipping the unit to/from Montreal Pier Facility in Superior, Wisconsin, USA?**
 - a. If no, what is the estimated cost of shipment?

C. Confidentiality

Applicants are responsible for providing any confidentiality or non-disclosure agreement desired prior to planning the test design. LSRI-GWRC will maintain confidentiality of any declared proprietary information relative to the technology subject to testing and will work with selected BWMS manufacturers to ensure that proprietary aspects of their technology are referred to in a general and categorical way in all planning and reporting documents.

D. Application Submission

Completed applications and supporting data (if applicable) will be accepted until 5:00 pm CST on 03 February 2023. Submit application materials via electronic mail to jmaki@uwsuper.edu. Applications received after the deadline will not be reviewed.

E. Reporting

The data from projects conducted under the R&D Plan will be made available to the public and will add to existing large-scale BWMS evaluation data obtained by other organizations. LSRI-GWRC will publish findings in peer-reviewed scientific or technical journals, and other publications or reports as deemed appropriate. Publication will be completed in collaboration with the applicants, and no declared proprietary information about the technology will be reported by LSRI-GWRC in publicly-available documents.

V. EVALUATION CRITERIA

Completed applications will be reviewed by a MARAD-convened panel consisting of MARAD staff, GWRC staff, and outside experts within four to six weeks of receipt. Review criteria are:

- Application completeness;
- BWMS availability for testing at Montreal Pier Facility;
- BWMS model compatibility with testing at Montreal Pier Facility;
- Cost of BWMS leasing, shipment, operation, and maintenance;
- Willingness to share cost associated with BWMS evaluation; and
- Applicability of BWMS for use in Great Lakes System and onboard Great Lakes vessels.

Any questions that arise during this review will be transmitted to the applicant for feedback by electronic mail. After the four to six-week review period, GWRC will transmit an email indicating the outcomes of the review to the applicant.

VI. AWARD OF SERVICES

If land-based testing services are awarded, GWRC will forward a scope of work (SOW) and contract terms and conditions for applicant review, revision, and signature. Next, GWRC will develop a test plan tailored to the BWMS unit to be evaluated and the project goals and objectives. The test plan will be reviewed by the applicant, revised as needed, and finalized with signatures from GWRC and the applicant.

VII. REFERENCED LITERATURE

- Frank Lobiondo Coast Guard Authorization Act of 2018, Pub. L. No. 115–282, 176 (2018).
- International Maritime Organization. (2004). *Regulation D-2 Ballast Water Performance Standard*. International Convention for the Control and Management of Ships' Ballast Water and Sediments. London, United Kingdom.
- U.S. Environmental Protection Agency. (2010). *Generic Protocol for the Verification of Ballast Water Treatment Technology*, EPA/600/R-10/146. Environmental Technology Verification Program.