

# Lakers and Ballast Water



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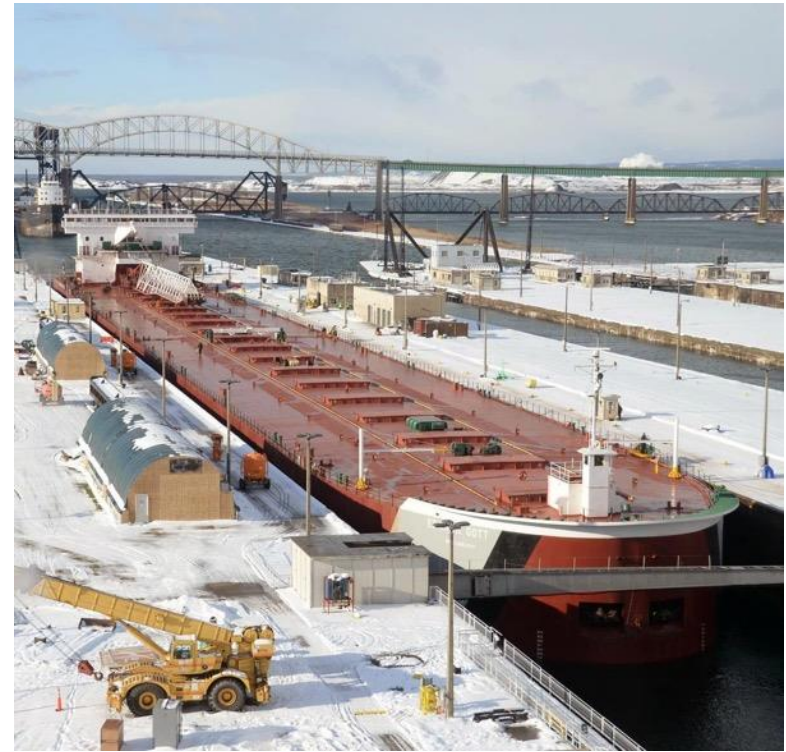
Lake Carriers' Association

Great Lakes Panel on Aquatic Nuisance Species Meeting  
June 2024



# What is a U.S. Flagged Laker?

- Vessel primarily confined to four Great Lakes – Lake Superior, Lake Michigan, Lake Huron, and Lake Erie
- Built:
  - Original: 1906 to 2020
  - Modification: 1946 to 1998
- Vessel designed to operate in the Great Lakes
  - Low depth profile
  - Uncoating ballast tanks
- Quick offloading of goods requires high ballast water pumping rates
- Truncated operating year due to ice and Soo Locks winter closure



# Ballast Water - Lakers & Early Actions

- 1993 – Voluntary Actions for the Ruffe invasion to Duluth Harbor (updated in 2008).
- 1996 – 1998 – Filtration and treatment systems were evaluated with the help of the NEMW I
- 2001 – Voluntary Best Management Practices (BMPs) to reduce the risk of the spread risk of Aquatic Nuisance Species (ANS) within the Great lakes. These items were the basis for the initial Great Lakes – St. Lawrence Seaway and U.S. EPA Vessel General Permit ballast water requirements.
- 2007 – Voluntary BMPs for the VHS virus.
- ***Lakers were and are proactive for any known problem.***

# Vessel Size

Two largest  
U.S. flagged  
vessel classes



1013 ft



767 ft

Largest Canadian  
Flagged Laker



730.5 ft



305 ft

# Ballast Water Systems

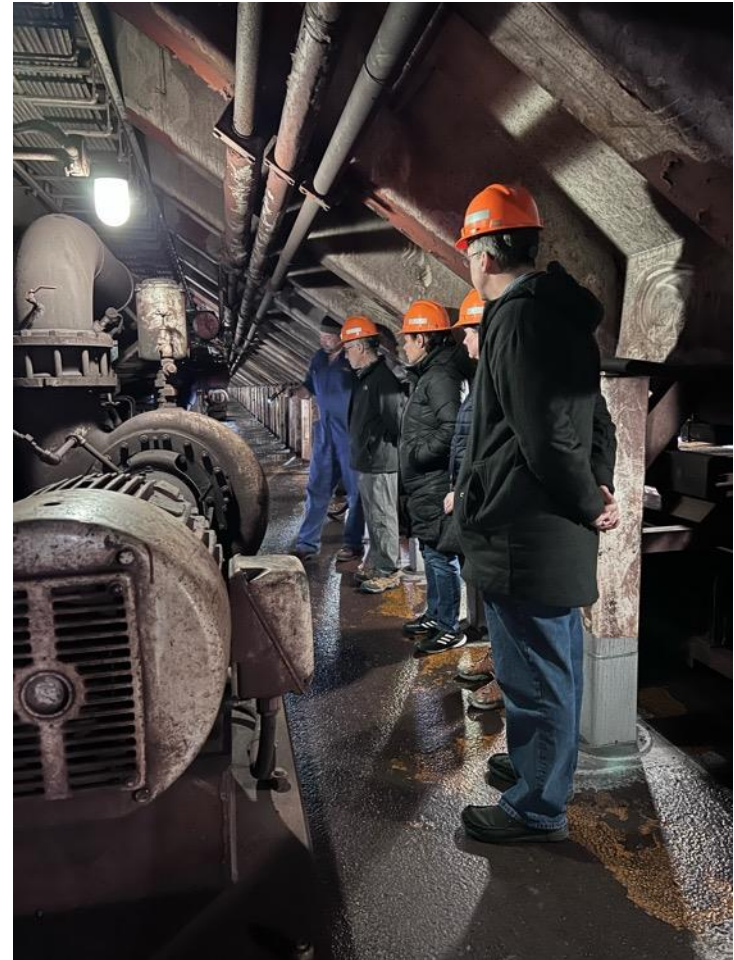
Specifications	1,000' Manifold Ballast System	1,000' Independent Ballast System	609' to 806' Converted Vessels Manifold Ballast System	Canadian Laker
Gross Tonnage (average)	35,815	33,466	13,707	22,512
No. of Ballast Tanks	17	19	11 – 20	16
No. of Ballast Pumps	4 in Engine Room	8 - 36	2 in Engine Room	?
Average Ballast Capacity (m <sup>3</sup> )	62,038	51,907	25,853	18,306
Ballast Pumping Capacity (m <sup>3</sup> /h)	Total: 9,084 – 14,534 Per Pump: 2,271 – 3,634	Total: 11,809 – 18,123 Per Pump: 818 – 1,476	Total: 4,769 – 14,716 Per Pump: 1,703 – 7,358	?

# Space – Where to install?

Manifold Ballast System



Independent Ballast System



# Obstacles to Overcome

- Approved for use on a U.S. flagged vessel
- Approved for use in freshwater
- Ballasting flow rates
- Compliance with State Water Quality Limits
- Corrosivity of oxidizing agents
- Time constraints
- Space for equipment
- Electric power demands
- Water Quality (i.e., water temperature, turbidity, total suspended solids (TSS), UV transmittance (UVT))
- Manning limitations

# Analysis for State of Minnesota Permit

- Since 2018, LCA annually reviewed compatibility of all USCG type approved ballast water management systems (BWMS).
- Evaluate:
  - Vessel stability
  - Corrosivity
  - Vessel transit/hold times times
  - Water quality (e.g., TSS, turbidity, UVT, temperature)
- Determined that no USCG type approved BWMS is compatible with the operation of a U.S.-flagged Laker.

**mn** MINNESOTA POLLUTION CONTROL AGENCY

State Disposal System (SDS)  
Vessel Discharge Permit No. MNG300000  
Notice of Coverage

Permittee: Multiple  
Facility name: Ballast Water General Permit  
Receiving water: Minnesota state waters of Lake Superior  
Location: Multi-location mobile vessel  
Issuance date: October 1, 2018  
Expiration date: September 30, 2028

The state of Minnesota, on behalf of its citizens through the Minnesota Pollution Control Agency (MPCA), authorizes the Permittee to transit through and discharge ballast water to the state waters of Lake Superior, in accordance with the requirements of this permit.

The goal of this permit is to reduce pollutant levels in point source discharges and protect water quality in accordance with Minnesota and U.S. statutes and rules, including Minn. Stat. chs. 115, 116; and Minn. R. chs. 7001, 7050, 7053, and 7060.

This permit is effective on the issuance date identified above and shall expire at midnight on the expiration date identified above.

Signature: Theresa Haugen  
(The document has been electronically signed)  
Theresa Haugen  
Supervisor  
Water Section  
Industrial Division  
for the Minnesota Pollution Control Agency

Submit WQ reports to:  
Attention: WQ Submittals Center  
Minnesota Pollution Control Agency  
520 Lafayette Road North  
St Paul, Minnesota 55155-4194

Questions on this permit?  
• For specific permit requirements or permit compliance contact:  
John Thomas ([john.thomas@state.mn.us](mailto:john.thomas@state.mn.us)) 218-302-6616  
• General permit or NPDES Program questions contact:  
MPCA at 651-282-6143 or 1-800-657-3938

wq-08-07a



# GWRC Research Projects

- PERE MARQUETTE (403 ft)
  - Ballast Capacity: 1,019 m<sup>3</sup>
  - Ballast Pumps: 2 x 454 m<sup>3</sup>/h
  - BIO-SEA BWMS installed as part of research.
- DIRK S. VANENKEVORT / MI TRADER (740 ft)
  - Ballast Capacity: ~24,000 m<sup>3</sup>
  - Ballast Pumps: 4 x 1,599 m<sup>3</sup>/h
  - DESMI CompactClean BWMS installed during tug construction.
  - STBD unit not operating since mid-2023.
- PATHFINDER –
  - Filtersafe filter installed in 2024



# PERE MARQUETTE BIO-SEA BWMS



Installed in barge for research project  
Atypical space for Laker

# MI TRADER CompactClean BWMS



Installed during tug construction



# Ballast Water Treatment Issues

- No BWMS is required to undergo shipboard testing in freshwater.
- No BWMS is required to undergo testing in coastal waters with high TSS, turbidity, and low UV-transmittance.
- Treatment rated capacity (TRC) of BWMS needs to be redefined.
- BWMS manufacturers are not interested in issues specific to the Great Lakes – the market is too small.

## Ballast Water Management Convention and BWMS Code

WITH GUIDELINES FOR IMPLEMENTATION  
2018 EDITION

Pt. 162		46 CFR Ch. I (10-1-19 Edition)	
<b>PART 162—ENGINEERING EQUIPMENT</b>		<b>Subpart 162.050—Pollution Prevention Equipment</b>	
<b>Subpart 162.017—General</b>	<b>Provisions: Valves, Pressure/Vacuum Relief, for Tank Vessels</b>	162.050-1 Scope.	162.050-2 Definition.
162.017-1	Preventive effect, incorporation by reference.	162.050-3	Incorporation by reference: Where used 2 per 4 copy of the pollution prevention manual for each.
162.017-2	Type.	162.050-4	Condition of application.
162.017-3	Materials, construction, and workmanship.	162.050-5	Approval procedures.
162.017-4	Marking.	162.050-6	Test report.
162.017-5	Procedure for approval.	162.050-7	Marking.
<b>Subpart 162.018—Safety Relief Valves, Liquefied Compressed Gas</b>		162.050-8	Factory production and inspection.
162.018-1	Applicable specifications, and referenced material.	162.050-9	Designation of facilities.
162.018-2	Scope.	162.050-10	Separator test rig.
162.018-3	Materials.	162.050-11	Oil content meter and bilge alarm test rig.
162.018-4	Construction and workmanship.	162.050-12	Separator and bilge alarm test facility.
162.018-5	Shut-down, adjustment, and pigging.	162.050-13	Separator Design specification.
162.018-6	Marking.	162.050-14	Separator Approval tests.
162.018-7	Flow rating tests.	162.050-15	Oil content meter Design specifications.
162.018-8	Procedure for approval.	162.050-16	Oil content meter approval tests.
<b>Subpart 162.021—Combination Fishoe Nozzles</b>		162.050-17	Bilge alarm: Design specifications.
162.021-1	Scope.	162.050-18	Bilge alarm: Approval tests.
162.021-2	Incorporation by reference.	162.050-19	Viscosity test.
162.021-3	Design, construction, testing, and marking requirements.	<b>Subpart 162.060—Ballast Water Management Systems</b>	
162.021-4	Approval procedures.	162.060-1	Purpose and scope.
<b>Subpart 162.028—Extinguishers, Fire, Portable, Marine Type</b>		162.060-2	Definition.
162.028-1	Applicable specifications.	162.060-3	Incorporation by reference.
162.028-2	Classification.	162.060-4	Approval procedures.
162.028-3	Requirements.	162.060-5	Use and acceptance of existing test data.
162.028-4	Marine type label.	162.060-6	Information requirements for the ballast water management system (BWMS) application.
162.028-5	Approved laboratories.	162.060-7	Changes to an approved ballast water management system (BWMS).
162.028-6	Examination, tests, and inspection.	162.060-8	Supplements, withdrawal or termination of approval.
162.028-7	Procedure for listing and labeling.	162.060-9	Design and construction requirements.
162.028-8	Termination of listing or labeling.	162.060-10	Marking requirements.
<b>Subpart 162.029—Extinguishers, Fire, Semi-portable, Marine Type</b>		162.060-11	Test Plan Requirements.
162.029-1	Incorporation by reference.	162.060-12	Labeling listing requirements.
162.029-2	Classification.	162.060-13	Approval listing requirements.
162.029-3	Requirements.	162.060-14	Testing requirements for ballast water management system (BWMS) components.
162.029-4	Marine type label.	162.060-15	Testing and evaluation requirements for active substances, propellants, and related chemicals.
162.029-5	Approved laboratories.	162.060-16	Test Report requirements.
162.029-6	Examination, tests, and inspection.	162.060-17	Quality Assurance Project Plan (QAPPP) requirements.
162.029-7	Procedure for listing and labeling.	162.060-18	Operation, Maintenance, and Repair Manual (OMRM).
162.029-8	Termination of listing or labeling.	162.060-19	Requirements for independent laboratories (IL).
162.029-9	Procedure for testing and labeling.	162.060-20	Requirements for independent laboratories (IL).



# BWMS Freshwater Testing

BWMS	Land-Based Testing				Shipboard Testing
	Temperature Range (°C)	BWMS Unit Tested (m <sup>3</sup> /h)	Flow Measured During Testing (m <sup>3</sup> /h)	BWMS Flow Reduction	BWMS Flow Reduction in Seawater
Optimarin Ballast System (OBS)	9 – 16	334	88 – 180	44 – 75%	No testing
BIO-SEA B, M and L models	15 – 18.2	300	106 – 172	43 – 65%	No testing
CompactClean	6.9 – 21	340 and 510	71 – 123	70 – 82%	No testing
PureBallast 3.2	7.5 – 16	No Data	No Data	No Data	No data provided
Evolution	11.3 – 20.2	250	173 – 199	21 – 31%	No testing
GloEn-Patrol 2.0	9.2 – 22	No Data	No Data	No Data	No testing
Hyde GUARDIAN-US	16 – 23	300	97 – 152	49 – 68%	50% reduction
Purestream™ BWMS	15.6 – 20	500	156 – 347	31 – 69%	No testing

Note: Data from IMO documents. USCG data not available.

Review of testing shows that the installed BWMS need to be approximately 2 x larger.

# LCA FMC Petition – A Trade Barrier

- The LCA Federal Maritime Commission petition is not about environmental impacts. It is a trade barrier.
- **Issue – Transport Canada actions are unfavorable to U.S. flagged Lakers in U.S. – Canadian trade.**
- Final Transport Canada ballast water regulations included a ballast water uptake requirement – even if the ballast water is not discharged in Canadian waters.
- U.S. should regulate discharges in the U.S. - and Canada should regulate discharges in Canada.
- Transport Canada excluded U.S. flagged Lakers:
  - in their Regulatory Impact Analysis
  - in ballast water work shops
  - from Ballast Water Innovation Program – unless partnering with a Canadian company
  - from apply for an exemption/extension to the September 8, 2024 compliance timeline (until new policy unveiled in this month)
- The U.S. EPA and USCG treat Canadian shipowners the same as U.S. shipowners.



# Questions?



# Thank you

- Jim Weakley, President  
(440) 333-9995 / [weakley@lcaships.com](mailto:weakley@lcaships.com)
- Eric Peace, Vice President  
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# Extra Slides (if needed)

# 2001 Best Management Practices

- Vessel operators will assist in developing programs should U.S. Fish and Wildlife Service (or an equivalent Canadian authority) determine a nuisance species has established niche communities in a specific harbor, providing that these programs will result in substantial prevention of the spread of the species or harmful organism via ballast water.
- Each vessel will perform annual inspections to assess sediment accumulations. Removal of sediment, if necessary, will be carried out. Records of these actions will be kept onboard the ship.
- Each company will develop sediment removal policies and plans.
- When practical and safe, vessels will take only the minimum amount of ballast required to safely depart the dock and will complete ballasting in deeper water. Records of all ballasting operations will be kept onboard the ship.
- Cooperation will be provided, as mutually agreed upon, for scientific research into sampling and analysis programs that will not interfere with normal and safe ship operations.
- Cooperation will be provided, as mutually agreed upon, for developing and testing ballast water treatment systems.