National Park Service
U.S. Department of the Interior

Isle Royale National Park

Mobile Ballast Water Treatment for Contingency or Emergency Responses

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G.L. ANS Panel Meeting, Ann Arbor, MI, Nov. 14, 2019

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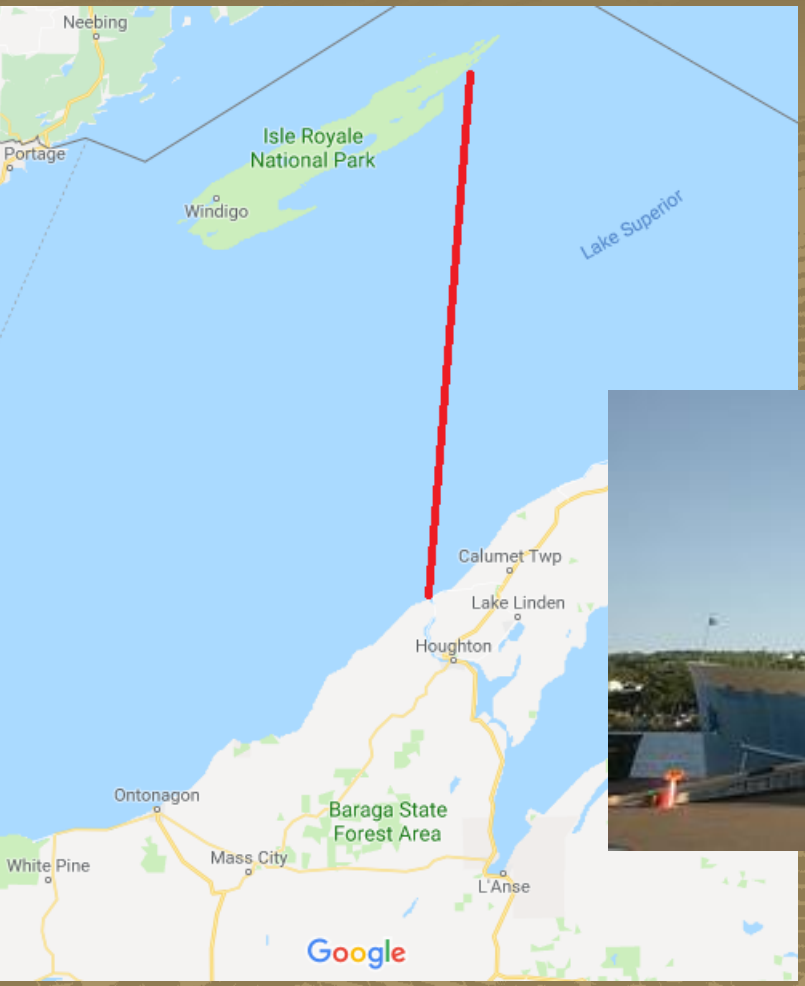
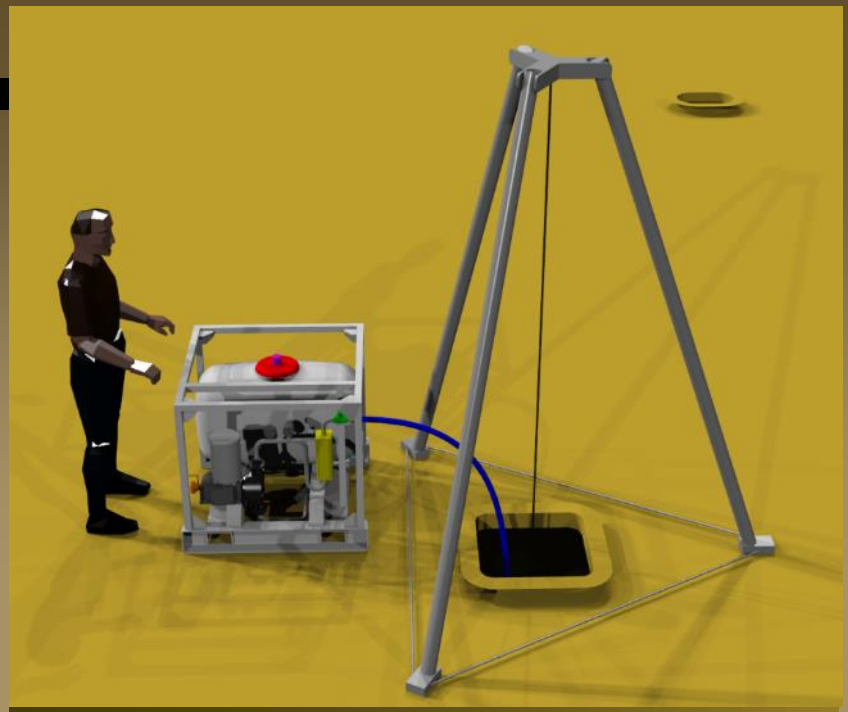
Isle Royale N.P.'s *M/V Ranger III*



Lake Superior Shipping Lanes

http://greatlakesmapping.org/great_lake_stressors/6/shipping-lanes

Mobile BWTS



Response Scenarios

- Contingency
  - Installed BWTS failure due to operator error or mechanical
- Emergency
  - Containment of ANS outbreaks
  - Lack of on-board BWTS (exemption or otherwise)
  - Emergency groundings

System development

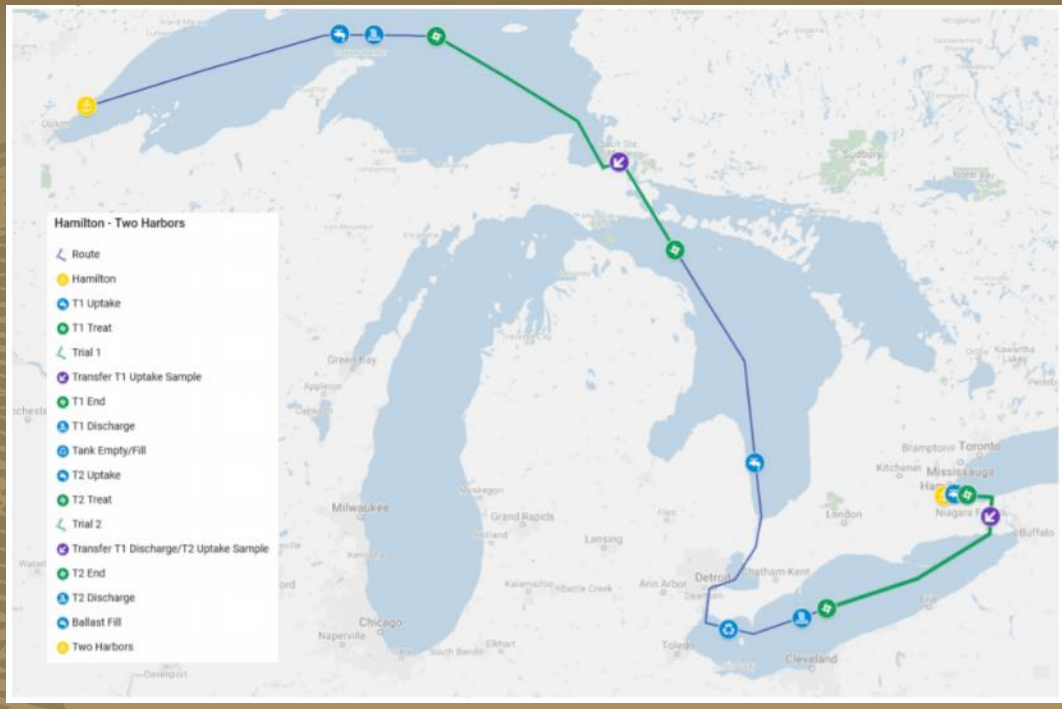
- Mixing system – scale and shipboard
- Biocide dosing procedures – bench, land-based and shipboard
- Full system shipboard –
  - Brackish water
    - Golden Bear – 2014
  - Great Lakes fresh water
    - McAsphalt – 2016
    - Algoma – September 2018

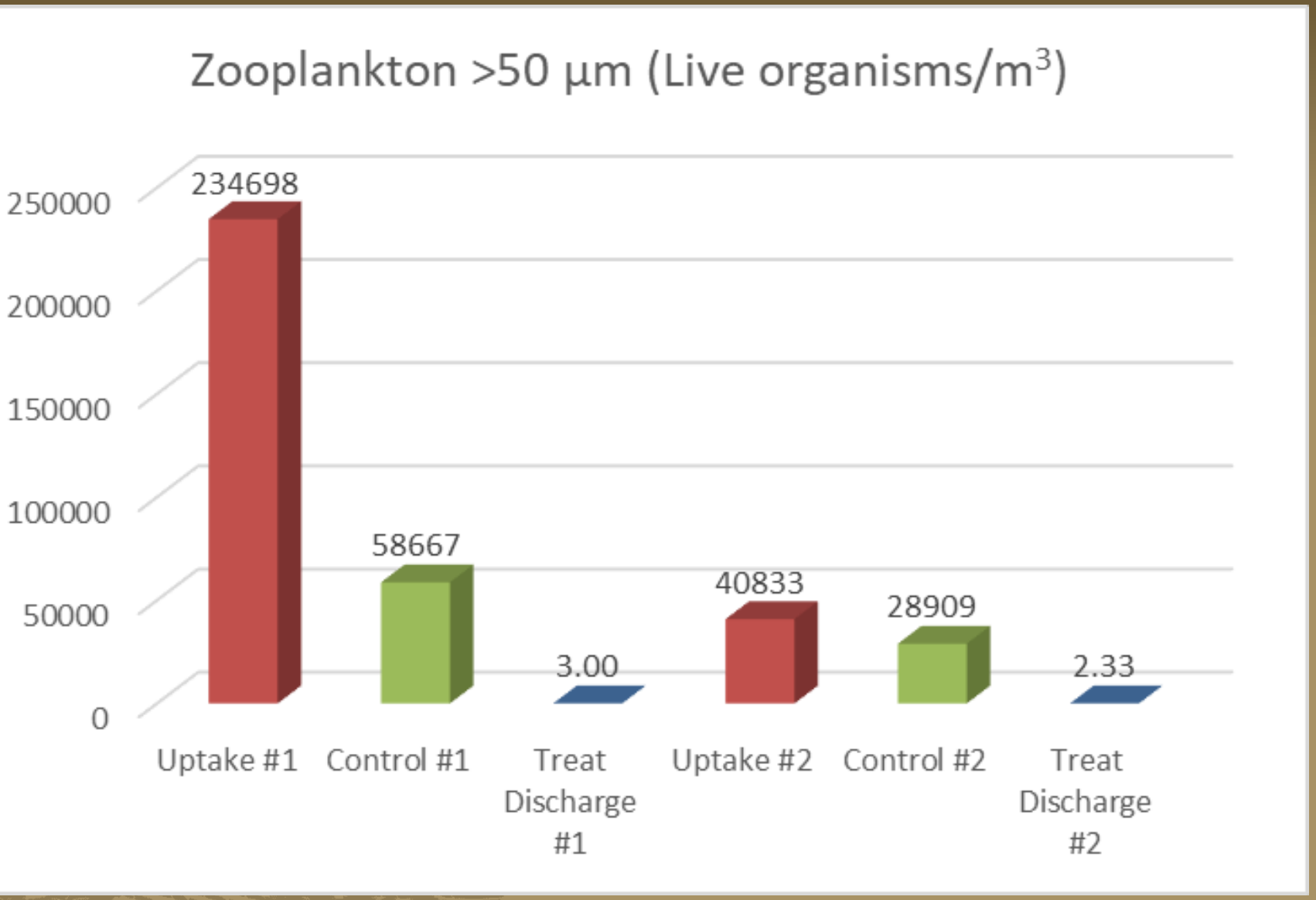
Test Platform

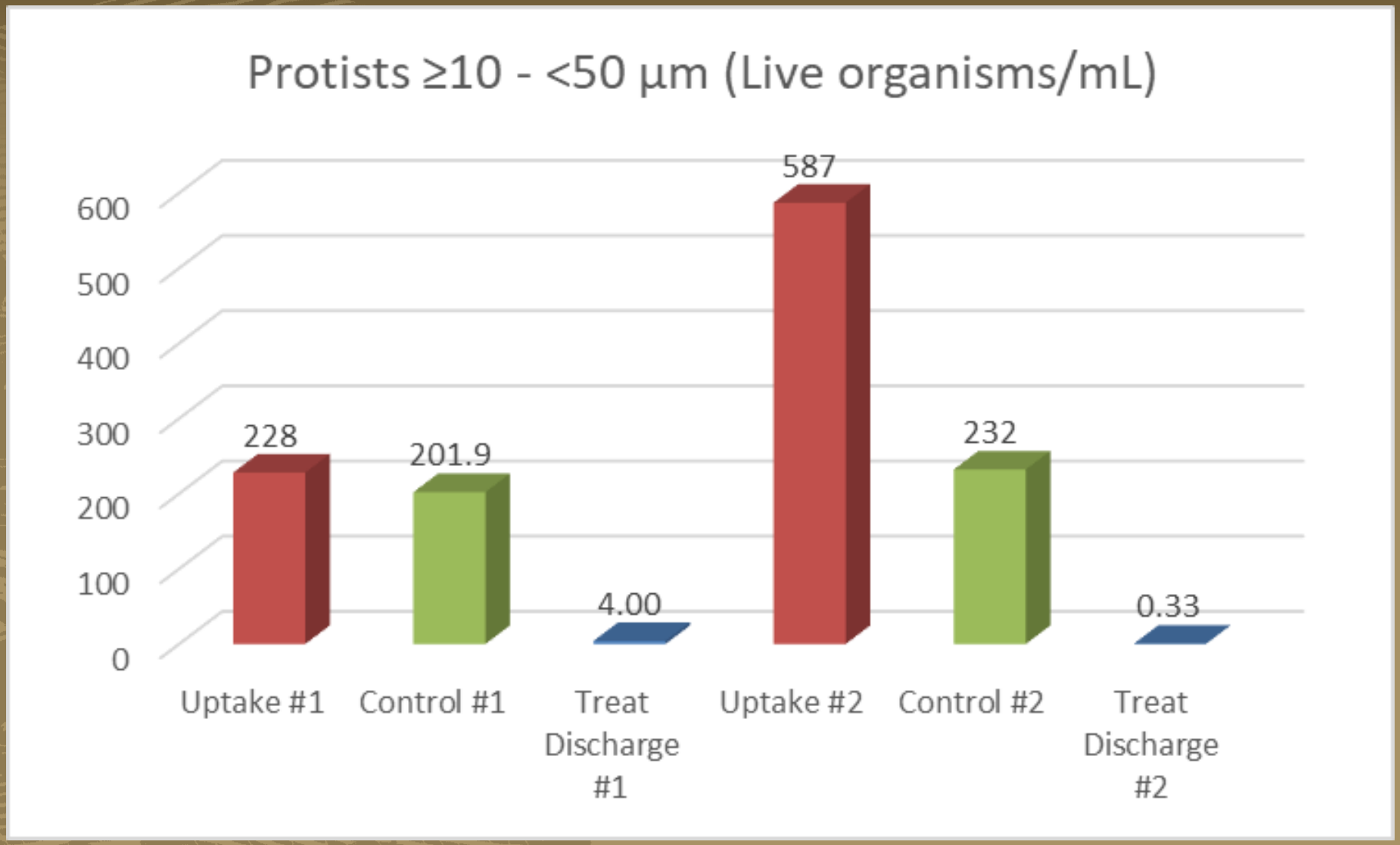
- Algoma Central's M/V *Tim S. Dool*
  - Bulk carrier – grain or iron
  - 730 feet long

Testing Details

- Route
  - Hamilton, ON to Superior, WI
  - Sep. 13 – 19, 2018
- Two Trials - uptakes in
  - #1 Hamilton, ON
  - #2 W. L. Erie
- Three test tanks
  - 830 m^3 (220,000 gal) per tank

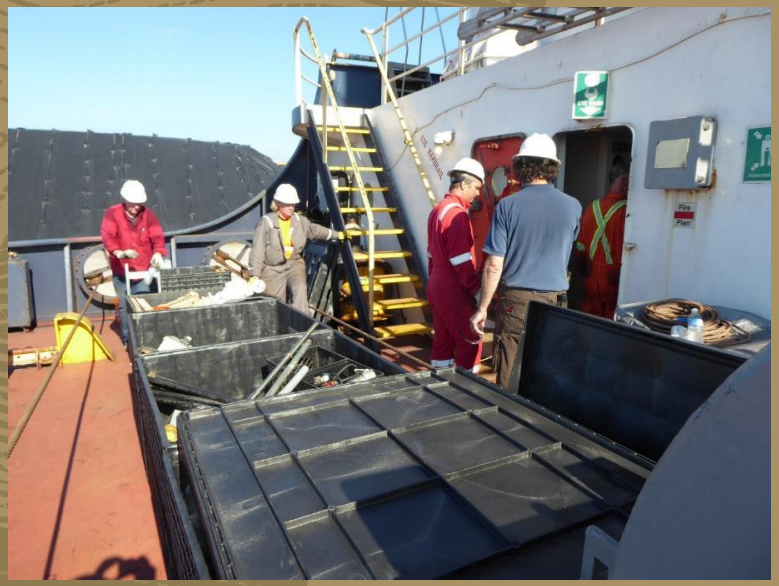


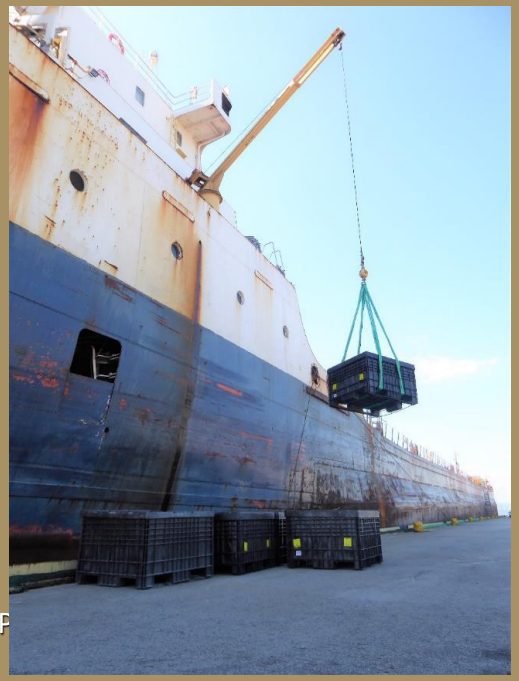

Zooplankton >50 µm (Live organisms/m3)
250000
200000
150000
100000
50000
0
234698
58667
3.00
40833
28909
2.33
Uptake #1
Control #1
Treat Discharge #1
Uptake #2
Control #2
Treat Discharge #2


Protists ≥10 - <50 µm (Live organisms/mL)
600
500
400
300
200
100
0
228
201.9
4.00
587
232
0.33
Uptake #1
Control #1
Treat Discharge #1
Uptake #2
Control #2
Treat Discharge #2

Implementation Ready

- Deployment demonstration
- Partner – Glosten
- Regulatory approvals





Emergency Use Scenario

- Oregon code 783.635(4)(a) – “The Environmental Quality Commission may adopt…
  - (B) Emergency response procedures for managing high-risk ballast water... [including] feasible alternative ballast water management strategies.”

Barge in Coos Bay, OR

MarineLink

Shipbuilding Offshore Coastal/Inland Government Equipment Training Law & Regulations

Mobile System Used for Treating Ballast Water

MarineLink June 11, 2018

Glosten and Global Diving & Salvage say they have used a mobile system to treat ballast water on board a 350-foot marine vessel moored in Coos Bay, Ore.

The firms deployed the Glosten Ballast Responder successfully treating all 3,990 tons of ballast water on board. The contingency response team deployed from Seattle the morning of May 21 and certified all ballast water on board as safe for discharge by the evening of May 23.

"The system and team performed very well," said Glosten Principal and ballast water treatment expert Kevin Reynolds, PE. "We will continue to incorporate lessons learned as we perform additional deployments."

The treatment utilized a mobile ballast water mixing system that Glosten developed in cooperation with the U.S. Geological Survey and the National Park Service. Previous deployments were used to gain biological efficacy data and establish practical treatment protocols; however, this treatment marks the first live deployment to assist a vessel requiring ballast water management for treating aquatic nuisance species.

Contingency Use

- “the operations that deal with planned ballast water discharges that do not meet port State control requirements with regard to harmful aquatic organisms.”

- International Maritime Organization resolution, MEPC.306(73):
  - “The ballast water management plan may include contingency measures…”

BMP for ANS Emergencies

- Vessel Incidental Discharge Act, 33 USC 1322(p)(4)(E) and (6)(E)(ii)(III)

- BEST MANAGEMENT PRACTICES FOR AQUATIC NUISANCE SPECIES EMERGENCIES
  - “necessary to reduce the reasonably foreseeable risk of introduction or establishment of an aquatic nuisance species”

Even more options

- No discharge
- Mid-lake discharge
- Off-ship treatment
- Other?

Figure 2: Damen's prototype Mobile/Barge water treatment system

Mobile BWTS Benefits

- Mobility and quick response times
- En route treatment option
- Potential range of liquid biocides and neutralizers

NPS Partners

- 2018 Trials
  - Algoma Central Corporation
  - Glosten (naval architecture and marine engineering firm)
  - Global Diving & Salvage
  - Moss Landing Marine Laboratories
  - Chamber of Marine Commerce
  - St Louis County, MN
  - Izaak Walton League – MN Division
  - Grand Portage Band of Lake Superior Chippewa
- Previous
  - American Steamship Company
  - Michigan Technological University
  - U.S. Geological Survey
  - NEMWI-GSI
  - McAsphalt Marine Transportation Ltd.
  - EPA – GLRI
  - David Wright/Env. Res. Serv.

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Houghton, MI

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