PICES 2019

Environmental impacts and potential mitigation of grey water discharges from ships

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Ocean Conservancy
People depend on a healthy ocean for subsistence and culture. Disturbance directly impacts food security.
Vessel Traffic is Increasing

**Doubling** of traffic in Canadian Arctic

**120 - 430%** vessel increase in Bering Strait by 2025
Grey water is drainage from dishwasher, shower, laundry, bath and washbasin drains.
“Untreated grey water characteristics are similar to, and in some cases have a higher concentration of constituents than domestic sewage.”

- U.S. Environmental Protection Agency

Fecal coliform = $1-3 >$ untreated domestic wastewater

BOD = $4 \times$ higher domestic sewage
• Excessive algal growth from nutrients

Dead zones

• Increased particulate matter

Smother benthic species

• Pathogen vector

Ecological and human health risks
## Grey Water Generated
### Canadian Arctic 2016

<table>
<thead>
<tr>
<th>Vessel Type</th>
<th>Greywater (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Vessel</td>
<td>11,622,319</td>
</tr>
<tr>
<td>Fishing Vessel</td>
<td>5,771,964</td>
</tr>
<tr>
<td>Coast Guard Icebreaker</td>
<td>3,743,490</td>
</tr>
<tr>
<td>General Cargo</td>
<td>2,439,094</td>
</tr>
<tr>
<td>Bulk Carrier</td>
<td>3,474,563</td>
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<tr>
<td>Tug</td>
<td>1,623,021</td>
</tr>
<tr>
<td>Cruise Ship</td>
<td>1,541,667</td>
</tr>
<tr>
<td>Tanker</td>
<td>1,270,625</td>
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<tr>
<td>Military Vessel</td>
<td>676,057</td>
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<tr>
<td>Factory Ship</td>
<td>328,385</td>
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<tr>
<td>Chemical Tanker</td>
<td>228,703</td>
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<tr>
<td>Sailing Ship</td>
<td>204,505</td>
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<tr>
<td>Trawler</td>
<td>165,938</td>
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<tr>
<td>Coast Guard Tender</td>
<td>139,219</td>
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<tr>
<td>Research Vessel</td>
<td>109,833</td>
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<tr>
<td>Yacht</td>
<td>76,583</td>
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<tr>
<td>Adventurer</td>
<td>15,781</td>
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<tr>
<td>Others</td>
<td>6,547</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>33,438,293</strong></td>
</tr>
</tbody>
</table>
IMPORTANT ECOLOGICAL AREAS

- Important narwhal & beluga areas
- Arctic char concentrations
- Eastern arctic sensitive benthic areas
- Beluga migration routes
Canadian West Coast Grey Water Report
Treatment options
Alaska large passenger vessel regulations

- Standards only achievable through use of AWTS
- Requires sampling, monitoring, reporting
California, Norway and elsewhere have specific grey water regulations.
Bilateral Grey Water Workshop Goals

• Address community concerns about grey water discharges
• Identify technologies for pragmatic treatment
• Exchange “lessons learned” to help inform practical solutions
• Discuss gaps and challenges
Bilateral Grey Water Workshop

Key Messages

No discharges near communities

Pragmatic treatment technologies available, in use, enforced

IMO action needed
International Context

Arctic Council

International Maritime Organization
THANK YOU

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