

Green Marine Environmental Program

2021



Performance
Indicators for
Ship owners

Copyright © 2021 Green Marine Management Corporation.
All rights reserved. Reproduction and distribution of the Green Marine
Environmental Program is strictly prohibited.

Table of contents

1. AQUATIC INVASIVE SPECIES	3
1.A - DOMESTIC SHIP OWNERS	3
1. AQUATIC INVASIVE SPECIES	5
1.B - INTERNATIONAL SHIP OWNERS	5
2. POLLUTANT AIR EMISSIONS - SOX AND PM	7
3. POLLUTANT AIR EMISSIONS - NOX	9
4. GREENHOUSE GAS EMISSIONS.....	10
5. CARGO RESIDUES (International dry bulk cargo carriers operating in the Great Lakes and St. Lawrence only)	11
6. OILY DISCHARGE.....	12
7. WASTE MANAGEMENT	14
8. UNDERWATER NOISE.....	15
9. SHIP RECYCLING	17

1. AQUATIC INVASIVE SPECIES

1.A - DOMESTIC SHIP OWNERS

OBJECTIVE: Reduce the risk of introducing and propagating aquatic invasive organisms and pathogens associated with ballast water discharges and biofouling.

APPLICABILITY: This indicator is only applicable for fleets that regularly manage ballast water.

LEVEL 1
Monitoring of regulations
LEVEL 2
<p><u>Note:</u> The US EPA VGP and USCG regulations contain operational measures 2.1 and 2.2 aimed at reducing the uptake and discharge of nonindigenous species. These measures should also be undertaken in Canadian waters.</p> <p>2.1 Minimize or whenever possible avoid uptake of ballast water in the following conditions:</p> <ul style="list-style-type: none"> - In shallow water; - In areas close to sewage outflows; - In areas with known epidemics or infestations; - In areas where dredging operations are underway; - In areas where tidal flushing is poor; - In areas identified by regulatory authorities. <p>2.2 Uptake only the minimum amount of ballast water required to safely depart the dock, and complete ballasting operations in deeper waters (while always ensuring the safety of the vessel).</p> <p>2.3 Periodically inspect vessels' hulls including niche areas, such as sea chests, propeller thrusters, keels, rudders, and dry dock support strips.</p> <p><u>Note:</u> Refer to 2011 IMO Biofouling Guidelines Sections 1.4, 7.2, 7.3, and 7.4. A copy can be found in the Members section of the Green Marine website.</p> <p>2.4 If needed, remove biofouling organisms from the hull, propellers, stern tube, sea chests, and other wetted portions of a vessel.</p> <p><u>Note:</u> Cleaning with capture is suggested if biofouling covers over 15% of the wetted surfaces. At 15% coverage, the vessel is considered extensively fouled. Diagrams to help estimate percent coverage can be found in the Members section of the Green Marine website.</p> <p>2.5 For each vessel, keep a record book on details of all inspections and biofouling management measures undertaken on the ship.</p> <p><u>Note:</u> A template of such a record book can be found in the members section of Green Marine's website.</p> <p><u>Domestic ship owners operating in the St. Lawrence and the Great Lakes:</u></p> <p>2.6 If feasible and safe, conduct salt water ballast exchange during coastal trades prior to re-entering the lakes.</p> <p><u>Note:</u> Coastal trade is defined as "Movement of cargo and passengers between inland waterways and coastal ports, and within EEZ waters".</p>
LEVEL 3
<p>3.1 Maintain a Ballast Water Management plan and Biofouling Management plan for each vessel which includes all the best practices required to achieve Level 2.</p> <p><u>Note:</u> A Biofouling Management plan template can be found in the Members section of the Green Marine website.</p> <p>3.2 Support scientific research on ballast water or biofouling by providing access to ships for sampling by governmental and research groups or by participating on an expert working group.</p> <p><u>Note:</u> It is not necessary to actively participate in the research program in order to fulfill this criterion.</p> <p>3.3 Complete and maintain an annual inventory to evaluate the amount of ballast water taken and discharged by the company's ships by origin/destination.</p> <p><u>Note:</u> See Annex 1-A.</p> <p>OR as an alternative to 3.3 <u>for vessels with a ballast water treatment system:</u></p> <p>3.4 Produce an internal annual log showing any cases of ballast water treatment system malfunctioning. For such cases include root cause(s) and preventive action(s) taken.</p>

LEVEL 4

Fulfill one of the following 2 criteria:

4.1 Actively participate in research and development on reducing the risk of AIS introduction and spread associated with ballast water operations and discharges, for example – partner with an academic institution, technology developer, innovation accelerator, or government agency.

OR

4.2 Actively participate in research and development on reducing the risk of AIS via biofouling, for example - coatings, autonomous underwater cleaning or underwater cleaning capture technologies.

Note: Active participation is defined as the provision of support by the company, whether through financial means, human resources or equipment and can include an experimental shipboard trial.

LEVEL 5

5.1 Use a ballast water treatment system (BWTS) on one or several of the company's vessels. And, for each installed and in-use BWTS, adopt contingency measures, as per MEPC 71/WP.9 Annex 4.

AND fulfill one of the following 3 criteria:

5.2 For each installed BWTS, conduct a ballast water management system commissioning test for biological efficacy. Use the International Maritime Organization (IMO) Marine Environment Protection Committee (MEPC) Circular 70 ([BWM.2/Circ.70/Rev.1](#)) as the basis for sampling and analysis. The document can be found in Members section of the Green Marine website.

OR

5.3 Purchase or install a compliance monitoring device and conduct annual self-monitoring of ballast water discharges for each installed BWTS.

OR

5.4 Submit data on the use of the BWMS to the shipowner's flag State to contribute to the IMO Experience Building Phase.

1. AQUATIC INVASIVE SPECIES

1.B - INTERNATIONAL SHIP OWNERS

LEVEL 1
Monitoring of regulations
LEVEL 2
<p><u>Note:</u> The US EPA VGP and USCG regulations contain operational measures 2.1 and 2.2 aimed at reducing the uptake and discharge of nonindigenous species. These measures should also be undertaken in Canadian and international waters.</p> <p>2.1 Minimize or whenever possible avoid uptake of ballast water in the following conditions:</p> <ul style="list-style-type: none">- In shallow water;- In areas close to sewage outflows;- In areas with known epidemics or infestations;- In areas where dredging operations are underway;- In areas where tidal flushing is poor;- In areas identified by regulatory authorities. <p><u>Note:</u> International ship owners should call on local agents to provide specific information and instructions in this matter.</p> <p>2.2 Uptake only the minimum amount of ballast water required to safely depart the dock, and complete ballasting operations in deeper waters (while always ensuring the safety of the vessel).</p> <p>2.3 Periodically perform in-water inspections of the vessel's hulls including niche areas, such as: sea chests, propeller thrusters, keels, rudders, and dry dock support strips.</p> <p><u>Note:</u> Refer to 2011 IMO Biofouling Guidelines Sections 1.4, 7.2, 7.3, and 7.4. A copy can be found in the Members section of the Green Marine website.</p> <p>2.4 If needed, remove biofouling organisms from the hull, propellers, stern tube, sea chests, and other wetted portions of a vessel.</p> <p><u>Note:</u> Cleaning with capture is suggested if biofouling covers over 15% of the wetted surfaces. At 15% coverage, the vessel is considered extensively fouled. Diagrams to help estimate percent coverage can be found in the Members section of the Green Marine website.</p> <p>2.5 For each vessel, keep a record book on details of all inspections and biofouling management measures undertaken on the ship.</p> <p><u>Note:</u> A template of such a record book can be found in the Members section of the Green Marine website.</p>
LEVEL 3
<p>3.1 Maintain a Ballast Water Management plan and Biofouling Management plan for each vessel which includes all the best practices required to achieve Level 2.</p> <p><u>Note:</u> A Biofouling Management plan template can be found in the Members section of the Green Marine website.</p> <p>3.2 Support scientific research on ballast water or biofouling by providing access to ships for sampling by governmental and research groups or by participating on an expert working group.</p> <p><u>Note:</u> It is not necessary to actively participate in the research program in order to fulfill this criterion.</p> <p>3.3 Produce an internal annual log showing any cases of ballast water treatment system malfunctioning. For such cases include root cause(s) and preventive action(s) taken.</p> <p><u>For vessels with antifouling or fouling release coating:</u></p> <p>3.4 Within dry-docking specifications, select coating with effective coating lifespan in line with schedule for next dry-docking and anticipating operational wear, such as contact with lock walls or abrasive cleaning.</p> <p><u>Note:</u> The effective coating lifespan is determined by the manufacturer based on the vessel-specific application scheme (e.g. coating thickness); it is the age of an anti-fouling coating after which the coating is no longer expected to satisfactorily prevent or deter the attachment and growth of biofouling organisms.</p>

LEVEL 4

Fulfill one of the following 2 criteria:

4.1 Actively participate in research and development on reducing the risk of AIS introduction and spread associated with ballast water operations and discharges, for example – partner with an academic institution, technology developer, innovation accelerator, or government agency.

OR

4.2 Actively participate in research and development on reducing the risk of AIS via biofouling, for example - coatings, autonomous underwater cleaning or underwater cleaning capture technologies.

Note: Active participation is defined as the provision of support by the company, whether through financial means, human resources or equipment and can include an experimental shipboard trial.

LEVEL 5

5.1 For each installed and in-use ballast water treatment system (BWTS), adopt contingency measures, as per MEPC 71/WP.9 Annex 4.

AND fulfill one of the following 3 criteria:

5.2 For each installed BWTS, conduct a ballast water management system (BWMS) commissioning test for biological efficacy. Use the International Maritime Organization (IMO) Marine Environment Protection Committee (MEPC) Circular 70 ([BWM.2/Circ.70/Rev.1](#)) as the basis for sampling and analysis. The document can be found in the Members section of the Green Marine website.

OR

5.3 Purchase or install a compliance monitoring device and conduct annual self-monitoring of ballast water discharges for each installed BWTS.

OR

5.4 Submit data on the use of the BWMS to the shipowner's flag State to contribute to the IMO Experience Building Phase.

2. POLLUTANT AIR EMISSIONS - SOX AND PM

OBJECTIVE: Reduce pollutant air emissions of sulphur oxides (SOx) and particulate matter (PM).

LEVEL 1		
Monitoring of regulations		
LEVEL 2		
<p>2.1 Implement a systematic control policy for documenting fuel (bunker notes). <u>Note:</u> Bunker notes must be conserved and annual consumption notes must be kept for each ship.</p> <p>2.2 Use climatology and weather forecasting to take advantage of tidal currents and avoid storms. Plan voyages to reduce running hours and idling time.</p> <p>2.3 Optimize trim for fuel efficiency when loading ships and barges.</p> <p>2.4 Follow voluntary slow speed measure in specific zones, as identified by port or governmental authority.</p> <p>2.5 Implement a preventive engine maintenance system in order to optimize performance.</p> <p>2.6 Identify optimal engine speed or engine load for fuel efficiency. Inform crew and ensure awareness of this optimal 'economic' speed. Transit at this speed to the extent practicable.</p> <p>2.7 Implement a replacement program for LED or other energy efficiency light upgrades.</p> <p><u>Pilot Boats and Tugs Only:</u></p> <p>2.8 Reduce idling with dispatch scheduling and/or providing tie-up locations where awaiting tow or escort.</p>		
LEVEL 3		
<p>3.1 Complete an annual inventory of SOx and particulate matter (PM) emissions for all the company's ships. <u>Note:</u> See Annexes 2-A, 2-B, and 2-D.</p> <p>AND, fulfill one of the following 3 criteria:</p>		
<p><u>International ship owners</u></p> <p>3.2 The average sulphur content by mass of the total amount of fuel consumed annually by all of the company's vessels is less than 0.45 %. <u>Note:</u> Fuel sulphur limit is 0.1 % within an ECA and 0.5 % outside ECAs.</p>	<p>OR</p> <p><u>Domestics subject to the Canadian Vessel Pollution and Dangerous Chemicals (VPDCR) regulations or to the US EPA 'Act to Prevent Pollution from Ships' (APPS) limiting fuel sulphur content to 0.1 % (equivalent to IMO MARPOL Annex VI – Emission Control Area (ECA))</u></p> <p>3.3 The average sulphur content by mass of the total amount of fuel oil consumed annually by all of the company's vessels is 0.01 % below permitted levels.</p>	<p>OR</p> <p><u>Domestics subject to Canadian Sulphur in Diesel Fuel Regulations or US EPA regulations limiting fuel sulphur content to 0.0015% (ULSD) (for example, harbour craft)</u></p> <p>3.4 Plug one or more vessels into shore power at one or more docks.</p>

LEVEL 4			
Fulfill one of the following 4 criteria:			
<p><u>International ship owners</u> 4.1 The average sulphur content by mass of the total amount of fuel consumed annually by all of the company's vessels is less than 0.35 %.</p>	<p>OR <u>Domestics subject to the Canadian Vessel Pollution and Dangerous Chemicals (VPDCR) regulations or to the US EPA 'Act to Prevent Pollution from Ships' (APPS) limiting fuel sulphur content to 0.1 % (equivalent to IMO MARPOL Annex VI – Emission Control Area (ECA))</u> 4.2 The average sulphur content by mass of the total annual amount of fuel oil consumed annually by all of the company's vessels is 0.03 % below permitted levels.</p>	<p>OR <u>Domestics subject to Canadian Sulphur in Diesel Fuel Regulations or US EPA regulations limiting fuel sulphur content to 0.0015 % (ULSD)</u> 4.3 Plug majority of vessels into shore power at majority of docks.</p>	<p>OR <u>All ship owners</u> 4.4 Use of equipment or alternative fuel allowing for the attainment of the same level of sulphur emissions as above.</p>
<p>AND (all ship owners), fulfill one of the following 2 criteria: 4.5 Sample PM emissions for one of the fleet's main engine types (slow-speed, medium-speed, high-speed, gas or steam turbine). <u>Note:</u> Sampling must be repeated every five (5) years. The sampling test plan must be consistent within the fleet, comparable with prior tests, and a recognized methodology, such as ISO 8178 or 40 CFR 51 Appendix M and 40 CFR 60 Appendix A.</p> <p>OR 4.6 Actively participate in research and development on reducing the impact of SOx and PM emissions, for example – improving inventory tools, developing hybrid or blended fuels, or conducting a pilot project on emission reduction technologies. <u>Note:</u> Active participation is defined as the provision of support by the company, whether through financial means, human resources or equipment and can include an experimental shipboard trial.</p>			
LEVEL 5			
All ship owners, fulfill the following criterion:			
<p>5.1 On board one or more of the company's owned ships, compared to no treatment, achieve a 75 % or greater reduction of PM emissions per ship by (i) applying pre-treatment and on-engine measures, (ii) applying after-treatment measures, such as a diesel particulate filter (DPF), diesel oxidation catalysts (DOCs), or other exhaust gas cleaning system (EGSC), or by (iii) burning LNG.</p>			
AND, fulfill one of the following 4 criteria:			
<p><u>International ship owners</u> 5.2 The average sulphur content by mass of the total amount of fuel consumed annually by all of the company's vessels is less than 0.25 %.</p>	<p>OR <u>Domestics subject to the Canadian Vessel Pollution and Dangerous Chemicals (VPDCR) regulations or to the US EPA 'Act to Prevent Pollution from Ships' (APPS) limiting fuel sulphur content to 0.1 % (equivalent to IMO MARPOL Annex VI – Emission Control Area (ECA))</u> 5.3 The average sulphur content by mass of the total amount of fuel oil consumed annually by all of the company's vessels is 0.05 % below permitted levels.</p>	<p>OR <u>Domestics subject to Canadian Sulphur in Diesel Fuel Regulations or US EPA regulations limiting fuel sulphur content to 0.0015 % (ULSD)</u> 5.4 Plug all vessels into shore power at all docks.</p>	<p>OR <u>All ship owners</u> 5.5 Use of equipment or alternative fuel allowing for the attainment of the same level of sulphur emissions as above.</p>

3. POLLUTANT AIR EMISSIONS - NOX

OBJECTIVE: Reduce pollutant air emissions of nitrogen oxides (NOx).

LEVEL 1
Monitoring of regulations
LEVEL 2
<p><i>The use of specialized software or of any other verifiable procedure can serve as evidence that the practices below have been implemented.</i></p> <p>2.1 Implement a systematic control policy for documenting fuel (bunker notes). <u>Note:</u> Bunker notes must be conserved and annual consumption notes must be kept for each ship.</p> <p>2.2 Use climatology and weather forecasting to take advantage of tidal currents and avoid storms. Plan voyages to reduce running hours and idling time.</p> <p>2.3 Optimize trim for fuel efficiency when loading ships and barges.</p> <p>2.4 Follow voluntary slow speed measure in specific zones, as identified by port or governmental authority.</p> <p>2.5 Implement a preventive engine maintenance system in order to optimize performance.</p> <p>2.6 Identify optimal engine speed or engine load for fuel efficiency. Inform crew and ensure awareness of this optimal 'economic' speed. Transit at this speed to the extent practicable.</p> <p>2.7 Implement a replacement program for LED or other energy efficiency light upgrades.</p> <p><u>Pilot Boats and Tugs Only:</u></p> <p>2.8 Reduce idling with dispatch scheduling and/or providing tie-up locations where awaiting tow or escort.</p>
LEVEL 3
<p>3.1 Complete an annual inventory of NOx emissions for all the company's ships. <u>Note:</u> See Annexes 2-C and 2-D.</p>
LEVEL 4
<p>4.1 Conduct sampling of NOx emissions on at least one of the company's ships within the last five (5) years. The sampling test plan must be consistent within the fleet, comparable with prior tests, and a recognized methodology, such as ISO 8178 or IMO NOx Technical Code 2008.</p> <p>4.2 On board one or more of the company's owned ships, install a higher tier engine than required or use and maintain on-engine or after-treatment NOx emission reduction technologies, like selective catalytic reduction (SCR) or exhaust gas recirculation (EGR), or methods that result in a 15% reduction of NOx emissions below the permitted limits. <u>Note:</u> Permitted limits are published in the document 'NOx emission permitted limits' in the Members section of the Green Marine website.</p>
LEVEL 5
<p>Fulfill one of the following 2 criteria:</p> <p>5.1 On board the majority (50%+1) of the company's owned ships, install a higher tier engine than required or use and maintain on-engine or after-treatment NOx emission reduction technologies or methods that result in a 15 % reduction of NOx emissions per ship below the permitted limits. <u>Note:</u> Permitted limits are published in the document 'NOx emission permitted limits' in the Members section of the Green Marine website.</p> <p>OR</p> <p>5.2 On board one or more of the company's owned ships, achieve a 50% or greater reduction of NOx emissions per ship below the permitted limits by installing a higher tier engine than required or by using and maintaining NOx emission reduction technologies.</p>

4. GREENHOUSE GAS EMISSIONS

OBJECTIVE: Reduce greenhouse gas (GHG) emissions.

LEVEL 1
Monitoring of regulations
LEVEL 2
<p><i>The use of specialized software or of any other verifiable procedure can serve as evidence that the practices below have been implemented.</i></p> <p>2.1 Implement a systematic control policy for documenting fuel (bunker notes). <u>Note:</u> Bunker notes must be conserved and annual consumption notes must be kept for each ship.</p> <p>2.2 Use climatology and weather forecasting to take advantage of tidal currents and avoid storms. Plan voyages to reduce running hours and idling time.</p> <p>2.3 Optimize trim for fuel efficiency when loading ships and barges.</p> <p>2.4 Follow voluntary slow speed measures in specific zones, as identified by port or governmental authority.</p> <p>2.5 Implement a preventive engine maintenance system in order to optimize performance.</p> <p>2.6 Identify optimal engine speed or engine load for fuel efficiency. Inform crew and ensure awareness of this optimal 'economic' speed. Transit at this speed to the extent practicable.</p> <p>2.7 Implement a replacement program for LED or other energy efficiency light upgrades.</p> <p><u>Pilot Boats and Tugs Only:</u></p> <p>2.8 Reduce idling with dispatch scheduling and/or providing tie-up locations where awaiting tow or escort.</p>
LEVEL 3
<p>3.1 Complete an annual GHG emissions inventory (totals and intensity) for the company's entire fleet. <u>Note:</u> See Annex 3-A.</p> <p>3.2 Adopt an Energy Performance plan that has quantifiable objectives and which formally incorporates the best practices required for achievement of level 2. <u>Note:</u> See Annex 3-B.</p>
LEVEL 4
<p>4.1 Achieve an annual average reduction in GHG intensity (GHG emissions per tonne-nautical mile or per hour for tugs, passenger vessels, or other non-cargo ships) of 1.0% since 2008. <u>Note:</u> See Annex 3-A for the methodology.</p>
LEVEL 5
<p>5.1 Achieve an annual average reduction in GHG intensity (GHG emissions per tonne-nautical mile or per hour for tugs, passenger vessels, or other non-cargo ships) of 2.0% since 2008. <u>Note:</u> See Annex 3-A for the methodology.</p>

5. CARGO RESIDUES (International dry bulk cargo carriers operating in the Great Lakes and St. Lawrence only)

OBJECTIVE

Reduce cargo residue discharges.

NOTE:

These practices are not part of a performance indicator, and participants are therefore not required to link their performance with any particular level. The performance indicator on cargo residues was retired from the Green Marine program in 2016. Since the indicator was developed in 2007, Green Marine successfully raised awareness and participants improved their performance. Seven companies carrying dry bulk in the Great Lakes and St. Lawrence region reported to this indicator, and collectively, they reached an average of level 4 in 2015, the highest recorded average for any performance indicator. Over the years, US and Canadian regulations have also increased. However, it was decided to maintain the zero discharge policy (previously a level 5 requirement for that indicator) for all international ship owners within the Great Lakes / St. Lawrence area and make it a prerequisite for any new international ship owner joining the Green Marine program.

CRITERIA
5.1 Implement a zero discharge policy for all cargo residues in the Great Lakes – St. Lawrence area.

6. OILY DISCHARGE

OBJECTIVE: Minimize risk of oily discharges incidental to the normal operation of the vessel.

LEVEL 1	
Monitoring of regulations	
LEVEL 2	
<p>Vessels using an Oily Water Separator (OWS) on board: <u>Implementation of 6 of the following 10 best practices on all company vessels:</u></p> <p>2.1 Give staff proper training on bilge water management.</p> <p>2.2 Monitor compliance of the oily water discharge by: a) Conduct annual calibration of the oil content meter; or b) Sample treated water monthly and have it analyzed by an accredited lab; or c) Use a secondary monitoring unit (e.g. white box).</p> <p>2.3 Periodically test oil content alarm prior to operating the oily water separator.</p> <p>2.4 Use seals or locks on all overboard discharge valves.</p> <p>2.5 Post signs in the vicinity to clearly indicate who is responsible for opening any of the OWS overboard discharge valves, for operating oily water separation equipment and for oil transfer procedures.</p> <p>2.6 Lock out or seal the oil content meter so that the calibration cannot be tampered with.</p> <p>2.7 Maintain proper coordination with the navigation bridge when opening the overboard discharge valve so the bridge can also record the activity and the vessel's position.</p> <p>2.8 When feasible, only operate the oily water separator during the daytime.</p> <p>2.9 Regularly clean the applicable bilges and remove any solid material that may reduce the performance of the OWS.</p> <p>2.10 Reduce as much as possible the use of emulsifying cleaners and agents that can <u>degrade</u> the performance of the OWS.</p>	<p>Vessels NOT using Oily Water Separator (OWS) on board (even if installed): <u>Implementation of the majority of applicable best practices on all company's vessels:</u></p> <p>2.11 Regularly inspect and perform preventative maintenance of equipment using oil (engines, burners, pumps, pipes, heaters, filters, etc.) or water (condensers, boilers, pumps, pipes, etc.) to prevent leaks.</p> <p>2.12 Regularly assess condition and maintain stern tube seals and bearings to prevent water from entering.</p> <p>2.13 Stop leaks of oil or water in the engine room as soon as possible.</p> <p>2.14 Clean up oil and water spills as soon as possible after maintenance and repair operations.</p> <p>2.15 Maintain clean, dry bilges.</p> <p>2.16 Post signs in the vicinity to clearly indicate who is responsible for bilge water transfer procedures.</p> <p>2.17 Give staff proper training on bilge water management.</p> <p>2.18 Keep available on board oil absorption pads to intervene in case of minor oil spills.</p>
LEVEL 3	
<p>3.1 Adopt an Oily Water Management plan that formally incorporates all the best practices itemized in level 2. <u>Note:</u> See Annex 4-A.</p> <p>3.2 Complete an annual inventory of bilge water (produced, treated, discharged to sea, and off-loaded to shore, as applicable) and of oil residue (sludge) on a vessel by vessel basis and for the fleet as a whole. <u>Note:</u> See Annex 4-B.</p> <p>3.3 Develop and adhere to environmental procurement guideline for cleaning products to be used within the engine room, considering third party certifications* and product content** and packaging (see Waste Management performance indicator). *Such as USDA BioPreferred and Centre for Environment, Fisheries and Aquaculture Science (Cefas). **Chlorine, phosphate free, readily biodegradable, minimally toxic, etc.</p>	

LEVEL 4	
Vessels using an Oily Water Separator (OWS) on board:	Vessels NOT using Oily Water Separator (OWS) on board (even if installed):
<p>4.1 Adopt a modernization program for oily water separators and all related control and verification equipment. Systematic application of this policy on all new buildings and all ships undergoing major modifications. <u>Note:</u> See Annex 4-C.</p> <p><u>For the majority of New Builds:</u> 4.2 Implement an integrated bilge treatment system such as that defined in the IMO's revised guidelines (MEPC.1/Circ.642, 12 November 2008).</p> <p>OR</p> <p><u>On at least one existing vessel:</u> 4.3 Demonstrate an integrated bilge treatment system approach by respecting the requirements defined at annex 4-D. <u>Note:</u> See Annex 4-D.</p>	<p>4.4 Set reduction or maximum targets (for the fleet as a whole <u>or</u> by vessel category) for bilge water produced.</p> <p>4.5 Implement effective measures to reduce the quantity of bilge water and sludge produced on 50 % of the company's vessels. <u>Examples:</u> Separate drainage systems for water and oil drains, installation of drip trays or coamings under equipment, use less water for maintenance and cleaning, replacement and repair of stern tube seals, etc.</p>
LEVEL 5	
5.1 On all new build vessels fitted with conventional horizontal stern tubes, eliminate the oil-to-water interface by use of seawater lubricated bearings or an alternative sealing arrangement. For non-conventional propulsion arrangements, demonstrate best efforts to utilize technologies as they advance to eliminate or reduce the impact of an oil-to-water interface.	
Vessels using an Oily Water Separator (OWS) on board:	Vessels NOT using Oily Water Separator (OWS) on board (even if installed):
<p>5.2 Do not discharge treated bilge water in sensitive areas. <u>Note:</u> In addition where already prohibited, such as in the Arctic by the IMO Polar Code and in areas specified by Appendix G of the US EPA Vessel General Permit; sensitive areas are to include Canadian federal, territorial, or provincial Marine Protected Areas and Indigenous Protected and Conserved Areas (IPCAs). See: https://www3.epa.gov/npdes/pubs/vgp_permit2013.pdf https://www.dfo-mpo.gc.ca/oceans/maps-cartes/conservation-eng.html</p> <p><u>For all New Builds:</u> 5.3 Implement an integrated bilge treatment system such as that defined in the IMO's revised guidelines (MEPC.1/Circ.642, 12 November 2008).</p> <p>OR</p> <p><u>On the majority of the company's existing vessels:</u> 5.4 Demonstrate an integrated bilge treatment system approach by respecting the requirements defined at annex 4-D. <u>Note:</u> See Annex 4-D.</p>	<p>5.5 Implement effective measures to reduce the quantity of bilge water and sludge produced on 75 % of the company's vessels:</p> <p>5.6 Demonstrate an annual reduction or negligible amount in the quantity of bilge water and/or sludge produced (intensity unit is to be determined by the company, e.g. tonnes/hour of operation).</p>

7. WASTE MANAGEMENT

OBJECTIVE: Reduce ship generated garbage and increase recycling.

APPLICABILITY: This performance indicator only applies to the company’s owned vessels.

LEVEL 1
Monitoring of regulations
LEVEL 2
<p>2.1 Equip all of the company's ships with recycling bins and give staff proper training on established user procedures and the waste management hierarchy (reduce, reuse, recycle, recovery, disposal).</p> <p>2.2 Favor suppliers that use less packaging.</p> <p>2.3 Encourage the use of reusable, biodegradable and/or recyclable supplies.</p> <p>2.4 No shipboard incineration at port.</p> <p><u>Domestic ship owners only:</u> 2.5 Reuse as much as possible dunnage, lining and packaging material.</p>
LEVEL 3
<p>3.1 Produce an annual inventory of different types of garbage generated in the company's entire fleet, and indicate the company's actual garbage management practices. <u>Note:</u> Garbage types refer to the categories defined in MARPOL Annex V, but each company can include additional categories.</p>
LEVEL 4
<p>4.1 Develop and implement a garbage management strategy defining targets, tools and measures for reducing garbage generated, reducing discharge at sea and increasing recycling. <u>Note:</u> See Annex 5-A.</p>
LEVEL 5
5.1 Demonstrate continual improvement by achieving targets defined in the garbage management strategy.

8. UNDERWATER NOISE

OBJECTIVE

Reduce underwater noise made by ship operations to reduce impacts to marine mammals.

NOTES:

- Green Marine recognizes that underwater noise may potentially impact a broader range of aquatic species other than just marine mammals. While the initial objective of this indicator covers marine mammals, future development of this Performance Indicator may expand its scope.
- Green Marine recognizes that for most ships, under most operational conditions, cavitation is the main source of underwater noise.
- Applicable only for vessels transiting in salt water.

LEVEL 1
Monitoring of regulations
LEVEL 2
<p>2.1 Conduct regular hull cleaning and propeller blade maintenance. The participant must keep a record of these actions for each vessel in their fleet. <u>Note:</u> Hull cleaning and propeller maintenance should at least be done during dry dock.</p> <p>2.2 Review the list of sensitive areas in Canadian and US waters to determine whether the participant's vessels transit through or have operations in such areas. Ensure that this information is communicated to each vessel. <u>Note:</u> See Annex 6-A.</p> <p>2.3 Participate in voluntary traffic measures, like a slow-down or lateral displacement, in specific zones as identified by port or governmental authority.</p>
LEVEL 3
<p>3.1 Actively participate in collecting and providing whale sighting data (in Canadian and US waters) through a logbook or a recognized application (such as Whale Alert and Whale Report). <u>Note:</u> Sightings recorded in a logbook should be shared with a recognized central database.</p> <p>3.2 Develop and adopt a Marine Mammal Management plan (MMMP) in order to reduce the potential adverse effects of vessels, especially within known sensitive marine areas, as identified in Criterion 2.2. <u>Note:</u> See Annex 6-B.</p>
LEVEL 4
<p>4.1 Incorporate applicable vessel quieting technologies during retrofits and new vessel construction. <u>Note:</u> Refer to published documents like the IMO and the SNAME MVEP Guidelines, available in the Members section of the Green Marine website. This criterion is applicable only for ship owners ordering/designing new vessels (keel laid after Jan 2018) or conducting retrofits of propulsion systems or other equipment that contributes significantly to underwater noise.</p> <p>AND, fulfill one of the following 3 criteria:</p> <p>4.2 Work with ports to estimate relative ship noise levels for at least one vessel in their fleet.</p> <p>OR</p> <p>4.3 Estimate relative ship noise levels of at least one vessel in their fleet by using a dedicated hydrophone. <u>Note:</u> Collaboration with a bioacoustician is essential to obtain reliable data.</p> <p>OR</p> <p>4.4 Support / collaborate on scientific research on underwater noise allowing the estimation of relative ship noise levels for at least one vessel in their fleet.</p>

LEVEL 5

5.1 Proceed to an in-depth analysis of vessel noise footprint on at least one ship in order to identify main noise sources. Solutions to be identified and implemented to reduce noise output.

Note: ANSI/ASA S12.64-2009 or ISO 17208-1:2016 underwater noise standard measurement methodology should be used where at all possible.

AND, fulfill one of the following 3 criteria:

5.2 Work with ports to estimate relative ship noise levels **for 15% of the vessels** in their fleet, with a minimum of 3 vessels measured.

OR

5.3 Estimate relative ship noise levels **of 15% of the vessels** in their fleet, with a minimum of 3 vessels measured, using a dedicated hydrophone.

Note: Collaboration with a bioacoustician is essential to obtain reliable data.

OR

5.4 Support / collaborate on scientific research on underwater noise allowing the estimation of relative ship noise levels **for 15% of the vessels** in their fleet with a minimum of 3 vessels measured.

9. SHIP RECYCLING

OBJECTIVE

Reduce the effects of ship recycling on human health, safety and the environment.

LEVEL 1
Monitoring of regulations
LEVEL 2
<p><u>ALL ship owners:</u></p> <p>2.1 The participant has a written Policy (or Procedure within a management plan that has been approved by senior management) detailing how their written/documented commitment will assure that all ships at the end of their economic lives will be recycled in a sustainable, safe, responsible and environmentally sound manner. This Policy or Procedure must be applicable to all of the participants' vessels at the end of their economic life that are not sold for onward trading and are thus sent for recycling. <u>Note:</u> At level 2, the policy/procedure does not need to be made public.</p> <p>2.2 Develop Part 1 of an Inventory of Hazardous Materials (IHM) for all new builds that meets the requirements set out in the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships and is certified as such by a third party. <u>Note:</u> If the participant has no new builds on order, they must have at minimum an internal written policy/procedure stating their intentions to develop an IHMs for all new builds, should any vessels be ordered in the future.</p> <p>2.3 Adopt a formal plan to develop Part 1 of an IHM for all existing vessels.</p> <p><u>Ship owners who sold a vessel for recycling during year of reporting only:</u></p> <p>2.4 If towing a vessel to a recycling facility, review tow plan and towing company before making final selection.</p>
LEVEL 3
<p><u>ALL ship owners:</u></p> <p>3.1 Develop a hazardous material removal plan that promotes the substitution of hazardous materials during the maintenance of ships (during layup, repair, dry dock, or as other opportunities present themselves) by less hazardous, or preferably, non-hazardous materials.</p> <p>3.2 In accordance with the IHM plan created in level 2.3, develop Part 1 of an IHM for at least one existing vessel. IHM must meet the requirements set out in the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships.</p> <p><u>Ship owners who sold a vessel for recycling during year of reporting only:</u></p> <p>3.3 When seeking to recycle a vessel, the participant will only tender to (or via Cash Buyer warranting to use) Ship Recycling Facilities that:</p> <ul style="list-style-type: none"> a) are currently (and expected to be for the duration of the dismantling) fully certified by a recognized organization (RO) as having valid and verified accreditation against the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships; b) Are capable and commit to provide a Certificate of Completion of Recycling.

LEVEL 4

ALL ship owners:

4.1 Develop Part 1 of an IHM for 50% of vessels. IHMs must meet the requirements set out in the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships.

4.2 Implement the hazardous material removal plan adopted in level 3.

4.3 Make the ship recycling Policy publicly available; or make public the written/documentated commitment (Procedures within management plans) demonstrates your company's ship recycling management practices and accountability.

Ship owners who sold a vessel for recycling during year of reporting only:

4.4 Require the ship recycling facility, through a contractual clause, to provide regular recycling progress reports, from the time of vessel arrival to the time of receiving a Certificate of Completion of Recycling.

Note: See Annex 7-A for minimum progress report content requirements.

LEVEL 5

ALL ship owners:

5.1 Require all vessels to have completed Part 1 of an IHM.

5.2 Validate all IHM with accompanying statements of compliance and renew on a 5-year basis.

Ship owners who sold a vessel for recycling during year of reporting only:

5.3 Remove all hazardous materials not essential to the classification, certification or operation of vessel as part of pre-cleaning procedures prior to departure for the recycling facility.

5.4 Hire a third party auditor to undertake announced and unannounced visits to the recycling facility during the dismantling. The frequency to be agreed between the participant and the recycling facility. The "Audit During Recycling" (ADR) will be undertaken on site involving the participant (or third party auditor representing the participant) and the recycling facility senior management team. Each ADR report will be shared with the participant and recycling facility.

Note: See Annex 7-B for minimum audit report content requirements.