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REPORT II: MARINE DEBRIS AND COMMERCIAL MARINE VESSEL BEST PRACTICE

Review required under CMS Resolution 10.4 on Marine Debris

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Authors:

Dr Chris Sherrington

Clare Pitts-Tucker

Dr Dominic Hogg

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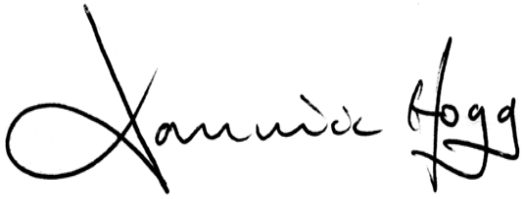
Report for:

The Secretariat of the Convention on Migratory Species

Prepared by:

Chris Sherrington, Clare Pitts-Tucker

Approved by:



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Dominic Hogg (Project Director)

Contact Details

Eunomia Research & Consulting Ltd
37 Queen Square
Bristol
BS1 4QS

United Kingdom

Tel: +44 (0)117 9172250
Fax: +44 (0)8717 142942

Web: www.eunomia.co.uk

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Disclaimer

EXECUTIVE SUMMARY

Eunomia Research & Consulting (Eunomia) has worked in partnership with the International Union for the Conservation of Nature (IUCN) and the Marine Conservation Society (MCS) to prepare three reports for the Convention on the Conservation of Migratory Species of Wild Animals (CMS) for 'Reviews required under Resolution 10.4 on Marine Debris'. The three reports are as follows:

- Report I: Migratory Species, Marine Debris and its Management;
- Report II: Marine Debris and Commercial Marine Vessel Best Practice; and
- Report III: Marine Debris Public Awareness and Education Campaigns.

Based on an extensive review of peer reviewed and grey literature, Report II identifies and evaluates the existing measures employed to manage waste on board commercial marine vessels and prevent the disposal of garbage at sea. Such measures include:

- Conventions;
- Legislation;
- Codes of conduct;
- Guidelines; and
- Best practice strategies.

These are categorised into international, regional, and industry / vessel based measures in Section 2.0 of the report.

Enforcement of such measures is essential to guarantee compliance, a precursor to ensuring their effectiveness. However, 'policing the seas' is one of the most challenging aspects in relation to improving waste management practices employed at sea. Enforcement mechanisms for existing measures are based on inspections and fines, where an organisation responsible for enforcement is in place and has sufficient resource. The issue of enforcement is explored further in Section 3.0.

Establishing the effectiveness of measures is also important in order to identify those which have the greatest impact and should be promoted as best practice. Key factors affecting the effectiveness of measures include the degree of participation, how well the measure is implemented, the cost of implementation, and the relevant enforcement mechanism (if any). Whilst these factors are discussed in Section 4.0, accurately establishing the effectiveness of the measures described in Section 2.0 is extremely difficult due to the significant lack of information regarding the existing baseline volume and dispersion of marine debris. This would need to be addressed in order for the impact of measures to be fully identified, thus providing a better understanding of the measures that have the most potential to reduce the disposal of garbage at sea from commercial vessels.

Despite the implementation of international legislation, gaps still remain in the regulatory framework. Key gaps identified in Section 5.0 of this report relate to the scope of specific requirements within MARPOL Annex V, which do not cover fishing vessels, despite fishing vessels constituting a significant proportion of the global commercial shipping fleet and therefore a significant potential source of marine debris at sea.

Another area where legislation does not sufficiently address the problem is the cruise shipping industry. Cruise ships have the potential to generate wastes similar in volume and character to those generated in hotels. The majority of current legislation regarding pollution and shipboard waste was developed prior to the rapid growth of the cruise market, and

consequently no international legislation exists to address this large and growing industry as a significant potential contributor to marine debris at sea.

Marine debris remains a global problem and challenge. In 2005, UNEP concluded that: *"… marine litter is not a problem which can be solved only by means of legislation, law enforcement and technical solutions. It is a social problem which requires efforts to change behaviours, attitudes, management approaches and multi-sectoral involvement."*[1] The circumstances do not appear to have changed since 2005, as such the report's recommendations, fully described in Section 6.0, include:

- Specific improvements to existing legislation, particularly MARPOL Annex V:
  - Suggestions include implementing zero discharge at sea, phasing out on-board waste incineration, and providing improved and harmonised port reception facilities;
- Significant gaps to address, including:
  - Lack of baseline and monitoring data surrounding marine debris;
  - Education for seafarers;
  - Targeting improvements within the cruise shipping industry; and
- The potential introduction of market-based instruments, for example:
  - Offering appropriate tax relief or a reduction in port fees to ships or fleets that operate a zero waste discharge at sea policy.

The maritime industry is a complex sector with stakeholders to be engaged at all levels. These interdependencies between fuel suppliers, ship owners, cargo owners and financing and insurance companies mean that the implementation of best practice requires not only technological, but also social and organisational changes. Ensuring success calls for a multi-stakeholder approach; the crew and ship owner are important, but a number of other players in the maritime industry must also be involved. When thinking about incentives or possible actions that are to be included it is essential to ensure they are well targeted to actors that can, and importantly are willing, to make a difference. [2]

As in other spheres there is always a tendency to try and shift the responsibilities to others. An example is waste collection and treatment. Ship operators complain that ports do not offer reception facilities while ports claim that the crew of visiting ships do not deliver their waste in port. Without clear directions, problems – and associated solutions – will be put on the shoulders of others. [3]

UNEP, perhaps through the Regional Seas Programme, can facilitate coordination between all of the different stakeholders to enable best practice measures to be implemented. International forums such as the IMO take decisions on the basis of a consensus, which

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[1] UNEP (2005) *Marine Litter: An Analytical Overview*, 2005

[2] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

[3] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

invariably means that large flag-States (particularly those acting as "open registry" for a large proportion of ships) have a loud voice and considerable influence. Therefore, the outcome of IMO deliberations may be somewhat lacking in ambition at times. It is important that key players are supported in promoting best practice and addressing the gaps identified to ensure improvements in international legislation and the global situation do not get overlooked, and UNEP, supported by CMS, can help provide this support.

To this end, CMS can encourage Parties to the Convention on Migratory Species to:

- Ratify key international legislation such as MARPOL Annex V (where CMS Parties have not yet done so);
- Initiate and support the improvement of MARPOL Annex V so that exemptions are tightened, in order to include most fishing vessels.
- Encourage ships and shipping operators from CMS Parties to sign up to measures such as the Clean Shipping Index;
- Encourage and support every seafarer to attend a marine environmental awareness course provided by ProSea or another similar organisation;
- Encourage shipping operators and other key industries from CMS Parties involved with the international transport of goods to drive environmental demands;
- Promote the wider rollout of the indirect fees system in ports, and support the improvement of port waste reception facilities in general; and
- Support and encourage CMS Parties to implement and achieve relevant ISO standards.

Many of the activities suggested here may involve approaching governments, industries and international organisations to facilitate research and explore funding potential for investigating how such actions could be best implemented. CMS may not be able to undertake all these activities alone, and so should support UNEP and the Regional Seas Programme to do so. Developing research questions around these topics and co-ordinating research to address information gaps is a good approach. For instance, initiating further research to investigate whether market based instruments are appropriate measures for preventing commercial shipping from disposing of garbage at sea. Additionally, identifying a strategy to target specific audiences and work with key industries in order to improve awareness, knowledge and behaviour with regards to marine debris would be beneficial. We recommend that one of the first industries to target would be the cruise ship industry, as they produce a significant amount of garbage at sea, therefore improving waste management and performance in this global industry would potentially have a large and beneficial impact.

Encouraging ratification of international legislation such as MARPOL is all well and good, but this report clearly shows that there are significant gaps that need to be addressed if the legislation is to become more effective. Therefore one of the key recommendations for CMS Parties and the Secretariat is to focus on the gaps identified in this report and explore the possible means to address them.

Contents

1.0 Introduction

Globally, marine vessels are estimated to account for about 20% of marine debris (albeit this figure is subject to some considerable uncertainty),[4] but in areas of high shipping density such as the North Sea the proportion coming from shipping is closer to 40%.[5] The protection of the marine environment can be enhanced significantly by reducing discharges of all kind of ship-generated waste and cargo residues into the sea.[6]

1.1 Approach

The key objective of Part B is to identify best practice for commercial marine vessels in terms of preventing the disposal of marine debris at sea. Our research of both peer-reviewed and grey literature has focused on the following areas:

- **Section 2.0** identifies existing guidelines, codes of conduct, best practice strategies, and international conventions, that address the management of solid waste on board commercial vessels;
- **Section 3.0** indicates the different types of enforcement mechanisms currently being used;
- **Section 4.0** investigates the effectiveness of the existing measures and initiatives;
- **Section 5.0** highlights the gaps in current regulation and management measures; and
- **Section 6.0** details our recommendations to CMS, addressing the gaps and issues raised by the previous sections.

Where possible we have been comprehensive in identifying the different *types* of schemes, measures, and enforcement mechanisms, but it is important to note that we have not listed every single instance.

Within the literature the phrase 'commercial marine vessels' tends not to include fishing vessels. However, we have included best practice measures, gaps in management and recommendations that apply to fishing vessels, as they may contribute a significant amount to the issue of marine debris from ocean based sources, and therefore should be included within the definition of 'commercial marine vessels'.

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[4] EMSA (2013) *Port Waste Reception Facilities*, accessed 18 October 2013, http://www.emsa.europa.eu/implementation-tasks/environment/port-waste-reception-facilities.html

[5] Zero Waste Europe (2013) *How much plastic litter is currently in EU waters?*, accessed 22 October 2013, http://www.zerowasteeurope.eu/2013/03/how-much-plastic-litter-is-currently-in-eu-waters/

[6] EMSA (2013) *Port Waste Reception Facilities*, accessed 18 October 2013, http://www.emsa.europa.eu/implementation-tasks/environment/port-waste-reception-facilities.html

2.0 Existing Measures

This section identifies the existing measures, such as codes of conduct, guidelines, best practice strategies, and regulations, which have been implemented throughout the world in order to prevent or discourage commercial shipping vessels from disposing of garbage at sea.

At the global level, there are several conventions and agreements applicable to the issue of marine vessel derived marine debris. At the regional level, there are no specific legal instruments dealing with marine debris, although it is addressed in several regional conventions and protocols on controlling marine pollution. At the national level, only the Wider Caribbean and Northwest Pacific regions contain countries with specific national legislation addressing marine debris. Marine debris (from both land and sea based sources) is not usually dealt with in policies or laws as a separate category of waste, it is considered to be part of the general solid waste stream. A majority of the regions acknowledge the inadequacy of implementation and enforcement of existing laws and regulations related to solid waste management.[7]

2.1 International Measures

2.1.1 MARPOL Annex V

The Convention for the Prevention of Pollution from Ships (MARPOL 73/78) is the most significant international convention that addresses and aims to control the disposal of garbage at sea from the shipping sector. The Convention was held in 1973, and the subsequent Protocol was established in 1978.

Annex V provides specific detail regarding the type and quantity of garbage that ships may or may not discharge into the sea, and the associated restrictions according to location, see Table 1 for further information.[8] [9] As of 30th September 2013, 145 States have ratified MARPOL Annex V, which represents 98.5% of the global shipping fleet tonnage.[10] According to Annex V, all ships of 100 gross tonnage and above, or ships certified to carry more than 15 persons, should develop and follow a written garbage management plan. A Garbage Record Book is supplied to every ship of 400 gross tonnage and above, and every ship which is certified to carry 15 or more

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[7] UNEP (2009) *Marine Litter - A Global Challenge*, accessed 11 October 2013, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

[8] IMO (2013) *MARPOL Annex V Discharge Requirements*, accessed 15 October 2013, http://www.ukpandi.com/fileadmin/uploads/uk-pi/Documents/Conventions/Environmental_Compliance/Annex%20V%20discharge%20requirements%2001-2013.pdf

[9] IMO (2011) *MARPOL Annex V*, accessed 10 October 2013, http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/201%2862%29.pdf

[10] NOAA, and UNEP (2013) *IMO Status of Conventions*, accessed 15 October 2013, http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx

persons. The details of each discharge to sea or to a reception facility, or a completed incineration must be recorded in the Garbage Record Book, as per the requirements in Annex V.[11]

[11] IMO (2011) *MARPOL Annex V*, accessed 10 October 2013, http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/201%2862%29.pdf

Table 1: Revised Discharge Requirements under MARPOL Annex V (resolution MEPC.201 (62)) which entered into force on 1 January 2013

<table>
<tr><th>Type of Garbage</th><th>Ships outside special areas</th><th>Ships within special areas</th><th>Offshore platforms and all ships within 500m of such platforms</th></tr>
<tr><td>Food waste comminuted or ground</td><td>Discharge permitted
≥ 3 nm from the nearest land and en route</td><td>Discharge permitted
≥ 12 nm from the nearest land and en route</td><td>Discharge permitted
≥ 12 nm from the nearest land and en route</td></tr>
<tr><td>Food waste not comminuted or ground</td><td>Discharge permitted
≥ 12 nm from the nearest land and en route</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Cargo residues* not contained in wash water</td><td rowspan="2">Discharge permitted
≥ 12 nm from the nearest land and en route</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Cargo residues* contained in wash water</td><td>Discharge only permitted in specific circumstances**
and ≥ 12 nm from the nearest land and en route</td><td>Discharge prohibited</td></tr>
<tr><td>Cleaning agents and additives* contained in cargo hold wash water</td><td rowspan="2">Discharge permitted</td><td>Discharge only permitted in specific circumstances**
and ≥ 12 nm from the nearest land and en route</td><td>Discharge prohibited</td></tr>
<tr><td>Cleaning agents and additives* contained in deck and external surfaces wash water</td><td>Discharge permitted</td><td>Discharge prohibited</td></tr>
<tr><td>Carcasses of animals carried on board as cargo and which died during the voyage</td><td>Discharge permitted
as far from the nearest land as possible and en route</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>All other garbage including plastics, domestic wastes, cooking oil, incinerator ashes, operational wastes and fishing gear</td><td>Discharge prohibited</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Mixed garbage</td><td colspan="3">When garbage is mixed with or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply</td></tr>
</table>

* These substances must not be harmful to the marine environment

** According to regulation 6.1.2 of MARPOL Annex V, the discharge shall only be allowed if: (a) both the port of departure and the next port of destination are within the special area and the ship will not transit outside the special areas between these ports (regulation 6.1.2.2); and (b) if no adequate reception facilities are available at those ports (regulation 6.1.2.3).

The designation of 'special areas' under MARPOL means "a sea area where for recognised technical reasons in relation to its oceanographic and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by sea garbage is required".[12]

The special areas established under Annex V are:

- The Mediterranean Sea;
- The Baltic Sea Area;
- The Black Sea Area;
- The Red Sea Area;
- The Gulfs Area;
- The North Sea;
- The Wider Caribbean Region; and
- The Antarctic Area.[13]

Within these areas, discharges of all kinds of garbage (except comminuted or ground food waste and cleaning agents/additives[14] contained in deck and external surfaces wash water) into the sea are prohibited.[15] However, not all these areas have adequate port facilities to handle the increased amount of garbage from ships and this is a prerequisite before designation can take effect. Consequently, many of the designated Special Areas may not yet be fully recognised as Special Areas.[16] [17]

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[12] IMO (2011) *MARPOL Annex V*, accessed 10 October 2013, http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/201%2862%29.pdf

[13] IMO (2011) *MARPOL Annex V*, accessed 10 October 2013, http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Documents/201%2862%29.pdf

[14] These substances must not be harmful to the marine environment

[15] IMO (2013) *MARPOL Annex V Discharge Requirements*, accessed 15 October 2013, http://www.ukpandi.com/fileadmin/uploads/uk-pi/Documents/Conventions/Environmental_Compliance/Annex%20V%20discharge%20requirements%2001-2013.pdf

[16] Sheavly, S.B. (2005) Marine Debris – an Overview of a Critical Issue for Our Oceans, Sixth Meeting of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea, 2005, http://www.un.org/depts/los/consultative_process/documents/6_sheavly.pdf

[17] Greenpeace (2006) *Plastic Debris in the World's Oceans*, accessed 16 October 2013, http://www.unep.org/regionalseas/marinelitter/publications/docs/plastic_ocean_report.pdf

All Contracting Parties to MARPOL Annex I and II should also ratify Annex V on garbage (although seven Parties have not yet done so[18]). Regional and national authorities must take steps to fully implement Annex V through national legislation, based on MARPOL guidance, in order to make sure that the requirements are met by all ships and ports under their jurisdiction.[19] [20]

MARPOL applies to ships through their Flag State, and to ports and terminals through the Government in Port States.[21] Ships of signatory nations have to abide by Annex V at all times in all waters, while ships from non-signatory nations must follow Annex V when in waters of signatory countries.[22]

With regards to open registry states, a total of 34 states have been identified by the International Transport Workers' Federation, [23] however only 27 of these are nations recognised by the UN. All but one (Myanmar) of these 27 states are signatories to MARPOL Annex V, meaning that even ships from an open registry state should be adhering to the requirements of Annex V. The remaining seven states that are not UN recognised nations[24] are either overseas territories or international ship registers, and therefore they are all covered by Annex V (to which the governing states of France, Germany, Denmark, the Netherlands and the UK are all signatories). In theory, none of the ships flying under an open registry are outside of the requirements set by MARPOL Annex V. Whether open registry states enforce MARPOL requirements is another question to be answered.

2.1.1.1 Port Waste Reception Facilities

Another requirement of MARPOL is for State Parties to provide facilities for the reception of ship-generated residues and garbage. These reception facilities must be

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[18] Brunei Darussalam, Cook Islands, Dijbouti, Myanmar, Seychelles, Thailand and Vietnam. Of these states only the Cook Islands, Dijbouti and Seychelles are signatories of the Convention on Migratory Species.

[19] UNEP GPA (2001) *Marine Litter - Trash That Kills*, accessed 11 October 2013, http://www.epa.gov/owow/oceans/debris/toolkit/files/trash_that_kills508.pdf

[20] Derraik, J.G. (2002) The pollution of the marine environment by plastic debris: a review, *Marine Pollution Bulletin*, Vol.44, No.9, pp.842–852

[21] Condino, D. (2013) Environmentally Sound Management of Ship's Waste and Adequate Port Reception Facilities, paper given at World Ocean Council Sustainable Ocean Summit, Washington D.C., 23 April 2013, http://oceancouncil.org/site/summit_2013/Presentation%20PDFs/2-PORT%20WASTE%20SECURED%20PDFS/2-PORTWASTE_Condino%20nn.pdf

[22] Sheavly, S.B. (2005) Marine Debris – an Overview of a Critical Issue for Our Oceans, Sixth Meeting of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea, 2005, http://www.un.org/depts/los/consultative_process/documents/6_sheavly.pdf

[23] International Transport Workers' Federation (2012) *Flags of Convenience Countries*, accessed 22 November 2013, http://www.itfglobal.org/flags-convenience/flags-convenien-183.cfm

[24] Bermuda (UK), Cayman Islands (UK), Faroe Islands (Denmark), French International Ship Register (France), German International Ship Register (Germany), Gibraltar (UK), and Netherlands Antilles (Netherlands)

adequate to meet the needs of ships using the port, without causing undue delay for ships. The relevant MARPOL regulations on port reception facilities are:

- Annex I Regulation 38;
- Annex II: Regulation 18;
- Annex IV: Regulation 12;
- Annex V: Regulation 8; and
- Annex VI: Regulation 17.

The 42nd session of the Marine Environment Protection Committee (MEPC) in November 1998 agreed that to achieve "adequate" reception facilities the port should have regard to the operational need of users and provide reception facilities for the type and quantities of waste from ships normally using the port, without causing undue delay for the ships. Resolution MEPC.83 (44) further stated that facilities provided by the port must meet the needs of the ships normally using the port, and allow for the ultimate disposal of ships' wastes to take place in an environmentally appropriate way.[25] In other words, port operators must not provide mariners with a disincentive to use the waste reception facilities.[26]

With the aim of promoting the effective implementation of MARPOL, IMO has developed a port reception facilities module in their Global Integrated Shipping Information System (GISIS)database, including a list of available port reception facilities (PRF) in ports and the possibility to report cases of alleged inadequacies.[27] However, research by the IMO suggests that there are still barriers to the efficient delivery of MARPOL residues/wastes ashore. One such barrier already identified is the lack of clear, easy to use guidance that outlines how the shipping community and reception facility providers can best conduct their operations in order to comply with MARPOL and to facilitate efficient, environmentally responsible disposal of MARPOL residues/wastes. [28]

In response to this, as well as the need to tackle the long-standing problem of the inadequacy of port reception facilities, IMO has developed a number of guidelines, most recent of which have been published as a Comprehensive Manual on Port Reception Facilities. The manual provides guidance on matters such as waste management strategy, type and quantity of ship-generated wastes, planning, choice of location, collection and treatment, financing and cost recovery, and cooperation of

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[25] EMSA (2013) *Port Waste Reception Facilities*, accessed 18 October 2013, http://www.emsa.europa.eu/implementation-tasks/environment/port-waste-reception-facilities.html

[26] Condino, D. (2013) Environmentally Sound Management of Ship's Waste and Adequate Port Reception Facilities, paper given at World Ocean Council Sustainable Ocean Summit, Washington D.C., 23 April 2013, http://oceancouncil.org/site/summit_2013/Presentation%20PDFs/2-PORT%20WASTE%20SECURED%20PDFS/2-PORTWASTE_Condino%20nn.pdf

[27] EMSA (2013) *Port Waste Reception Facilities*, accessed 18 October 2013, http://www.emsa.europa.eu/implementation-tasks/environment/port-waste-reception-facilities.html

[28] IMO (2013) Guide to good practice for port reception facility providers and users

port and ship requirements. IMO has also provided technical assistance over many years to a large number of countries in the form of seminars, symposia and workshops, mostly at the regional level. Progress has been made in certain parts of the world. It is apparent, however, that, in some oil producing regions, the situation with regard to the provision of reception facilities is not improving.

The provision of adequate reception facilities worldwide is a matter of extreme complexity which involves the shipping industry, port operators, oil and chemical companies and governments. A satisfactory solution to the shortage of reception facilities in many parts of the world has yet to be found. It is widely recognized that, if this problem is to be satisfactorily resolved, it will be necessary to address the economic as well as the technical aspects of this issue.[29]

2.1.2 ISO Standards

The International Organization for Standardization (ISO) has established two standards with regards to ships and marine technology (marine environment protection). Both of these standards relate to MARPOL and Annex V; however it is not a requirement that port authorities and ship operators obtain these standards:

1. ISO 16304:2013 Arrangement and management of port waste reception facilities; and
2. ISO 21070:2011 Management and handling of shipboard garbage.

The scope of each standard is described in more detail below.

The main driver for a ship or ship operator achieving accreditation in either or both of the standards would be to demonstrate to stakeholders the commitment to improving environmental standard of ship activities. This may help win an advantage over competitors, providing the organisation with a lead in the market.

It is currently unknown how many applications for each standard have been submitted and awarded. This standard relating to port waste reception facilities (ISO 16304:2013) was only published in March 2013, therefore the application of this standard is likely to be relatively low until awareness is raised and requirements for port reception facilities become more specific, driving the market towards best practice.

One of the benefits of ISO standards is the requirement for monitoring, as well as internal and external auditing. This ensures credibility, and is an alternative approach to ensuring compliance where enforcement mechanisms fall short.

ISO 16304:2013

This applies to the management of ship generated waste regulated by MARPOL that is discharged at ports and terminals. It also covers principles and issues that should be considered in the development of a port waste management plan (PWMP), its

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[29] IMO (2012) *Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organisation*, accessed 27 November 2013, http://www.imo.org/OurWork/Legal/Documents/Implications%20of%20UNCLOS%20for%20IMO.pdf

implementation and port reception facilities (PRF) operations. The operation of any PRF is governed by the principles and procedures included in the PWMP. The procedures to operate the PRF and the development of a PWMP are closely linked and therefore are integrated into ISO 16304:2013.[30]

ISO 16304:2013 provides guidance and sets best practice for the following areas of arrangement and management of port waste reception facilities:

- Waste segregation;
- Storage;
- Waste minimisation;
- Waste handling equipment;
- Recycling;
- Local and national regulations;
- Treatment technologies at the port; and
- Waste management planning.[31]

ISO 21070:2011

The requirements of MARPOL Annex V set the minimum standard for garbage management that apply to ships. Applicable national and regional regulations exceeding the requirements of MARPOL Annex V will also need to be observed. ISO 21070:2011 applies to the management and handling of garbage generated on board ships during the period the garbage will be on board. The definition of garbage in ISO 21070:2011 is as defined in MARPOL Annex V. ISO 21070:2011 contains procedures for the shipboard management of garbage, including handling, collection, separation, marking, treatment and storage. It also describes the vessel-to-shore interface and the delivery of garbage from the ship to the port reception facility.[32]

ISO 16304:2013 provides guidance and sets best practice for the following areas of management and handling of shipboard garbage:

- Equipment/technology (compactors, comminuters, pulpers, PAWDS (Plasma Arc Waste Destruction System, shredders, and incinerators)
- Calculating the amounts of waste; and

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[30] ISO (2013) *ISO 16304:2013 - Ships and marine technology -- Marine environment protection -- Arrangement and management of port waste reception facilities*, accessed 22 October 2013, http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=56129

[31] Condino, D. (2013) Environmentally Sound Management of Ship's Waste and Adequate Port Reception Facilities, paper given at World Ocean Council Sustainable Ocean Summit, Washington D.C., 23 April 2013, http://oceancouncil.org/site/summit_2013/Presentation%20PDFs/2-PORT%20WASTE%20SECURED%20PDFS/2-PORTWASTE_Condino%20nn.pdf

[32] ISO (2011) *ISO 21070:2011 - Ships and marine technology -- Marine environment protection -- Management and handling of shipboard garbage*, accessed 22 October 2013, http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=51003

- Segregation of Wastes.[33]

2.1.3 London Convention and Protocol

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (the London Convention) is one of the first global conventions to protect the marine environment from human activities. It has been in force since 1975, and its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter.[34] As of 30th September 2013, 87 States are Parties to this Convention.[35]

In 1996, the 'London Protocol' was agreed to further modernise the Convention and, eventually, replace it. Under the Protocol all dumping is prohibited, except for eight types of waste that may be considered for dumping:

- Dredged material;
- Fish waste;
- Vessels, platforms or other man-made structures;
- Inert, inorganic geological material;
- Organic material of natural origin;
- Bulky items; and
- CO2 storage in sub-seabed geological formations.[36]

The Protocol entered into force in March 2006 and there are currently 42 parties to the Protocol.[37] [38] The move from the London Convention, a permissive approach to

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[33] Condino, D. (2013) Environmentally Sound Management of Ship's Waste and Adequate Port Reception Facilities, paper given at World Ocean Council Sustainable Ocean Summit, Washington D.C., 23 April 2013, http://oceancouncil.org/site/summit_2013/Presentation%20PDFs/2-PORT%20WASTE%20SECURED%20PDFS/2-PORTWASTE_Condino%20nn.pdf

[34] IMO (2013) *London Convention and Protocol*, accessed 22 October 2013, http://www.imo.org/OurWork/Environment/SpecialProgrammesAndInitiatives/Pages/London-Convention-and-Protocol.aspx

[35] NOAA, and UNEP (2013) *IMO Status of Conventions*, accessed 15 October 2013, http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx

[36] Haag, F. (2013) Sea-based sources of marine litter: the IMO perspective, paper given at GLOC-2, Montego Bay, Jamaica, 2 October 2013, http://www.gpa.unep.org/index.php/global-partnership-on-nutrient-management/publications-and-resources/second-global-conference-on-land-ocean-connections-gloc-2/214-haag-seabased-sources-of-marine-litter-the-imo-perspective/file?limit=100

[37] IMO (2013) *London Convention and Protocol*, accessed 22 October 2013, http://www.imo.org/OurWork/Environment/SpecialProgrammesAndInitiatives/Pages/London-Convention-and-Protocol.aspx

[38] NOAA, and UNEP (2013) *IMO Status of Conventions*, accessed 15 October 2013, http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx

ocean dumping, towards a precautionary approach under the Protocol represents a shift in attitude towards waste and the environment.[39]

In relation to other international legislation, both the London Convention and Protocol provide the global rules and standards on dumping as called for in Article 210.6 of the UN Convention on the Law of the Sea (see Section 2.1.5 for further information).[40]

Whilst the MARPOL Convention covers technical aspects of pollution from ships, including the operational discharges by vessels, it does not cover the dumping of wastes by ships, which is covered by the London Convention. The prohibition of all incineration at sea under the London Protocol does not affect the incineration of garbage on board vessels allowed by Annex V of MARPOL (provided all conditions of that Annex are met).[41]

2.1.4 The Basel Convention

Marine debris from commercial shipping is partially addressed through the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (also known as the Basel Convention, 1992)

The main objective of this Convention, which has been ratified by 180 states, is 'environmentally-sound management', the aim of which is to protect human health and the environment by minimizing hazardous waste production whenever possible. [42, 43]

This means addressing the issue through an 'integrated life-cycle approach', which involves strong controls, from the generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal. Any hazardous (in the sense of the Convention) marine debris from land-based sources falls under the scope of the Convention. Some non-hazardous, land-based marine debris also falls under the scope of the Convention under the categories of wastes requiring special consideration. In this context, a number of technical guidelines for the

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[39] VanderZwaag, D.L. (2011) The International Control of Ocean Dumping: Precautionary Currents, Sea of Challenges

[40] IMO (n.d.) *London Convention and Protocol: their role and contribution to protection of the marine environment*, accessed 27 November 2013, http://www.imo.org/blast/blastDataHelper.asp?data_id=21278&filename=LC-LPbrochure.pdf

[41] IMO (2005) *London Convention Frequently Asked Questions*, accessed 27 November 2013, http://www.imo.org/blast/mainframemenu.asp?topic_id=1513

[42] UNEP (2009) *Marine Litter - A Global Challenge*, accessed 11 October 2013, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

[43] UNEP (2011) *The Basel Convention: Ship Dismantling*, accessed 8 November 2013, http://www.basel.int/Implementation/TechnicalAssistance/ShipDismantling/Overview/tabid/2762/Default.aspx

environmentally sound management of hazardous and other wastes, adopted by the Parties to the Convention, are relevant to the marine debris problem.[44]

The issue of wastes generated on board ships and how far the Basel Convention regulates the generation and management of such wastes, including their Transboundary movement, raises the question of the relationship between the Basel Convention and other treaties regulating maritime affairs that fall under the framework of the IMO. Parties to the Basel Convention and the IMO are in the process of clarifying the relationship between the Basel Convention and MARPOL; through assessing how far the current Basel Convention technical guidelines cover MARPOL wastes, in addition to developing a guidance manual on how to improve the sea-land interface to ensure that wastes falling within the scope of MARPOL, once offloaded from a shop, are managed in an environmentally sound manner.[45]

2.1.5 UNCLOS

The United Nations Convention on the Law of the Sea (UNCLOS) is the international agreement that resulted from the third United Nations Conference on the Law of the Sea, which took place between 1973 and 1982. UNCLOS defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for the management of marine natural resources. A total of 166 States are party to this Convention.[46]

Part XII of the Convention (protection and preservation of the marine environment) includes measures to prevent, reduce and control pollution of the marine environment and to prevent transfer of damage or hazards from one area to another. Article 194 (measures to prevent, reduce and control pollution of the marine environment) and Article 195 (duty not to transfer damage or hazards or transform one type of pollution into another) are relevant to marine debris.[47] Article 211 details the international rules and national legislation to be set according to UNCLOS, with regards to pollution from vessels. The enforcement required by flag states is detailed in Article 217. [48] Through these articles, UNCLOS supports the requirements set out in MARPOL Annex V.

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[44] UNEP (2009) *Marine Litter - A Global Challenge*, accessed 11 October 2013, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

[45] UNEP (2013) Development of an assessment of how far the Basel Convention technical guidelines cover MARPOL wastes and of a guidance manual on how to improve the sea-land interface to ensure that MARPOL wastes, once offloaded a ship, are managed in an environmentally sound manner

[46] UN (2013) *United Nations Convention on the Law of the Sea: Chronological lists of ratifications of, accessions and successions to the Convention and the related Agreements as at 29 October 2013*, accessed 23 October 2013, http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf

[47] Butt, N. (2007) The impact of cruise ship generated waste on home ports and ports of call: A study of Southampton, *Marine Policy*, Vol.31, pp.591 – 598

[48] UN (2013) *United Nations Convention on the Law of the Sea: Chronological lists of ratifications of, accessions and successions to the Convention and the related Agreements as at 29 October 2013*,

2.1.6 International Safety Management Code

The IMO adopted the International Management Code for the Safe Operation of Ships and for Pollution Prevention (the ISM Code) in 1993, and it became mandatory in 1998. The code establishes safety-management objectives and requires a safety management system to be established by "the Company", which is defined as the person assuming responsibility for operating the ship. The Company is then required to establish and implement a policy for achieving these objectives. This includes providing the necessary resources and shore-based support.[49] The ISM Code also contains requirements for all vessels to record volumes and types of waste (in accordance with MARPOL 73/78) and method of disposal.[50]

2.1.7 The Honolulu Strategy

The Fifth International Marine Debris Conference took place 20-25 March 2011, organised by the National Oceanic and Atmospheric Administration (NOAA) and UNEP, and established the Honolulu Strategy. This strategy sets forth a results-oriented framework of action with the overarching goal to reduce impacts of marine debris over the subsequent ten years. This goal will be achieved through the collective action of committed stakeholders at global, regional, country, local, and individual levels.[51]

The strategy establishes three main goals in a global framework for prevention and management of marine debris. The most relevant to marine debris from commercial shipping is Goal B, which aims to reduce the amount and impact of sea-based sources of marine debris, including solid waste; lost cargo; abandoned, lost, or otherwise discarded fishing gear (ALDFG); and abandoned vessels, introduced into the sea. The six strategies established to achieve this are as follows:

- Strategy B1.Conduct ocean-user education and outreach on marine debris impacts, prevention, and management
- Strategy B2.Develop incentives and markets to strengthen implementation of waste minimization and proper waste storage at sea, and of disposal at port reception facilities, in order to minimize incidents of ocean dumping
- Strategy B3.Develop and strengthen implementation of industry best management practices (BMP) designed to minimize abandonment of vessels and accidental loss of cargo, solid waste, and gear at sea

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accessed 23 October 2013, http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf

[49] IMO (2013) *Safety Management: Development of the ISM Code*, accessed 23 October 2013, http://www.imo.org/OurWork/HumanElement/SafetyManagement/Pages/Default.aspx

[50] Butt, N. (2007) The impact of cruise ship generated waste on home ports and ports of call: A study of Southampton, *Marine Policy*, Vol.31, pp.591 – 598

[51] NOAA, and UNEP (2011) *Fifth International Marine Debris Conference: The Honolulu Strategy*, accessed 23 October 2013, http://5imdc.wordpress.com/about/honolulustrategy/

- Strategy B4.Develop and promote use of fishing gear modifications or alternative technologies
- Strategy B5.Develop and strengthen implementation of legislation and policies to prevent and manage marine debris from at-sea sources, and implement the requirements of MARPOL Annex V, as well as other relevant international instruments and agreements
- Strategy B6. Build capacity to monitor and enforce (1) national and local legislation, and (2) compliance with requirements of MARPOL Annex V and other relevant international instruments and agreements.[52]

The Honolulu Strategy is being used to guide the Global Partnership on Marine Litter (GPML), a partnership formed by the Global Programme of Action (GPL) and UNEP in June 2012 following recommendations from the Manila Declaration.[53] [54] The three goals outlines in the Honolulu Strategy are the three key Partnership Areas driving research. The first partnership forum for the GPML was held during the Second Global Conference on land-Ocean Connections, 2-4 October, 2013, Montego Bay, Jamaica. Discussions during this conference will inform the priorities of the work plan, which, as of November 2013, has not yet been published.[55]

2.1.8 FAO Code of Conduct for Responsible Fisheries

As explained in Section 1.1, fishing vessels tend not to be included in the scope of 'commercial marine vessels', but as the fishing sector represents a significant proportion of seagoing vessels it is important that they are considered when discussing ocean based sources of marine litter.

The FAO (Food and Agriculture Organization of the United Nations) Code of Conduct for Responsible Fisheries is a guidance document that establishes this key message:

> *The right to fish carries with it the obligation to do so in a responsible manner so as to ensure effective conservation and management of the living aquatic resources*.

This Code was adopted in 1995, and sets out principles and international standards of behaviour for responsible practices with a view to ensuring the effective

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[52] NOAA, and UNEP (2011) *Fifth International Marine Debris Conference: The Honolulu Strategy*, accessed 23 October 2013, http://5imdc.wordpress.com/about/honolulustrategy/

[53] UNEP (2013) *Global Parnership on Marine Litter: Draft Framework Document/Operational Guidelines*, accessed 27 November 2013, http://www.gpa.unep.org/index.php/global-partnership-on-nutrient-management/publications-and-resources/global-partnership-on-marine-litter-gpml/170-draft-framework-document-for-gpml/file

[54] UNEP (2013) *Global Partnership on Marine Litter - Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA)*, accessed 27 November 2013, zotero://attachment/12140/

[55] UNEP (2013) *Global Partnership on Marine Litter - Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA)*, accessed 27 November 2013, zotero://attachment/12140/

conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity.[56] [57]

Article 8.7 of the Code (protection of the aquatic environment) provides detail on the requirements with regards to preventing loss of fishing gear and the disposal of garbage at sea:

- Article 8.7.1: States should introduce and enforce laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).
- Article 8.7.2: Owners, charterers and managers of fishing vessels should ensure that their vessels are fitted with appropriate equipment as required by MARPOL 73/78 and should consider fitting a shipboard compactor or incinerator to relevant classes of vessels in order to treat garbage and other shipboard wastes generated during the vessel's normal service.
- Article 8.7.3: Owners, charterers and managers of fishing vessels should minimize the taking aboard of potential garbage through proper provisioning practices.
- Article 8.7.4: The crew of fishing vessels should be conversant with proper shipboard procedures in order to ensure discharges do not exceed the levels set by MARPOL 73/78. Such procedures should, as a minimum, include the disposal of oily waste and the handling and storage of shipboard garbage.[58]

A report undertaken by the World Wildlife Fund (WWF) and the University of British Columbia Fisheries Centre assessed the implementation of the FAO Code of Conduct after the first ten years of its operation. This report evaluated the top 53 fishing countries responsible for 95% of the reported world marine fish catch, using a questionnaire to capture the level of compliance with the Code. Overall compliance with the Code is described to be 'dismal', with not one country out of the 53 achieving a 'good' compliance score. [59]

With regards to preventing loss of fishing gear the report assessed the top 53 fishing nations for the mention of the topic of ghost fishing in the available literature, which yielded poor results for the majority of countries. Only five countries (South Korea, Canada, Australia, Sweden and Norway) have good compliance with the Code in terms of retrieving ADLFG, according to the WWF report.[60]

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[56] FAO (1995) *Code of Conduct for Responsible Fisheries*, 1995

[57] UNEP (2009) *Marine Litter - A Global Challenge*, accessed 11 October 2013, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

[58] FAO (1995) *Code of Conduct for Responsible Fisheries*, 1995

[59] WWF (2008) *Safe Conduct? Twelve years fishing under the UN Code*, accessed 27 November 2013, http://awsassets.panda.org/downloads/un_code.pdf

[60] WWF (2008) *Safe Conduct? Twelve years fishing under the UN Code*, accessed 27 November 2013, http://awsassets.panda.org/downloads/un_code.pdf

2.2 Regional Measures

2.2.1 Marine Strategy Framework Directive (European Union)

At the regional level, Europe provides a good example of where there is a developing momentum in respect of legislative approaches to marine litter. The Marine Strategy Framework Directive (2008/56/EC), adopted in 2008, aims to achieve "Good Environmental Status" (GES) of all marine waters of the European Union by 2020. The eleven qualitative descriptors for determining good environmental status are included within Annex I of the Directive. [61] [62]

The Directive establishes European Marine Regions on the basis of geographical and environmental criteria. Each Member State, in co-operation with other Member States and non-EU countries with a marine region, is required to develop strategies for their marine waters. The marine strategies to be developed by each Member State must contain a detailed assessment of the state of the environment, a definition of "good environmental status" at regional level and the establishment of clear environmental targets and monitoring programmes. Each Member State must draw up a programme of cost-effective measures. Prior to any new measure, an impact assessment, which includes a detailed cost-benefit analysis of the proposed measures, is required.[63]

The European Commission held a Workshop on Marine Litter in Brussels (8 November 2010), and an international conference in Berlin (10-12 April 2013) on the Prevention and Management of Marine Litter in European Seas.

2.2.2 EU Directive on Port Reception Facilities for Ship-generated Waste and Cargo Residues (EC/2000/59)

This EU Directive is another example of action taken at the regional level. It aims to significantly reduce the illegal discharge of ship-generated waste and cargo residues into the marine environment by improving the availability and use of port reception facilities. The regulations entered into force in July 2003 and key terms include:

- The mandatory provision of waste reception facilities in all ports, tailored to the size of port and type of vessels calling there. Ports must draw up waste reception and handling plans to be inspected and approved by Member States every three years;

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[61] European Commission (2012) *A Marine Strategy Directive to save Europe's seas and oceans*, accessed 28 November 2013, http://ec.europa.eu/environment/water/marine/directive_en.htm

[62] European Commission (2008) *Directive 2008/56/EC - Marine Strategy Framework Directive*, accessed 15 October 2013, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:164:0019:0040:EN:PDF

[63] European Commission (2008) *Directive 2008/56/EC - Marine Strategy Framework Directive*, accessed 15 October 2013, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:164:0019:0040:EN:PDF

- All ships must deliver their waste to the port reception facilities before leaving the port or terminal, unless they are exempt or have sufficient dedicated storage capacity to store the waste until the next port of call;
- Captains of ships bound for a port or terminal must notify it of certain information including the types and quantities of waste for discharge and the date and last port where waste was discharged;
- Ships that do not deliver waste in one port and who are not subject to an exemption will be reported to their next port of call and required to undergo a detailed inspection before cargo and passengers can be transferred;
- Ports must establish a cost-recovery system to encourage vessels to discharge their waste on land and discourage dumping at sea. All ships must pay a mandatory charge to make a significant contribution to the cost of the port reception facilities for ship generated waste, irrespective of whether they use them or not; and
- Member States must ensure proper monitoring of compliance with the directive, both by ships and ports, and submit a progress report to the European Commission every three years about the status of the Directive's implementation.[64]

The ongoing review of the Port Reception Facilities Directive gives the EU an opportunity to target litter originating from ships and remove the economic disincentives to discharging waste at reception facilities.

2.2.3 Regional Seas Programme - Regional Conventions

The Regional Seas Programme aims to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environment, by engaging neighbouring countries in comprehensive and specific actions to protect their shared marine environment. Thirteen regions have been established under the auspices of UNEP (Black Sea, East Asian Seas, Eastern Africa, the ROPME Sea Area, Mediterranean, North-East Pacific, Northwest Pacific, Red Sea & Gulf of Aden, South Asian Seas, Pacific, South-East Pacific, Western Africa and Wider Caribbean). Similar independent agreements are in place in the Antarctica, Arctic, Baltic, Caspian and North-East Atlantic.[65]

The majority of regional sea areas have a convention in place that provides the legal framework for the regional Action Plan. The Convention expresses in clear terms the legal commitment and political will of governments to tackle their common environmental problems. Most regional conventions are similar in structure but different in specifics. Six of the regional conventions draw particular attention to the

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[64] European Commission (2010) *Port facilities for ship-generated waste and cargo residues*, accessed 28 November 2013, http://europa.eu/legislation_summaries/environment/waste_management/l24199_en.htm

[65] UNEP (n.d.) *Regional Seas Programme*, accessed 28 November 2013, http://www.unep.org/regionalseas/about/default.asp

dumping of waste at sea: Barcelona Convention (Mediterranean), Bucharest Convention (Black Sea), Cartagena Convention (Wider Caribbean), Helsinki Convention (Baltic Sea), Noumea Convention (Pacific Islands), OSPAR Convention (North East Atlantic). [66] [67] The Cartagena Convention is described below as an example.

Cartagena Convention

In the Caribbean, the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, known as the Cartagena Convention, came into force in 1987. It includes measures to prevent or reduce pollution from both ships and land-based activities.[68] Although the Caribbean has been designated as a Special Area under MARPOL Annex V, this designation has not yet entered into force because many countries in the region lack the port facilities necessary for receiving Annex V wastes from ships.[69] [70]

Article 4: GENERAL OBLIGATIONS

1. The Contracting Parties shall, individually or jointly, take all appropriate measures in conformity with international law and in accordance with this Convention and those of its protocols in force to which they are parties to prevent, reduce and control pollution of the Convention area and to ensure sound environmental management, using for this purpose the best practicable means at their disposal and in accordance with their capabilities.
2. The Contracting Parties shall, in taking the measures referred to in paragraph 1, ensure that the implementation of those measures does not cause pollution of the marine environment outside the Convention area.
3. The Contracting Parties shall co-operate in the formulation and adoption of protocols or other agreements to facilitate the effective implementation of this Convention.
4. The Contracting Parties shall take appropriate measures, in conformity with international law, for the effective discharge of the obligations prescribed in this Convention and its protocols and shall endeavour to harmonize their policies in this regard.

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[66] UNEP (n.d.) *Regional Seas Programme*, accessed 28 November 2013, http://www.unep.org/regionalseas/about/default.asp

[67] IMO (n.d.) *London Convention/London Protocol linkages with other international conventions for the protection of the marine environment*, accessed 28 November 2013, http://www.imo.org/blast/blastDataHelper.asp?data_id=30589&filename=E-LP-Linkages.pdf

[68] Sheavly, S.B. (2005) Marine Debris – an Overview of a Critical Issue for Our Oceans, Sixth Meeting of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea, 2005, http://www.un.org/depts/los/consultative_process/documents/6_sheavly.pdf

[69] UNEP (2005) *Marine Litter: An Analytical Overview*, 2005

[70] Greenpeace (2006) *Plastic Debris in the World's Oceans*, accessed 16 October 2013, http://www.unep.org/regionalseas/marinelitter/publications/docs/plastic_ocean_report.pdf

5. The Contracting Parties shall co-operate with the competent international, regional and sub-regional organizations for the effective implementation of this Convention and its protocols. They shall assist each other in fulfilling their obligations under this Convention and its protocols.

Article 5: POLLUTION FROM SHIPS

The Contracting Parties shall take all appropriate measures to prevent, reduce and control pollution of the Convention area caused by discharges from ships and, for this purpose, to ensure the effective implementation of the applicable international rules and standards established by the competent international organization.

Article 6: POLLUTION CAUSED BY DUMPING

The Contracting Parties shall take all appropriate measures to prevent, reduce and control pollution of the Convention area caused by dumping of wastes and other matter at sea from ships, aircraft or manmade structures at sea, and to ensure the effective implementation of the applicable international rules and standards.

2.2.4 Memoranda of Understanding on Port State Control

The IMO recognises that the primary responsibility for implementing the regulations provided for in IMO conventions (such as MARPOL) rests with the flag State. However, it also acknowledges the need for port State control (PSC) with a view to promoting more effective implementation of all applicable standards for maritime safety and pollution prevention. [71]

A number of PSC resolutions have been adopted by the IMO over the years. Resolution A.787 (19) was adopted in 1995, amalgamating guidelines contained in several IMO resolutions, with the aim of providing one set of basic guidelines on the conduct of PSC inspections. [72]

Through the conduct of PSC inspections and discussions at IMO, member governments realised that more effective PSC could be conducted by establishing regimes for its coordinated implementation at the regional level. Accordingly, many States have entered into Memoranda of Understanding (MoUs) with the view to enhancing compliance by all vessels with international rules and standards for the prevention, reduction and control of pollution from vessels. Each MoU identifies the relevant conventions to be enforced through that particular MoU. Most MoUs establish targets for the inspection of a minimum number or percentage of vessels visiting Member States ports. The following MoUs have been concluded so far:

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[71] IMO (2012) *Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organisation*, accessed 27 November 2013, http://www.imo.org/OurWork/Legal/Documents/Implications%20of%20UNCLOS%20for%20IMO.pdf

[72] IMO (2012) *Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organisation*, accessed 27 November 2013, http://www.imo.org/OurWork/Legal/Documents/Implications%20of%20UNCLOS%20for%20IMO.pdf

- the Latin American Agreement on Port State Control of Vessels, signed in Viña del Mar, Chile, on 5 November 1992
- the Memorandum of Understanding on Port State Control in the Asia-Pacific Region (Tokyo MoU), signed in Tokyo, Japan, on 1 December 1993
- the Caribbean Memorandum of Understanding on Port State Control (Caribbean MoU), signed in Christchurch, Barbados, on 9 February 1996
- the Memorandum of Understanding on Port State Control in the Mediterranean Region (Mediterranean MoU), signed in Malta on 11 July 1997;
- the Indian Ocean Memorandum of Understanding on Port State Control (Indian Ocean MoU), signed in Pretoria, South Africa, on 5 June 1998;
- the Memorandum of Understanding for the West and Central African Region (Abuja MoU), signed in Abuja, Nigeria, on 22 October 1999;
- the Memorandum of Understanding on Port State Control in the Black Sea (Black Sea MoU), signed in Istanbul, Turkey, on 7 April 2000; and
- the Riyadh Memorandum of Understanding on Port State Control in the Gulf Region (Riyadh MoU), signed in Riyadh, Saudi Arabia, in June 2004. [73]

Take for instance the Paris Memorandum of Understanding; 27 States in the North Atlantic region have signed the Paris Memorandum of Understanding (Paris MOU) and agreed to control visiting ships in their ports. More than 18,000 inspections take place on board foreign ships in the Paris MoU ports each year, ensuring that these ships meet international safety, security and environmental standards, and that crew members have adequate living and working conditions.[74] The number of detentions increased from 944 in 2005 to 1,174 in 2006.[75]

2.2.5 Indirect Fee System

The concept of an indirect fee or "no special fee" system is that port fees paid for by visiting ships to use the existing facilities also include waste disposal services. Multiple factors can influence the success of this incentive to encourage delivery of wastes in ports, most importantly the institutional framework and design or roll-out of the instrument. The lack of harmonisation throughout ports in close proximity is a factor that may hinder the full potential of the system as an instrument. [76]

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[73] IMO (2012) *Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organisation*, accessed 27 November 2013, http://www.imo.org/OurWork/Legal/Documents/Implications%20of%20UNCLOS%20for%20IMO.pdf

[74] Paris MoU (2013) *Paris MoU on Port State Control*, accessed 28 November 2013, https://www.parismou.org/about-us/organisation

[75] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

[76] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

2.2.5.1 Baltic Sea Example

The No Special Fee System (NSF) implemented in the Baltic Sea is defined as '*a charging system where the cost of reception, handling and disposal of ship generated wastes, originating from the normal operation of the ship, as well as of marine litter caught in fishing nets, is included in the harbour fee or otherwise charged to the ship irrespective of whether wastes are delivered or not*'. The system is not restricted to any specific type of ship-generated waste, and thus includes the most common wastes from normal operation of ships: oily waste, sewage and garbage.[77]

In spite of efforts to set up a harmonised system for the Baltic Sea, it appears that implementation of the fee system for ship-generated waste reception in ports differs between the countries of the Baltic. This is partly due to the many regulations and recommendations in place (MARPOL requirements, binding EU Directive, the HELCOM recommendation and existing or new national legislation). Such differences can exist in terms of granted exemptions, waste types and amounts under the system, and the level of the waste fees. [78]

Exemptions

A consultation with Baltic ports identified that the percentage of individual ships covered by the NSF could range from 2 to 100%, depending on the port. The differences between countries are caused by the decision on exemptions being a Port State responsibility. Finland appears to apply more exemptions than its neighbouring country Sweden: for example, cruise ships can be exempted in Finland, but not in Sweden. The demand for an exemption is typically due to economic criteria and the benefits of flexibility in choosing specific ports for certain types of waste (where ships may have their own agreements for waste reception and handling). Ports have no insight on waste streams from exempt ships; how these ships fulfil their waste disposal requirements is reported to the national authority. [79]

Waste Types and Amounts

Differences between ports based on waste types and amounts can vary significantly. Some accept any amount of garbage within no special fee conditions, whereas others only accept a specific amount of waste (often since the last port of call) under the NSF and require an additional payment for the rest of the waste. The amount of solid

[77] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[78] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[79] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

waste allowed to be left at the port in the Baltic Sea ports ranges from 0.4m^3 to an unlimited amount. [80]

Fee Rates

Port Authorities are responsible for selecting fee rates; most ports fees are differentiated by type of ship: ships carrying freight, tankers, passengers or cruise ships. In the Baltic Sea region the fee system is described in the waste management plan of the port, and the national authority must control whether the proposed system for calculation is acceptable, but does not comment on the level of the fees. The fee calculation is based on a cost recovery perspective. Total waste costs are then allocated to different ship types according to their waste generating patter (highest costs are charged for cruise ships as they produce the most garbage). The same principles apply for the calculation of reductions in fees, and reductions are usually granted for activities such as waste sorting or the reduction of the quantity of waste. [81]

In the first evaluation of the NSF in Baltic ports undertaken in 2006, almost no countries offered reductions in harbour fees to reward good waste management practices. Today, reductions on port tariffs in most ports are present. A consultation of Baltic ports in 2007 identified that international cruise vessels can save up to 33% of the fee payable per passenger by sorting their waste to the approved fractions. [82]

Evaluating Effectiveness

The 2012 Arcadis report reviews the effectiveness of the NSF against the criteria of goal achievement and additionality. In terms of garbage and solid waste, an important objective of the no special fee system is the encouragement for ships to deliver waste in ports. There is no straightforward indicator to measure this; however some statistics on the amounts of waste delivered to PRF have been collected by HELCOM.[83] These show a generally increasing trend that may indicate a positive development in the use of port reception facilities across the Baltic. However due to the lack of detailed data across the region an evaluation of the effectiveness of the NSF system cannot be made at present. Furthermore, it is not feasible to identify a causal relationship between the installation of the NSF system and increased delivery of ship-generated waste in ports. Despite the increasing trend to deliver in ports, the lack of harmonisation between fee systems and differences in port reception facilities

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[80] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[81] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[82] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[83] HELCOM (2010) *Ecosystem Health of the Baltic Sea 2003-2007*, 2010, http://www.helcom.fi/Lists/Publications/BSEP122.pdf

may hinder the overall positive effect. [84] For the full, detailed evaluation of the NSF system in the Baltic Sea please refer to the Arcadis 2012 report.

2.2.5.2 Ensuring a level playing field

There are substantial differences in charging systems for waste disposal. At one end of the spectrum ports do not charge a direct fee for waste disposal, whereas other ports charge directly for waste disposal and then a discount is provided. Differences in charging systems for waste disposal may render the situation unstable; unless initiatives to manage this are taken, ports with no direct fee for waste disposal may attract disproportionate amounts of waste. From the perspective of port authorities and port users, the level playing field should not be distorted with indirect financing, unless it is to be introduced simultaneously by all ports in the area concerned. [85]

There are two policy options that would ensure an undistorted playing field and user-friendly waste disposal facilities:

1. Obligating ships to demonstrate they have disposed of their waste in their previous port of call; and
2. A system of waste-disposal vouchers.

Vouchers obtained by a shipping company could be spent with any registered waste collection firm in any regional port, with the indirect fee being set at a regional level and at the same price for all regional ports. This system would ensure a level playing field and the burden on shipping lines would be low, due to the 100% indirect charge. The system is also commercially advantageous as shipping lines can dispose of waste at their port of choice. [86] Neither of the options for achieving a level playing field mentioned above has been demonstrated yet.

2.2.5.3 Summary

The EU Directive on port reception facilities aims at the further development of these facilities in Member States, leaving ports and countries a degree of freedom to decide on the port reception facilities financing mechanism. The No Special Fee system works in combination with other policy instruments (prohibition of discharging, e.g. MARPOL special area, mandatory delivery) that are generally difficult to enforce. These difficulties cannot be overcome at national level and would require an

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[84] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[85] de Langen, P.W., and Nijdam, M.N. (2008) Charging systems for waste reception facilities in ports and the level playing field; a case from North-West Europe, *Coastal Management*, Vol.36, No.1, pp.109 – 124

[86] Seas at Risk (n.d.) *Ship waste dumping and the clean ship concept: how an improved EU PRF Directive can play a key role in cleaning up the seas*, accessed 12 November 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Position%20Paper160911.pdf

international or, at least, regional cooperation (e.g. Baltic and North Sea) in order to create a level playing field for competitors. [87] [88]

Additional difficulties arise from equity issues (fair sharing of the cost burden amongst ships and between ships and ports) or bottlenecks in the extended waste chain. Cooperation and the involvement of all stakeholders in defining the requirements (e.g. adequate port reception facilities) may help to increase acceptance and uptake of the necessary actions.[89]

Based upon (some quantitative) figures for selected ports or countries, it is reasonable to assume that the No Special Fee system contributed to increased delivery of wastes in ports (effectiveness), though uniform and reliable statistics to confirm this positive evolution are generally lacking. The effect of the No Special Fee system cannot be isolated from the wider strategy to reduce (illegal) pollution from shipping. A No Special Fee system should be combined with mandatory delivery, strict legislation on the prohibition of (harmful) discharges, sufficient port reception facilities and effective control. [90]

The No Special Fee system has gained acceptance from different stakeholders. The shipping industry believes it is a good and suitable system if it is applied in a transparent and harmonised manner, whereas environmental NGOs oppose direct charging for waste services as this is considered to be the largest disincentive to deliver on land. The majority of Baltic ports are also in favour of the system, while not ignoring the necessity of an increased harmonisation of the implementation in order to share the waste burden. [91]

The Baltic example has shown the potential positive effect of the No Special Fee or (100%) indirect fee system. No sufficient evidence could be collected, however, to demonstrate a larger incentive effect for ships to deliver waste in ports compared to other port reception facilities charging / cost recovery systems. The key element for a charging system is that mechanisms should not include any financial disincentive to use waste reception facilities in ports. Fee systems should be fair and transparent.

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[87] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[88] de Langen, P.W., and Nijdam, M.N. (2008) Charging systems for waste reception facilities in ports and the level playing field; a case from North-West Europe, *Coastal Management*, Vol.36, No.1, pp.109 – 124

[89] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[90] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[91] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

For them to be really effective, the system should preferably be harmonised over a wider geographical area. Diversity in implementation, aggravated by varying levels of adequacy of port reception facilities has maintained uneven waste flows (and associated waste costs) between Baltic ports. The risk of 'waste tourism' is even higher when regarding at the wider EU level and considering the competitive environment where ports and ships are operating.[92]

2.3 Industry / Vessel-based Measures

2.3.1 Cruise Lines International Association

Cruise ships represent less than 1% of the global merchant fleet yet it has been estimated that they are responsible for 24% of the solid waste generated by merchant vessels. For example, a typical cruise ship catering for around 3,000 passengers and crew on a one week cruise generates about 50 tons of solid waste.[93] The Cruise Lines International Association (CLIA) is the major trade association of the cruise industry, representing 26 major cruise lines which operate worldwide. Their remit is to monitor domestic and international policy that directly affects the industry and to develop recommendations for its members that reflect the policy climate.[94]

CLIA member cruise vessel operators agreed to incorporate mandatory standards for cruise ships in 2001; this committed them to a policy goal of zero discharges of MARPOL Annex V solid waste products. This is to be achieved by using comprehensive waste minimisation practices, and re-use and recycling waste strategies.[95] [96]

However, whilst mandatory commitments may be in place for member cruise lines, these standards have been criticised as '*simply a restatement of what is already contained in mostly inadequate legislation and international polices. They scarcely exceed the minimum requirements already in place'*.[97] Whilst the policies in place may demonstrate best practice, whether compliance with the requirements is actually achieved is another matter discussed further in Sections 3.0 and 4.0.

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[92] ARCADIS (2012) *Economic assessment of policy measures for the implementation of the Marine Strategy Framework Directive*, accessed 15 October 2013, http://ec.europa.eu/environment/enveco/water/pdf/report.pdf

[93] The Ocean Conservancy (2002) *Cruise Control: A Report on How Cruise Ships Affect the Marine Environment*, accessed 17 October 2013, http://www.cruiseresearch.org/Cruise%20Control.pdf

[94] UNEP (2002) *Industry as a partner for sustainable development: Tourism*, accessed 17 October 2013, http://www.unep.fr/shared/publications/pdf/WEBx0012xPA-IndustryTourism.pdf

[95] UNEP (2005) *Marine Litter: An Analytical Overview*, 2005

[96] Greenpeace (2006) *Plastic Debris in the World's Oceans*, accessed 16 October 2013, http://www.unep.org/regionalseas/marinelitter/publications/docs/plastic_ocean_report.pdf

[97] Klein, R. (2003) *The Cruise Industry and Environmental History and Practice : Is a Memorandum of Understanding Effective for Protecting the Environment?*, accessed 24 October 2013, http://www.cruisejunkie.com/MOUFinal.pdf

2.3.1.1 Royal Caribbean International: Solid Waste Management

Within their 2008 Stewardship Report, Royal Caribbean International set out their commitment to implementing the waste hierarchy in the management of solid waste, i.e. to prioritize waste management routes with waste reduction being the preferred option, followed by re-use, recycling, energy recovery and then landfilling as the least preferred. Working with local authorities, vendors, conservation groups and recycling centres, the company has agreements in 20 major ports with waste management companies to receive separated and sorted materials for recycling. These partnerships have been established in eight US ports, six European ports, three Canadian ports and several Caribbean and South American ports. Throughout the fleet, approximately 25% of all waste is recycled in US ports; the most successful ships have been able to attain an 80% recycling rate of the total waste they land.[98]

The Stewardship Report sets out Royal Caribbean International's intentions to further reduce their fleet's overall waste impact, both onshore and offshore. The key target established is to decrease waste incinerated and/or moved to landfills by 50% by 2015. To meet this challenge, the company intends to develop new, innovative waste stream management practices, reducing the volume of solid waste generated by 35%. Royal Caribbean International will also seek partnerships with recycling and reuse facilities in all major ports of call, in order to reach the 2015 aspirational goal of having 50% of all waste landed ashore being recycled.[99]

2.3.2 The Clean Ship Concept

The Clean Ship approach is the concept of vessels designed, constructed and operated in an integrated manner with the objective to eliminate harmful operational discharges and emissions; it is a ship that is constructed and can ultimately be recycled in an environmentally acceptable way, and one that is energy and resource efficient in its daily operation.[100] A Clean Ship operation maximises the opportunities for safe and environmental navigation while at the same time providing all possible safeguards in the event of an accident. It requires a shipping sector that puts safety and environmental protection first; an industry with a "safety culture" at its heart.[101]

Seas At Risk coined the phrase "Clean Ship" and launched the concept at the fifth North Sea Conference in 2002 (Bergen, 20-21st March). Ministers embraced the idea and since then it has passed into popular parlance, with regulators and other

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[98] Royal Caribbean Cruises Ltd (2008) *Stewardship Report*, accessed 16 October 2013, http://media.royalcaribbean.co.uk/content/en_US/env_sitelet/flash/RCCL_sitelet.pdf

[99] Royal Caribbean Cruises Ltd (2008) *Stewardship Report*, accessed 16 October 2013, http://media.royalcaribbean.co.uk/content/en_US/env_sitelet/flash/RCCL_sitelet.pdf

[100] Seas at Risk (2005) *Background paper on the Clean Ship approach prepared for Gothenburg meeting*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Background%20document%20for%20Gothenburg.pdf

[101] Seas at Risk (2013) *The Clean Ship concept*, accessed 29 September 2013, http://www.seas-at-risk.org/n3.php?page=67

stakeholders increasingly using the term to define and describe their ultimate objective for an environmentally benign shipping sector.[102]

Seas At Risk welcomes this but is increasingly concerned that the concept is being used solely as an argument for more research rather than urgent regulatory action. While research and development is needed in some areas the reality is that if all shipping adopted the technologies and practices that are currently being used by the best operators then the industry would be 90% of the way to implementing a Clean Ship approach. Unfortunately the quality operators occupy a small niche in an otherwise environmentally sub-standard industry, and regulations are rarely an encouragement to high standards, normally lagging far behind current best available technologies and practices. Seas At Risk's work in this area is now focussing on closing this gap between regulatory standards and the best currently available technologies and practices.[103] [104] [105]

The Gothenburg Declaration 2006 (the outcome of an OSPAR conference in Gothenburg) specifically focused on impacts of fisheries and shipping as important pressures on the marine environment of the North Sea. The Declaration reinforces the commitment of North Sea states to the "clean ship approach" as a concept of vessels designed, constructed and operated in an integrated manner with the objective to eliminate harmful discharges and emissions throughout their working life. As an integrated approach of sustainable shipping it addresses all vessel operations and possible impacts on the environment, and will provide an increased opportunity for transport managers to choose environmentally sound sea transport options. The clean ship approach has been followed up by some OSPAR countries, such as Germany through the Blue Angel eco label (see Section 2.3.3 for more details).[106]

2.3.3 The Blue Angel

The Blue Angel is an environment-related label that may be awarded to products and services which, from a holistic point of view, meet high environmental standards. The

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[102] Seas at Risk (2013) *The Clean Ship concept*, accessed 29 September 2013, http://www.seas-at-risk.org/n3.php?page=67

[103] Seas at Risk (2013) *The Clean Ship concept*, accessed 29 September 2013, http://www.seas-at-risk.org/n3.php?page=67

[104] Seas at Risk (2005) *Background paper on the Clean Ship approach prepared for Gothenburg meeting*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Background%20document%20for%20Gothenburg.pdf

[105] Gothenburg Declaration (2006) Declaration, paper given at North Sea Ministerial Meeting on the Environmental Impact of Shipping and Fisheries, Gothenburg, Sweden, 5 May 2006, http://qsr2010.ospar.org/media/assessments/Basic_documents/Gothenburg_Declaration.pdf

[106] OSPAR Commission (2009) *Assessment of the impacts of shipping on the marine environment*, accessed 10 October 2013, http://qsr2010.ospar.org/media/assessments/p00440_Shipping_Assessment.pdf?zoom_highlight=clean%2Bship#search=%22clean%20ship%22

Blue Angel was created in 1978 on the initiative of the German Federal Minister of the Interior, but can be awarded to a service or product in international markets.[107]

The Blue Angel may be awarded to environmentally-sound ship operations, recognising efforts to reduce emissions and releases of pollutants into the marine environment caused by a seagoing vessel. To achieve the Blue Angel eco-label, particularly high standards are imposed on the management of shipping companies and ships, on ship design and equipment, and especially on the measures for the reduction of emissions. Fishing vessels, tank ships, sports boats and naval vessels are excluded from the Blue Angel.[108] [109]

The standards for waste disposal under the Blue Angel eco-label refer to the requirements of MARPOL Annex V with regards to distances from the coastline for disposal at sea and the maintenance of a Garbage Record Book. The Blue Angel also refers to the EU Port Reception Facility Directive, which requires ships to dispose of their waste on land. Additional obligatory requirements under the eco-label are as follows:

- For cargo ships:
  - Implementation of a purchasing strategy aimed at waste avoidance;
  - On-board storage of all wastes and disposal on land; and
  - Ban on waste incineration at sea.
- For passenger ships:
  - Implementation of a purchasing strategy aimed at waste avoidance; and
  - Incineration of wastes provided that no intermediate shipboard storage is feasible until the waste can be disposed of ashore in an ecologically sound manner.

Ship operators can demonstrate compliance with these standards by incorporating procedural instructions in the management system stipulating a corresponding waste management (such as the purchasing strategy, storage etc.). There are no optional requirements; all must be adhered to in order to achieve the Blue Angel.[110] The

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[107] The Blue Angel (2013) *The Blue Angel*, accessed 7 November 2013, http://www.blauer-engel.de/en/index.php

[108] The Blue Angel (2013) *Environment-conscious Ship Operation (Edition January 2010) (RAL-UZ 110)*, accessed 7 November 2013, http://www.blauer-engel.de/en/products_brands/search_products/produkttyp.php?id=506

[109] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

[110] The Blue Angel (2013) *Environment-conscious Ship Operation (Edition January 2010) (RAL-UZ 110)*, accessed 7 November 2013, http://www.blauer-engel.de/en/products_brands/search_products/produkttyp.php?id=506

application of the Blue Angel amongst shipping operators has not yet been publicised, however a wide range of products have been awarded the eco-label, see http://www.blauer-engel.de/en/index.php for more information.

2.3.4 The Clean Shipping Index

The Clean Shipping Index (CSI) is an easy to use, transparent tool which can be used by cargo owners to evaluate the environmental performance of their providers of sea transport. To be included in the Clean Shipping Index, ship-owners are required to complete a questionnaire consisting of twenty questions on a vessel's operational impact. The information is entered on a ship-by-ship basis but is also added to total carrier fleet score for an overall ranking. Depending on the information provided, scoring is obtained in five different areas: SO_x and PM emissions, NO_x emissions, CO_2 emissions, chemicals, water and waste control. Questions on waste relate to garbage handling and crew awareness. Scores can only be obtained for measures that go beyond existing regulations.[111]

Based on the scores, a ship is ranked as having a 'low', 'medium' or 'good' performance. The final index score is the total average score multiplied by the percentage of reported ships of the totally owned or managed fleet. Data can be analysed in much more detail, down to the level of NO_X emissions for a single engine or stern tube oil usage on a single ship for example. A vessel or shipping company cannot perform well in only one area of the index (for instance sulphur emissions) and get a good overall performance. The index is dynamic; what is perceived to be good environmental performance at one point in time may change as new technology is developed and installed, and environmental legislation becomes stricter. At the time of writing this report, data from around one thousand six hundred large vessels is included in the database; more vessels are continuously added as time goes by.[112]

If reasonable but significant environmental demands are coordinated from large cargo owners, a win-win situation could be created. This would be beneficial for quality shipping companies, subcontractors for clean technology and the environment itself. Submission is voluntary and data is only verified if ship owners pay Class Societies (so far Lloyd's Register and Det Norske Veritas offer these services) for third party verification. Amongst the shippers in the Clean Shipping Network, submission of data is becoming a requirement for shipping goods. For example, Volvo requires all ship-owners transporting Volvo goods to submit CSI data.[113]

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[111] Clean Shipping Index (2011) *Clean Shipping Index: Environmental Opportunities for Shipping*, accessed 16 October 2013, http://www.s1137723-4240.crystone.net/cleanshippingindex.org/wp-content/uploads/2012/12/CleanShippingBrochure.pdf

[112] Clean Shipping Index (2011) *Clean Shipping Index: Environmental Opportunities for Shipping*, accessed 16 October 2013, http://www.s1137723-4240.crystone.net/cleanshippingindex.org/wp-content/uploads/2012/12/CleanShippingBrochure.pdf

[113] Clean Shipping Index (2011) *Clean Shipping Index: Environmental Opportunities for Shipping*, accessed 16 October 2013, http://www.s1137723-4240.crystone.net/cleanshippingindex.org/wp-content/uploads/2012/12/CleanShippingBrochure.pdf

A summary of benefits to the key users of the CSI are as follows:

- **Port authorities** can use the Clean Shipping Index as a tool to measure environmental performance of the ships calling into the port in question. Well-performing vessels could be offered a reduction in the port dues; this may help to attract high performing vessels as well as environmentally focused cargo owners;
- **Shipping companies** can add vessels to the Clean Shipping database and see the environmental performance of each vessel, and their fleet, compared to competitors. When the performance of a ship or fleet is good, information provided via the CSI can be used to gain market share from competitors; and
- **Cargo owners**: consumers are becoming more and more interested in the indirect emissions of products. The CSI helps cargo owners keep track of which carriers are best when it comes to environmental performance.[114]

2.3.5 Zero Solid Waste Policy

Preventing marine debris from ocean based sources requires the commitment and efforts of companies operating in the marine environment. This includes corporate culture, policies, protocols, and practices to ensure that company activities at sea do not generate marine debris. Matson Navigation transits the Pacific between Hawaii, California and China, and is the only commercial container operator that has a zero solid waste discharge policy.[115]

The "Greentainer" Program with Zero Solid Waste was developed in 1993 through collaboration with the Center for Marine Conservation (now Ocean Conservancy). Matson spent $224,000 to replace existing containers with ones specifically designed for storing solid waste when at sea. This programme was designed to also engage employees of shipyards and containerised freight companies to develop controls on discharges of solid wastes into the ocean and ports. Thus far the programme has been embraced enthusiastically by Matson's personnel, and has resulted in improved handling of solid wastes in port. [116] [117]

The programme consists of signage, workshops for dock employees, increased waste receptacles on ships, and increased shoreline waste management facilities. Since

[114] Clean Shipping Index (2011) *Clean Shipping Index: Environmental Opportunities for Shipping*, accessed 16 October 2013, http://www.s1137723-4240.crystone.net/cleanshippingindex.org/wp-content/uploads/2012/12/CleanShippingBrochure.pdf

[115] NOAA, and UNEP (2011) *Honolulu Strategy: Technical Proceedings of the Fifth International Marine Debris Conference (Honolulu Strategy)*, accessed 23 October 2013, http://5imdc.files.wordpress.com/2011/03/5imdc-proceedings-final1.pdf

[116] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

[117] Matson (2012) *Environmental Stewardship - Zero Solid Waste*, accessed 13 November 2013, http://www.matson.com/corporate/about_us/zero_solid_waste.html

1994 approximately 12,000 tons of material has been kept on board rather than going into the ocean.[118] [119]

3.0 Enforcement Mechanisms

Regulating marine debris at an international level presents numerous challenges. The immensity of the ocean and the lack of state jurisdiction beyond approximately 200 nautical miles off the coast make effective enforcement of international legislation very challenging. Within the current regulatory system compliance with international standards is left to the decision of the captain of the ship.

Enforcement and compliance are delegated to individual states, and regulated by the International Maritime Organization (IMO). When a Government accepts an IMO Convention it agrees to make it part of its own national law, and to enforce it just like any other law. However, some countries lack the expertise, experience and resources required to do this properly. Others may implement the requirements into national legislation as required, but enforcement may be low on the priority list.[120] Furthermore, although the IMO has enacted many rules, violators are not incentivised to comply, and largely feel free to discharge without fear of being caught.[121] [122] [123]

When a coastal state detects an alleged violation, it is required to either take action under its own laws or forward the case to the flag state for consideration. When an offence occurs in international waters, the responsibility for imposing the penalty lies with the flag state.[124] However, it appears that the level of enforcement depends on the both the priority that marine debris has within the nation or government

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[118] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

[119] Matson (2012) *Environmental Stewardship - Zero Solid Waste*, accessed 13 November 2013, http://www.matson.com/corporate/about_us/zero_solid_waste.html

[120] IMO (2013) *Frequently Asked Questions*, accessed 12 November 2013, http://www.imo.org/About/Pages/FAQs.aspx

[121] Rakestraw, A. (2012) *NOTE: Open Oceans and Marine Debris: Solutions for the Ineffective Enforcement of MARPOL Annex V*, accessed 12 November 2013, https://litigation-essentials.lexisnexis.com/webcd/app?action=DocumentDisplay&crawlid=1&doctype=cite&docid=35+Hastings+Int%27l+%26+Comp.+L.+Rev.+383&srctype=smi&srcid=3B15&key=8ffd62b74e788907b70e5863412f38ef

[122] NOAA, and UNEP (2011) *Honolulu Strategy: Technical Proceedings of the Fifth International Marine Debris Conference (Honolulu Strategy)*, accessed 23 October 2013, http://5imdc.files.wordpress.com/2011/03/5imdc-proceedings-final1.pdf

[123] Palomares, M. (2006) Prevention of Marine Litter Pollution Under IMO Conventions, paper given at 1st NOWPAP Workshop on Marine Litter, Incheon, Republic of Korea, 9 June 2006, http://www.unep.org/regionalseas/marinelitter/publications/workshops/nowpap/presentation/imoconventions.pdf

[124] NOAA, and UNEP (2011) *Honolulu Strategy: Technical Proceedings of the Fifth International Marine Debris Conference (Honolulu Strategy)*, accessed 23 October 2013, http://5imdc.files.wordpress.com/2011/03/5imdc-proceedings-final1.pdf

concerned, and the status of the ocean area in which non-compliance has been discovered. For instance, special areas (as designated by MARPOL Annex V) are more likely to be subject to more active monitoring and enforcement by the surrounding nations.

Today, many cruise and shipping companies register their ships in open registry states, but register their corporate financial instruments elsewhere. The industry's ability to capitalize on governmental complacency often associated with flag-of-convenience countries and the strict secrecy laws associated with offshore tax havens make it difficult for federal investigators to gather information relevant to environmental crimes and to enforce penalties.[125]

Open registry states undermine the enforcement regime through their inability or unwillingness to pursue violators. In the case of garbage discharge, detecting violations while in international waters is not feasible. True enforcement lies in the regular maintenance of a garbage record book and in the construction of a viable garbage management plan, both of which are overseen by flag states.[126]

3.1 Fines

Fines, penalties, penalty charges and non-compliance fees are a type of market-based instrument, used in order to discourage dumping garbage at sea. The levels may be set using different criteria, such as: the costs of damage; on an "affordability basis"; or on legal limits. Sometimes non-compliance fees are a great deal higher than the costs associated with compliance, if established correctly. Collection of fees and enforcement are essential in making these instruments work.[127]

Some State Parties may impose financial fines on organisations that do not comply with international and national regulations, such as MARPOL and its implementation within Member States. For instance in Australia, fines of up to $A 1.3 million for companies and $A 260,000 for individuals may be imposed on vessel operators illegally discharging garbage at sea. Recently there have been a number of prosecutions for garbage offences in Australian waters. Examples of penalties imposed on vessel owners include:

- Food waste discharged in the Great Barrier Reef fines ranging from $4,825 to $6,000; and
- Plastic discharged into the sea fines ranging from $350 to $35,000.[128] [129]

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[125] The Ocean Conservancy (2002) *Cruise Control: A Report on How Cruise Ships Affect the Marine Environment*, accessed 17 October 2013, http://www.cruiseresearch.org/Cruise%20Control.pdf

[126] NOAA, and UNEP (2011) *Honolulu Strategy: Technical Proceedings of the Fifth International Marine Debris Conference (Honolulu Strategy)*, accessed 23 October 2013, http://5imdc.files.wordpress.com/2011/03/5imdc-proceedings-final1.pdf

[127] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

[128] Australian Maritime Safety Authority (2008) *Stow it Don't Throw it*, accessed 17 October 2013, http://www.amsa.gov.au/forms-and-publications/Publications/Stow-it.pdf

In the EU it is the prerogative of the individual Member State to determine what the penalty (fine, imprisonment) should be for a ship caught, or suspected, of dumping waste at sea. In Europe there are several cases of ships being temporarily banned from entry for being sub-standard under the Paris MOU (see Section 2.2.4) but very few tough penalties have been handed out. [130]

In contrast, in the US, substantial fines and cases of imprisonment have often been awarded to sub-standard ships. For example, the US cruise ship Regal Princess was fined $US 500,000 (€336,600) in 1993 for dumping 20 bags of garbage in to the sea and earlier in 2011 the shipping company Cardiff Marine Inc. was sentenced to pay $US 2.4 million (€1.7 million) for falsifying records of illegal discharges of oily waste. A system of fines for vessels caught with falsified record books, for example, should provide a disincentive to discharge illegally[131] and act as a genuine deterrent to dumping of debris.[132] [133]

3.2 Inspections

With the exception of very small vessels, ships engaged on international voyages must carry on board valid international certificates which may be accepted at foreign ports as prima facie evidence that the ship complies with the requirements of the MARPOL Convention. If, however, there are clear grounds for believing that the condition of the ship or its equipment does not correspond substantially with the particulars of the certificate, or if the ship does not carry a valid certificate, the authority carrying out the inspection may detain the ship until it is satisfied that the ship can proceed to sea without presenting unreasonable threat of harm to the marine environment.[134]

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[129] gCaptain (2012) *Shipping Company Fined $5000 For Dumping Food Waste on Great Barrier Reef*, accessed 17 October 2013, http://gcaptain.com/shipping-company-fined-5000-dumping/

[130] Seas at Risk (n.d.) *Ship waste dumping and the clean ship concept: how an improved EU PRF Directive can play a key role in cleaning up the seas*, accessed 12 November 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Position%20Paper160911.pdf

[131] Carpenter, A., and Macgill, S.M. (2001) Charging for Port Reception Facilities in North Sea Ports: Putting Theory into Practice, *Marine Pollution Bulletin*, Vol.42, No.4, pp.257 – 266

[132] OSPAR Commission (2009) *Marine Litter in the North-East Atlantic Region: Assessment and priorities for response*, accessed 10 October 2013, http://qsr2010.ospar.org/media/assessments/p00386_Marine_Litter_in_the_North-East_Atlantic_with_addendum.pdf

[133] Seas at Risk (n.d.) *Ship waste dumping and the clean ship concept: how an improved EU PRF Directive can play a key role in cleaning up the seas*, accessed 12 November 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Position%20Paper160911.pdf

[134] IMO (2013) *MARPOL 73 - 78: Brief History - list of amendments to date and where to find them*, accessed 12 November 2013, http://www.imo.org/KnowledgeCentre/ReferencesAndArchives/HistoryofMARPOL/Documents/MARPOL%2073-78%20Brief%20History%20-%20List%20of%20amendments%20and%20how%20to%20find%20them.htm

However, inspections may not be achieving their full potential; under the EU Directive on Port Reception Facilities there is no requirement for port state control to check either garbage record books or the Oil Record Books. This is a stipulation of the Directive on Port State Control (2009/16/EC). However, under this directive there is no direction to verify whether the information detailed in either book correlates with the estimated quantities of garbage/oil on board the vessel. Here, it is clear that further guidance should be given as to what would entail an adequate inspection.[135]

3.3 Summary

The persistence of the marine debris problem results from both a lack of global and regional strategies and deficiencies in the implementation and enforcement of existing international, regional and in particular national programmes, regulations and standards. A number of countries have taken steps at the national level to address the marine debris problem through legislation and enforcement of regional and international agreements through national regulations, provision of appropriate reception facilities for ship-generated wastes (including damaged fishing gear and nets), cooperative action within the fishing sector to prevent the abandonment and discarding of old fishing gear, improvements in waste management practices and beach clean ups, underpinned by information, education and public awareness programmes. [136]

However, much more information on the scope and prevention of the marine debris problem is needed. There are many areas where no information on marine debris types, amounts, sources and impacts has been collected. With the continued presence and increasing impacts of this global problem, it is evident that current efforts are not adequate to abate this pollution issue.[137]

Prevention is generally more effective and efficient than remedial action. In many cases, preventive mechanisms and the authority to enforce them are already implicit in existing global or regional conventions and action plans, even when marine debris is not specifically mentioned. They often include, for example, measures to decrease or eliminate the discharge of ship-generated waste, stop the discharge of solid wastes from land-based sources, protect rivers from pollution, and reduce the loss of fishing gear from fishing vessels. Similarly, when political agreements address the need to protect coastal habitats, sustain the health and productivity of seas and coastal areas, pursue integrated coastal zone management and sustainable development of seas and coastal zones and raise environmental awareness, the issue of marine debris is included. It is critical that these regional and international instruments are

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[135] Seas at Risk (n.d.) *Ship waste dumping and the clean ship concept: how an improved EU PRF Directive can play a key role in cleaning up the seas*, accessed 12 November 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Position%20Paper160911.pdf

[136] UNEP (2009) *Marine Litter - A Global Challenge*, April 2009, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

[137] UNEP (2009) *Marine Litter - A Global Challenge*, April 2009, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

made effective through improved legislation, regulations, enforcement and compliance at the national level.[138]

4.0 Effectiveness

Despite growing political commitment and a range of international, regional and national initiatives to address and control marine debris, it remains a global problem and challenge which requires further actions that include coordinated and multi-sectoral strategies.[139]

However, before launching into an analysis on the effectiveness of implemented measures, it is important to note that a significant lack of accurate data regarding the level of marine debris, both past and present, and on different geographical scales, influences the ability to assess the effectiveness of such measures. In other words, identifying overall changes in total levels of marine debris is compromised by the lack of an established baseline, as well as the geographical dispersion of incidents.

A review and analysis of the twelve regional assessment documents on marine debris, seven Regional Action Plans on the management of marine debris and the three global reviews on specific topics (marine debris monitoring; abandoned, lost or otherwise discarded fishing gear; and economic instruments) revealed a widespread lack of systematic scientific knowledge on the amounts, sources, fates, trends and impacts (social, economic and environmental) of marine debris, which hampers development and implementation of effective mitigation actions. This deficiency, in combination with the lack of specific legislation, adequate law enforcement and funding, are the primary reasons why the problem of marine debris is far from being solved. Unless effective action is taken, the global marine debris problem will only continue to worsen in the years to come.[140] This shows that the effectiveness of interventions on marine debris is difficult to measure, but should not be used as a reason not to act. Gaps in the regulatory system may not be easy to address until better information regarding marine debris is obtained; this may also explain why existing regulation does not address the situation either.

Despite this lack of data, several studies have made contrasting claims on the effectiveness of MARPOL Annex V. According to one study in 2002, MARPOL was widely ignored and ships continued to dump several million tonnes of plastic every year. [141] A more recent study from 2013 claims that despite 145 nations agreeing to eliminate plastics disposal at sea, oceanic sampling suggests that the problem has

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[138] UNEP (2009) *Marine Litter - A Global Challenge*, April 2009, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

[139] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

[140] UNEP (2009) *Marine Litter - A Global Challenge*, April 2009, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

[141] Derraik, J.G. (2002) The pollution of the marine environment by plastic debris: a review, *Marine Pollution Bulletin*, Vol.44, No.9, pp.842–852

persisted or worsened since MARPOL was signed.[142] [143] It is important to take land-based sources of debris into account, as they may contribute more to overall marine debris than sea-based sources. On the other hand, another study from 2005 suggested that MARPOL has led to a reduction of debris in the oceans and on beaches. [144] Different reports may make contrasting conclusions, but it has been suggested that evaluation of the impacts of MARPOL may prove difficult due to the survey samples being low and from restricted geographical areas. [145]

An assessment by the OSPAR Commission in 2007 suggests that very little progress has been achieved in the development and implementation of programmes and measures to reduce the illegal input of wastes from its marine sources, or to introduce mechanisms for the remediation of existing debris in the coastal and marine environments.[146] However this study was undertaken seven years ago and may not present the current situation. A study by the German Federal Environment Agency suggests that around 60% of the wastes from shipping washed up on the beach of the German North Sea coast in 1991 – 2002 were plastic and styrofoam, with timber providing the second largest waste quantities. Since 1998, OSPAR has monitored levels of beach debris, initially through a pilot project followed by a voluntary monitoring programme which suggests no statistically significant trend in volumes of beach debris between 2001 and 2006.[147] It is however difficult to confirm how much debris actually is attributable to shipping and efforts should be made to improve our knowledge. Marine debris remains an outstanding pollution issue throughout the North-East Atlantic.

In light of the limited availability of relevant data, a more qualitative approach using knowledge from industry stakeholders could be taken to assessing the effectiveness of measures. There are three key indicators that can be used on this basis are:

1. Participation of relevant industries;

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[142] Rochman, C.M., Browne, M.A., Halpern, B.S., et al. (2013) Policy: Classify plastic waste as hazardous, *Nature*, Vol.494, pp.169 – 171

[143] NOAA, and UNEP (2013) *IMO Status of Conventions*, accessed 15 October 2013, http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx

[144] Sheavly, S.B. (2005) Marine Debris – an Overview of a Critical Issue for Our Oceans, Sixth Meeting of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea, 2005, http://www.un.org/depts/los/consultative_process/documents/6_sheavly.pdf

[145] Barnes, D.K.A., and Milner, P. (2005) Drifting plastic and its consequences for sessile organism dispersal in the Atlantic Ocean - Springer, *Marine Biology*, Vol.146, No.4, pp.815 – 825

[146] OSPAR Commission (2007) *Background Report on Fishing-for-litter Activities in the OSPAR Region*, accessed 10 October 2013, http://science-to-manage-uncertainty.com.au/marinedebris/files/OSPAR%20Fishing%20for%20Litter%20activities%202007[1].pdf

[147] OSPAR Commission (2009) *Marine Litter in the North-East Atlantic Region: Assessment and priorities for response*, accessed 10 October 2013, http://qsr2010.ospar.org/media/assessments/p00386_Marine_Litter_in_the_North-East_Atlantic_with_addendum.pdf

2. Success or failure in implementation; and
3. Cost effectiveness.

These indicators are described in more detail below.

4.1 Participation

The take up and participation of relevant industries in the strategies and measures listed in Section 2.0 can be used to determine its potential success in achieving a reduction in marine debris sourced from commercial vessels. For instance, a particular strategy that is considered to be 'best practice' is all very well, however if the majority of the commercial shipping sector does not adopt this practice for one reason or another, it is unlikely to have any significant impact on the level of marine debris generated by commercial vessels.

As described in Section 2.3.5, only one commercial container operator has established a policy for zero solid waste disposal at sea; the fleet of this operator only represents 0.19% of the total TEU[148] of the top 100 container shipping companies.[149] [150] Whilst the impact of this strategy may be low at present, if the appropriate amount of pressure and incentives (see Section 4.2) are applied to the commercial shipping sector it is possible that best practice such as this will become widely adopted.

Whilst environmental policies and Corporate Social Responsibility reports may state their participation and compliance with key international legislation (such as MARPOL Annex V, the London Convention/Protocol, and the Basel Convention) or other best practice measures, the actions of each vessel are ultimately governed by their captain. As enforcement of activities in international waters is particularly difficult, accurate and reliable data regarding participation is undoubtedly challenging to obtain.

Participation alone may not be considered as the only indicator of effectiveness, for whilst participation is key to effectiveness, it is inevitably influenced by how well the measure is implemented. For instance, MARPOL Annex V could be considered successful in that the majority of nations throughout the world have agreed to comply with its requirements; however the extent to which they have been implemented varies from one signatory state to another. Furthermore, the quality of the requirements is another question; although MARPOL was signed in 1973, a complete ban on the disposal of plastics at sea was not enacted until the end of 1988. The general prohibition on discharge of all garbage into the sea (except as provided otherwise in Annex V with regard to, for example, food waste, cargo residues, cleaning agents and additives) only entered into force as part of the revised Annex V on 1st January 2013.

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[148] Twenty foot equivalent units (TEU)

[149] Matson (2012) *Environmental Stewardship - Zero Solid Waste*, accessed 13 November 2013, http://www.matson.com/corporate/about_us/zero_solid_waste.html

[150] Alphaliner (2013) *Top 100 Operated fleets*, accessed 13 November 2013, http://www.alphaliner.com/top100/

4.2 Implementation Success or Failure

The effectiveness of the measures is also affected by the implementation process, and how well this has been executed. By looking at the challenges and weaknesses encountered during implementation, it is possible to identify the areas in which the measure has been unsuccessful. Weaknesses undermining the effectiveness of a measure typically fall into one of the following categories:

- **Lack of awareness**: campaign and education initiatives targeting certain groups have a part to play in reducing marine debris, these are explored further in Report III;
- **Lack of enforcement**: as discussed in Section 3.0 if polluters don't get caught or if the fines are too low, environmental offences will remain a minor business risk; and
- **Lack of economic incentive**: port fees for handling waste may act as a disincentive if they are too high. Potential economic incentives for encouraging commercial vessels to dispose of waste on shore are described in Section 6.0.

Another potential factor reducing the effectiveness of measures depends upon the guidance issued alongside the measure concerned, and therefore how the measure is interpreted by different states. Take the example of the implementation of the EU Directive on Port Reception Facilities, which has been transposed in all Member States (MSs) through national and/or regional legislation. The level of implementation of the Directive by ports within the EU differs from MS to MS, especially regarding the provisions related to Cost Recovery Systems (CRS) as well as the incentives for ships to deliver waste in ports.

In all ports the Directive has led to an improvement (from low to high) of the solid waste handling systems and to a stronger awareness among stakeholders of the environmental impact of illegal discharges into the sea. This has resulted in an increased waste delivery from ships. However, ports have interpreted the Directive in different ways leading to some confusion among stakeholders (ships, shipping agents, waste operators and environmental authorities). Most ports and ships have shown therefore a strong wish to have more detailed and clear and uniform guidelines, when these are not provided by central or regional government. Only in MSs with detailed and clear transposing measures and clear guidelines, in accordance with the principles of The Directive, is the waste delivery in ports shows to be significantly higher.[151]

Despite the study by EMSA described above it is difficult to identify an improvement in the situation with respect to port waste reception facilities as prior to implementation date of measures there was no reporting system in place and most waste operations

[151] EMSA (2005) *A study on the availability and use of port reception facilities for ship-generated waste*, accessed 10 October 2013, http://www.emsa.europa.eu/implementation-tasks/environment/port-waste-reception-facilities/download/445/235/23.html

in ports are contracted out to private operators. These operators often do not report to port authorities and therefore only limited statistics are available.[152]

In addition to the factors influencing effectiveness already discussed, the priority of marine debris for the government in question must be taken into account. In cases where countries have ratified Annex V, these countries need to have the financial and technical capacity to enforce necessary regulations. Countries are at different levels of development; ensuring implementation and compliance with international legislations could pose a particular challenge to developing countries.[153]

It is clear from both the international and individual state experiences that regulations to prevent garbage from vessels of all sizes may not be a comprehensive solution to the problem. While regulation is essential, enforcement of regulations becomes extremely difficult when vessels are routinely out of sight of enforcement agencies and, in the case of smaller vessels, are not even required to keep records of garbage management practices on board.[154]

4.3 Cost effectiveness

Information regarding the cost of rolling out different strategies is not widely available; where data is published the true cost of a strategy is likely to be hidden in wider budgets. The cost of compliance with strategies or measures is also not particularly well known, as relevant data will not be estimated unless an Impact Assessment has been carried out. In light of the lack of information about costs it is necessary to rely on anecdotal information and experience from stakeholders as to the strategies and measures that work in practice.

4.4 Summary

The key point raised by attempting to identify the effectiveness of measures, is that there is a significant lack of information regarding the volume and dispersion of marine debris. This must be addressed in order to have a better understanding of the measures that have the most potential to reduce the disposal of garbage from commercial vessels.

Once a better dataset has been established for the identified areas, it would be interesting to investigate whether the effectiveness of guidelines correlates with the extent to which the guidelines draw on the full waste hierarchy (i.e waste management steps from reduction, re-use, recycling, energy recovery and landfill, in

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[152] OSPAR Commission (2009) *Assessment of the impacts of shipping on the marine environment*, accessed 10 October 2013, http://qsr2010.ospar.org/media/assessments/p00440_Shipping_Assessment.pdf?zoom_highlight=clean%2Bship#search=%22clean%20ship%22

[153] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

[154] NOAA, and UNEP (2011) *Honolulu Strategy: Technical Proceedings of the Fifth International Marine Debris Conference (Honolulu Strategy)*, accessed 23 October 2013, http://5imdc.files.wordpress.com/2011/03/5imdc-proceedings-final1.pdf

order of the most preferred option to the least preferred), rather than simply waste segregation at sea. If the measures rely on segregation alone, this could be interpreted as a weakness, as the goal should be to ensure waste is disposed of on land. This would be guaranteed if the waste hierarchy had to be respected as the most of the final waste destinations in the hierarchy are generally implemented on land.

5.0 Regulatory Gaps

Despite the implementation of international legislation, gaps still remain in the regulatory framework, meaning that the disposal of garbage into the sea is not entirely eliminated.

5.1 MARPOL Annex V

Ratification

At a global level, there is still a need to ratify and implement existing international conventions which can assist in addressing the marine debris problem. For example, not all coastal or flag states have ratified or adhere to international instruments such as MARPOL Annex V. [155] According to the IMO status of conventions, a total of 145 nations have ratified MARPOL Annex V, as of 30th September 2013.[156] Whilst this may be the majority of nations, it leaves significant gaps where nations have not ratified. For instance, if a ship is registered with a non-ratified state under an open registry, the ship may continue to discharge garbage in international waters; there is no regulatory framework to prevent this activity, and the ship has no obligation to stop.

States that have not ratified Annex V are widespread globally, but there appear to be several 'clusters' of non-ratified states in coastal areas:

- The Caribbean (Costa Rica, Grenada, Haiti);
- South East Asia and Pacific Islands (Myanmar, Thailand, Vietnam, Nauru, Federal States of Micronesia, Timor-Leste, Fiji, Cook Islands); and
- Red Sea and Gulf of Aden (Eritrea, Djibouti, Yemen, Sudan, Somalia).

These clusters of non-ratified states may have an impact on the effectiveness of MARPOL Annex V, particularly in relation to port reception facilities and controlling ships with an open registry in these states.

Specific requirements

[155] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

[156] NOAA, and UNEP (2013) *IMO Status of Conventions*, accessed 15 October 2013, http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx

With regards to the specified requirements for ships under MARPOL Annex V, the IMO adopted amendments in 2011 (entry into force date of 1 January 2013) which require that:

1. Every ship of 100 gross tonnage and above, and every ship certified to carry 15 or more persons, and fixed or floating platforms shall carry a garbage management plan;
2. Every ship of 400 gross tonnage and above, and every ship certified to carry 15 or more persons engaged in voyages to ports or offshore terminals of another Party, and every fixed or floating platform shall be provided with a Garbage Record Book; and
3. Every ship of 12 metres or more in length overall, and fixed or floating platforms shall display placards which notify the crew and passengers of the ship's disposal requirements of regulations 3, 4, 5 and 6 of the Annex as applicable.[157]

Consequently, these requirements present a gap in that vessels outside of the described scope do not have any obligation to comply. As less than 1% of vessels in the world fishing fleet have a gross tonnage of over 100 tonnes,[158] this means that the majority of the fleet do not have any obligations to have a garbage management plan or a Garbage Record Book maintained and in place. Whilst fishing vessels may not be considered as 'commercial' shipping vessels, they still contribute towards the problem of marine debris, particularly in terms of ADLFG which is understood to have a considerable impact on marine species (although this may be because ADLFG is easily recognisable compared to other types of marine debris)[159] [160], therefore this gap in international regulation should be addressed.

In several circumstances the regulations do not provide clear definitions of terms, therefore creating potential loopholes. For example, the term "reasonable precaution" is used under regulation 7.2, in relation to the accidental loss of garbage resulting from damage to a ship or its equipment, and 7.3, which relates to the accidental loss of fishing gear. The lack of a proper definition here may lead to misuse of the term. Along a similar vein, regulation 10.3.2 only obliges a ship to report the "estimated" amount of discharged or incinerated garbage. This provision does not adequately address the need for robust monitoring of on-board waste and makes it difficult to check whether the regulations have been adhered to.

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[157] MEPC (2012) *2012 Guidelines for the Development of Garbage Management Plans. Resolution MEPC.220(63) Adopted on 2 March 2012 (Annex 25)*, accessed 15 October 2013, http://www.ukpandi.com/fileadmin/uploads/uk-pi/Documents/Conventions/Environmental_Compliance/MEPC.219%2863%29.pdf

[158] FAO (2013) *World Fishing Fleet*, accessed 15 November 2013, http://www.fao.org/fishery/topic/1616/en

[159] Butterworth, A., Clegg, I., and Bass, C. (2012) *Untangled - Marine Debris: a global picture of the impact on animal welfare and of animal-focused solutions*, Report for WSPA, 2012, http://www.wspa-international.org/Images/Untangled%20Report_tcm25-32499.pdf

[160] STAP/GEF (2012) *Impacts of marine debris on biodiversity: Current status and potential solutions*, Report for CBD, 2012

Port Waste Reception Facilities

Another gap identified in MARPOL Annex V relates to port waste reception facilities. MARPOL requires that the Government of each Party is to provide facilities for the reception of ship-generated residues and garbage that cannot be discharged into the sea. The reception facilities must be *adequate* to meet the needs of ships using the port, *without causing undue delay to ships*. In providing further clarification for what this requirement actually means, resolution MEPC 83 (44) in March 2000 concluded that adequate facilities can be defined as those which:

- Mariners use;
- Fully meet the needs of the ships regularly using them;
- Do not provide mariners with a disincentive to use them; and
- Contribute to the improvement of the marine environment.

Furthermore, resolution MEPC 83 (44) stated that facilities provided by the port must meet the needs of the ships normally using the port, and allow for the ultimate disposal of ships' waste to take place in an environmentally appropriate way.[161]

Closer scrutiny of these requirements indicates that MARPOL does not set any prescriptive standards for port reception facilities, other than requiring that these are 'adequate', which in itself is defined as a qualitative manner in an MEPC resolution (which is not a mandatory instrument). Furthermore, MARPOL does not set any certification requirements for port reception facilities, and does not set any requirements for the environmentally sound management of any residues or garbage delivered to a port reception facility. Resolution MEPC 83 (44) requires that facilities should allow for the ultimate disposal of ships' wastes to take place in an environmentally appropriate way, but as mentioned previously, the MEPC resolution is not a mandatory instrument. [162]

Another problem with Port Waste Reception Facilities under MARPOL Annex V is that fishing vessels are required to offload all ship-generated waste (other than sewage) to shore reception facilities, but are not required to notify the harbour authority or terminal operator in advance or to pay the mandatory charge. This informal approach to fishing vessels may encourage them to offload garbage at ports; however it could be argued that fishing vessels should be subject to the same requirements as other vessels (i.e. make arrangements and payment for the landing of waste with the

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[161] Mikelis, N. (2010) IMO's Action Plan on tackling the inadequacy of port reception facilities, paper given at Ships' Waste: Time for action!, Brussels, 14 October 2010, http://www.imo.org/OurWork/Environment/PollutionPrevention/PortReceptionFacilities/Documents/2010-10-14%20%20IMOs%20Action%20Plan%20on%20tackling%20the%20inadequacy%20of%20port%20reception%20facilities%20-%20FEBEM%20-%20EUROSHORE%20Conference%20Brussels.pdf

[162] Mikelis, N. (2010) IMO's Action Plan on tackling the inadequacy of port reception facilities, paper given at Ships' Waste: Time for action!, Brussels, 14 October 2010, http://www.imo.org/OurWork/Environment/PollutionPrevention/PortReceptionFacilities/Documents/2010-10-14%20%20IMOs%20Action%20Plan%20on%20tackling%20the%20inadequacy%20of%20port%20reception%20facilities%20-%20FEBEM%20-%20EUROSHORE%20Conference%20Brussels.pdf

harbour/terminal in question). Nevertheless, introducing such requirements for fishing vessels may act as a disincentive to dispose of garbage on land rather than at sea.

The port reception facilities database (GISIS) enables inadequate facilities to be reported, however it could be argued that introducing more specific requirements within MARPOL would speed up the process of improving waste reception facilities in all ports. On the other hand, some may disagree in that the introduction of a more detailed specification would be too prescriptive, and thus have a negative impact on the quality of port reception facilities. Despite the existence of the GISIS database, very few reports are actually made through this facility, compared to the number or port calls made by commercial ships across the globe. If used for its designed purpose, the GISIS database could be a useful tool for reporting inadequate port waste reception facilities. One potential method of increasing its usage could be to introduce mandatory reporting of facilities after each port of call a commercial ship makes.

Whilst it is generally conceived that good quality port reception facilities that meet the needs of visiting ships is important in encouraging ships to dispose of their garbage at ports rather than in the sea, MARPOL does not provide any requirements for how waste should be managed and treated on land. Responsible waste management on land, especially along the coast, is important in ensuring waste does not escape containment and find its way into the sea. However, under the Basel Convention, parties have the duty to take all appropriate measures to ensure the environmentally sound management of hazardous wastes (paragraphs b), c), e), f), g), and h) of Article 4.2).[163] Despite the notion of environmentally sound management being described in rather general terms by the Basel Convention,[164] the concept is a useful one that may be beneficial if applied to MARPOL.

To summarise, the current Annex V requirements of MARPOL do not support a closed system, in terms of what goes on board a ship and the resultant discharges, particularly solid garbage. In the present situation it is impossible to verify what a ship discharges and where; and whether this follows recommended best practice. Until this is achieved, it is impossible to know how much waste is discharged over board. Equally, this is difficult to regulate, but the unfortunate reality is that whatever prohibitive measures are agreed upon, whether they are abided by will remain unknown.

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[163] UNEP (2013) Development of an assessment of how far the Basel Convention technical guidelines cover MARPOL wastes and of a guidance manual on how to improve the sea-land interface to ensure that MARPOL wastes, once offloaded a ship, are managed in an environmentally sound manner

[164] Abrams, D., J. (1990) Regulating the International Hazardous Waste Trade: A Proposed Global Solution, *Columbia Journal of Transnational Law*, Vol.28, p.828

5.2 London Convention and Protocol

According to the IMO status of conventions, 87 nations have ratified the London Convention, and 43 nations have ratified the London Protocol. [165] The lack of nations ratifying both the Convention and the Protocol represents a significant gap in the regulatory framework. Whilst encouraging land-locked nations to ratify may not be necessary, it is important to engage with coastal nations that are flag (or open registry) states for ships. It would be beneficial to encourage states to ratify the Protocol rather than the Convention, as the Protocol has a more precautionary approach to waste and the environment.

5.3 Cruise Ships

Cruise ships operate in every ocean worldwide, often in pristine coastal waters and sensitive marine ecosystems. Cruise ship operators provide amenities to their passengers that are similar to those of luxury resort hotels, including pools, hair salons, restaurants, and dry cleaners. As a result, cruise ships have the potential to generate wastes similar in volume and character to those generated by hotels. According to a 1999 Royal Caribbean Cruises Environmental Report, packaging materials from consumables and spare parts for a ship can generate up to 15 tons of waste in a single day.[166]

Worldwide, the cruise industry has a compound annual passenger growth rate of 7% since 1990. Worldwide, the number of passengers carried is expected to increase from approximately 21 million in 2013 to 23.7 million in 2017.[167]

The majority of current legislation regarding pollution and shipboard waste was developed prior to the rapid growth of the cruise market; as a consequence there exists no international legislation addressing the particular issues surrounding pollution and waste management on these vessels. [168]

Passengers partaking of cruises are invariably attracted to those parts of the world that can be described as 'ecologically vulnerable' or as 'bio-diversity hot spots', which cannot, or struggle to, assimilate the added pressure that these vessels place on their fragile environments.[169]

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[165] NOAA, and UNEP (2013) *IMO Status of Conventions*, accessed 15 October 2013, http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx

[166] UNEP, and Caribbean Environment Programme (2007) *The Caribbean Environment Programme: Draft Cruise Ship Discharge Assessment Report*, accessed 19 November 2013, http://www.cep.unep.org/publications-and-resources/databases/document-database/other/cruiseship-discharge-assessment-report.pdf/view

[167] Cruise Market Watch (2013) *Growth of the Cruise Line Industry*, http://www.cruisemarketwatch.com/growth/

[168] Butt, N. (2007) The impact of cruise ship generated waste on home ports and ports of call: A study of Southampton, *Marine Policy*, Vol.31, pp.591 – 598

[169] Johnson, D. (2002) Environmentally sustainable cruise tourism: a reality check, *Marine Policy*, Vol.26, No.4, pp.261–270

The Caribbean islands are a case in point, with an estimated 44% share of the total cruise market. Alaska, another ecologically sensitive area, accounts for 7.9% and the Mediterranean, a semi-enclosed sea, 12.7% of the market.[170] Both the Caribbean (Gulf of Mexico) and the Mediterranean sea have been designated 'special areas' under MARPOL Annex V, highlighting the need for protection in these areas.

Another key point to make in relation to cruise ships is not exactly a gap in legislation, but an issue related to the interpretation of MARPOL requirements for port waste reception facilities. This issue is demonstrated through the example in the box below.

Port waste reception facilities and cruise ships at Southampton

Associated British Ports (ABP) is responsible for the running of the Port of Southampton and has an environmental policy which supports ''...*sustainable development for both our business and the environment*''.[1] They advocate complying with all relevant legislation and call for the adoption and promotion of best practice through introducing 'robust' environmental management. This policy applies to all ports operated by ABP and is delivered through their 'Environmental Management Framework Waste Management Plan' which complies with MARPOL, the EU Directive on Port Reception Facilities, and other relevant legislation.

At the Port of Southampton there is a mandatory waste fee for all 'non-exempt' ships berthing at Southampton, which pays for the disposal of up to 4m^3 of solid waste that falls under MARPOL Annex V, any amount greater than this or waste falling under other MARPOL Annexes must be dealt with by outside waste contractors, arranged for by ship's agents. Clearly the ABP waste allowance is inadequate for cruise vessels even though EU Directive 2000/59, Article 4(2), requires that '...the reception facilities shall be capable of receiving the types and quantities of ship generated waste...and take into account the operational needs of the users of the port''. ABP address this issue by providing a list of outside waste contractors.[1]

6.0 Recommendations

6.1 General Recommendations

Marine debris remains a global problem and challenge. In 2005, UNEP concluded that: *"... marine litter is not a problem which can be solved only by means of legislation, law enforcement and technical solutions. It is a social problem which requires efforts to change behaviours, attitudes, management approaches and multi-sectoral involvement."*[171] The circumstances do not appear to have changed since

[170] UNEP (2002) *Industry as a partner for sustainable development: Tourism*, accessed 17 October 2013, http://www.unep.fr/shared/publications/pdf/WEBx0012xPA-IndustryTourism.pdf

[171] UNEP (2005) *Marine Litter: An Analytical Overview*, 2005

2005, as such the recommendations provided in the following sections are wide ranging.

Prevention is generally more effective and efficient than remedial action. In many cases, preventive mechanisms and the authority to enforce them are already implicit in existing global or regional conventions and action plans, even when marine debris is not specifically mentioned. When political agreements address the need to protect coastal habitats, sustain the health and productivity of seas and coastal areas, pursue integrated coastal zone management and sustainable development of seas and coastal zones, and raise environmental awareness, the issue of marine debris is covered.[172]

In order to achieve any improvement to the current situation with regards to marine debris, a collaborative approach between industry and governments will be required, with a focus on early facilitation of regional cooperation. However, challenges may arise in obtaining international agreement to change conventions, due to differences in priorities and ability to implement changes. For instance, developing countries and small island states may struggle with land-based infrastructure, adding to the challenge of managing ship-based waste.[173]

6.2 Improvements to Existing Regulations

Current rules are lagging far behind the practices at the better performing end of the market. This means that responsible ship operators have no competitive advantage. Regulation and enforcement is a powerful driver for quality shipping. [174]

Within the Clean Ship approach, established by Seas at Risk (see Section 2.3.2), it is suggested that regulators should close the gap between regulatory standards and existing best available technologies and practices. Quality operators will nearly always live by the rules, but only thorough and effective enforcement will ensure that everyone plays by the same rules.[175]

Looking back to the regulatory gaps identified in Section 5.0, the two key gaps are associated with the lack of ratification of international legislation across the globe, and the specification of the requirements in MARPOL Annex V. The lack of ratification can be addressed through raising awareness of the legislation, and how ratifying

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[172] UNEP (2009) *Marine Litter - A Global Challenge*, accessed 11 October 2013, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

[173] NOAA, and UNEP (2011) *Honolulu Strategy: Technical Proceedings of the Fifth International Marine Debris Conference (Honolulu Strategy)*, accessed 23 October 2013, http://5imdc.files.wordpress.com/2011/03/5imdc-proceedings-final1.pdf

[174] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

[175] Seas at Risk (2006) *Implementing the Clean Ship Approach: closing the gap between what is possible and what is required by law*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/SAR%20Mind%20the%20Gap%20seminar%20presentation.pdf

helps to prevent the problem of marine debris. Recommendations for addressing the specification of the requirements are dealt with in Section 6.2.1 below.

6.2.1 MARPOL Annex V

Existing rules under MARPOL are the bottom line for shipping, therefore new rules should make it more difficult for offenders to stay in business. There is a connection with innovation to be made; environmental policy and legal standards should be at least as strict as that made possible by the best available technologies. Strengthened enforcement remains important; if polluters don't get caught or if the fines are too low, environmental offences will remain a minor business risk. New regulations should encourage innovation, not only setting a standard for now, but also a target for the short and long term.[176]

Seas at Risk made the following recommendations for improving MARPOL Annex V:

1. **Clear Rules, clear compliance and strong enforcement**: Clear rules for on-board personnel and passengers regarding waste and marine debris creates awareness and improves behaviour;
2. **Zero discharge = zero confusion**: At the moment, certain types of waste are still allowed to be thrown overboard and others are not. Implementing a "zero discharge" (at sea) approach makes environmental sense and avoids confusion;
3. **Phase-out on-board waste incineration**: compliance with recommendations 1 and 2 is impossible to control or enforce as waste can be burnt at sea and regulators have to rely on logged estimated amounts incinerated.
4. **Deliver waste in ports**: improved and harmonised port reception facilities that are simple to use, accessible and affordable will decrease the amount of waste that ends up as marine debris; and
5. **Waste management as business practice**: waste management and recycling is all about volumes. If all ships deliver all their waste to ports the chances for the creation of serious markets in ship waste recycling increases.[177]

These suggested recommendations are very similar to those provided by the Clean Shipping Coalition, who also emphasise the need to improve port reception facilities, and the need to prohibit discharge of waste at sea (except when the ship or crew safety is at risk and there are no other alternative means of handling the waste).

A further recommendation made by the Clean Shipping Coalition is to prohibit all discharges in the Polar area. The IMO is in the process of developing a draft mandatory international code of safety for ships operating in polar waters (the Polar

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[176] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

[177] Seas at Risk *No place for waste: let's end ship waste dumping at sea*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Marine%20litter%20brochure_2.pdf

Code). Friends of the Earth International (FOEI), Greenpeace International, International Fund for Animal Welfare (IFAW) and World Wildlife Fund (WWF) submitted a joint proposal to the IMO detailing their recommendations for a 'Mandatory Polar Code'. Within these recommendations it was suggested that the code must be applicable to all vessels, and must include comprehensive provisions for environmental protection for all vessels operating in polar water, such as more stringent provisions for garbage discharge, amongst other discharges. [178] [179]

The scope of vessels to which MARPOL Annex V applies is limited in that only certain vessels are required to have or maintain garbage management plans, a Garbage Record Book, and placards to notify the crew and passengers of the vessel of the ship's disposal requirements. The vessels that are not obligated to comply with these requirements represent a key gap in MARPOL Annex V. For instance, according to the European Commission's Fishing Fleet Register, only 4% of EU registered fishing vessels are covered by the requirement to have a garbage management plan. As the tonnage threshold for the carrying of a Garbage Record Book is even higher, it equates to just 0.4% of all EU-registered fishing vessels. [180] [181]

To properly cover waste from fishing vessels, Annex V should be amended to include a mandatory requirement for all commercial seagoing vessels to have a Garbage Management Plan and a Garbage Record Book. [182] With regards to the definition of a 'commercial shipping vessel', perhaps this too should be more clearly defined within MARPOL to ensure that there is no misunderstanding. We would recommend that fishing vessels are included within this definition.

6.2.2 Port Waste Reception Facilities

The requirements for port waste reception facilities under MARPOL are not specific, simply requiring that ports are 'adequate' and do not cause undue delay to ships. Perhaps introducing specific requirements for port waste reception facilities, staggered through targets over time, may help ports improve the standards of their waste reception facilities. Another recommendation for improving port reception facilities and the way they handle waste could be to take the concept of

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[178] MEPC (2009) *Mandatory Polar Code: Submitted by Friends of the Earth International (FOEI), Greenpeace International, IFAW and WWF (MEPC 59/20/5)*, accessed 19 November 2013, http://www.zeemail.nl/upload/actueel/2_MEPC_59-20-5_polar_code_FOEI_Ifaw.pdf

[179] Clean Shipping Coalition (2010) *Interpretations of, and amendments to, MARPOL and related instruments*, accessed 11 October 2013, http://www.seas-at-risk.org/1mages/MEPC%2061-7-12csc.pdf

[180] European Commission (2013) *Community Fishing Fleet Register*, accessed 19 November 2013, http://ec.europa.eu/fisheries/fleet/index.cfm

[181] Clean Shipping Coalition (2010) *Interpretations of, and amendments to, MARPOL and related instruments*, accessed 11 October 2013, http://www.seas-at-risk.org/1mages/MEPC%2061-7-12csc.pdf

[182] Clean Shipping Coalition (2010) *Interpretations of, and amendments to, MARPOL and related instruments*, accessed 11 October 2013, http://www.seas-at-risk.org/1mages/MEPC%2061-7-12csc.pdf

environmentally sound management from the Basel Convention, and apply it to MARPOL Annex V waste arriving in the port reception facility to the final disposal destination.

As indicated in the previous Section (6.2.1), it is generally agreed that port waste reception facilities should be improved to encourage waste disposal in ports rather than illegal dumping at sea. An indirect fee system of charging for waste disposal in ports was discussed in Section 2.2.5. However, if this approach is to be expanded to more ports both regionally and internationally, careful steps must be taken to ensure a level playing field is achieved to maintain competition between ports. Options for ensuring this were discussed in Section 2.2.5.2. Undertaking further research into the expansion of the indirect fee system using these options could be a task for CMS.

IMO has developed a number of guidelines, the most recent of which have been published as a Comprehensive Manual on Port Reception Facilities. It is possible that a review may be required to understand whether these guidance documents fulfil the needs of the relevant stakeholders, and whether amendments or further guidance needs to be written to enable successful compliance and enforcement of MARPOL Annex V and port waste reception facilities.

6.3 Gaps to Address

6.3.1 Lack of data

While there are governmental and national efforts to survey, monitor and quantify marine debris from land-based sources, information about debris from ocean-based sources in most cases is non-existent or not collected on a regular basis. In some instances the collection of such information is largely dependent on funding from international organisations such as UNEP and the Intergovernmental Oceanographic Commission (IOC).[183]

A lack of data regarding the level of marine debris, both past and present, and on different geographical scales has an impact on the decision making process, as well as affecting the ability to assess the effectiveness of existing or proposed measures.

Monitoring and evaluation are critical components of determining whether strategies are achieving expected results. The following are potential evaluation questions and indicators, proposed within the Honolulu Strategy, to be considered in developing an evaluation approach for strategies focused on shipping, boating, and transport:

1. What is the level of awareness of specific groups of ocean users regarding Best Management Practices (BMPs), storage and disposal options, and legislation and policies?
    - Percentage of ocean users by specific industry or group
    - Percentage of ocean users briefed by specific industry or group

[183] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

- Percentage of ocean users adopting best practices by specific industry or group
- Tonnage of lost cargo
- Cost of lost cargo

2. What percentage of specific groups of ocean users are using proper waste storage and disposal options?
    - Percentage of ocean users using proper waste storage on board and disposal at port reception facilities
    - Tonnage of waste collected at port reception facilities
3. What is the level of awareness of fishermen regarding BMPs, legislation and policies?
    - Percentage of fishermen who think current practices and methods to prevent abandoned, lost, or otherwise discarded fishing gear (ALDFG) sources are adequate by fishing fleet or area
    - Percentage of fishers aware of BMPs, practices, and legislation by fishing fleet or area
    - Percentage of fishers briefed by fishing fleet or area
4. What percentage of fishermen are adopting best practices and modified or alternative fishing gear?
    - Percentage of fishermen adopting best practices by fishing fleet or area
    - Percentage of fishermen using alternative/modified fishing gear by fishing fleet or area
    - Number of gear items lost
    - Tonnage of gear lost
    - Cost of lost gear[184]

Whilst this information will contribute to the knowledge base on marine debris, it is important to also undertake research investigating the cost and cost effectiveness of measures to prevent the disposal of garbage at sea. At present there is a significant lack of data of this sort, but combined with information about the effectiveness of measures it is possible to estimate the level of funding and investment required to make a difference. Furthermore, whilst a number of best practice measures have been identified in Section 2.0, the extent to which these measures are implemented is not widely known; addressing this gap would be very useful in understanding the types of measures that industry does or does not favour.

[184] UNEP, and NOAA (2011) The Honolulu Strategy

6.3.2 Education for seafarers

Much of the pollution from shipping is caused by a lack of knowledge about the marine environment. Raising awareness and training on the issues of marine debris is essential to achieving success. [185] It is important to ensure education is delivered on all levels; from seafarers and fishermen to the top level of management in large shipping firms. There has been a distinct lack of campaigns to raise awareness or education programmes within the commercial shipping industry, an issue discussed in Report III.

At the end of the day it is people who build, maintain and operate the ships and take decisions which can have far-reaching consequences. Providing training for seafarers, both before they start working on a ship and when they have become part of the crew, is a keystone to achieving better compliance with international legislation. At present knowledge of the marine ecosystem is not a part of the curriculum. [186] The ProSea Foundation provides sustainability courses for the maritime and fishing sectors, schools, governmental agencies and businesses. The courses are for both those who work at sea, as well as land based decision makers. ProSea has been providing marine awareness courses since 1999 and has developed the IMO model course Marine Environmental Awareness. [187] As such, ProSea is a well-placed organisation for CMS to work with in terms of delivering the appropriate training and education for users of the marine environment, with particular regard to marine debris.

6.3.3 Cruise Ships

Generally speaking, it is sensible to assume that the volume of solid waste produced by a vessel at sea is proportionate to the number of crew and passengers on board. On this basis, combined with the fact that the cruise industry is rapidly expanding, cruise ships are a significant source of garbage, and could potentially be a large source of marine debris if not carefully regulated and monitored. As mentioned in Section 5.3, cruises often visit ecologically vulnerable or sensitive areas, yet the majority of current legislation regarding pollution and shipboard waste was developed prior to the rapid growth of the cruise market. Consequently there exists no international legislation addressing the particular issues surrounding pollution and waste management on these vessels.[188]

If such legislation were to be established, the possible criteria to address could be:

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[185] Seas at Risk (2006) *Implementing the Clean Ship Approach: closing the gap between what is possible and what is required by law*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/SAR%20Mind%20the%20Gap%20seminar%20presentation.pdf

[186] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

[187] ProSea (2014) *ProSea - About ProSea*, accessed 24 January 2014, http://www.prosea.info/?page_id=2

[188] Butt, N. (2007) The impact of cruise ship generated waste on home ports and ports of call: A study of Southampton, *Marine Policy*, Vol.31, pp.591 – 598

- Implementing zero disposal of solid waste at sea; and
- Ensuring that cruise ships only call at ports that have adequate port waste reception facilities to handle the volume of waste produced.

6.4 Market-based Instruments (MBIs)

When properly harnessed, the market can be a powerful driver for change. The use of economic incentives to discourage the disposal of garbage at sea has already been recommended by Seas at Risk, and UNEP commissioned a guidance document on the use of market-based instruments to address the problem of marine debris in April 2009. [189] [190]

The costs associated with marine debris are largely borne by those that are not causing the problem, with the result that there is insufficient liability to the entities responsible for the source of the problem. In other words, the polluter does not pay at present. As discussed in Report I, the impacts of marine debris can have high economic and ecological costs.[191] The direct and indirect benefits of reducing and preventing marine debris merit the investment of time, effort and money. However, there must be political will to address this issue; the cooperation and support of government, the private sector and the general population, are essential for a long-term and effective approach to handling marine debris.[192]

The aim of using economic incentives and disincentives is to change people's behaviour regarding the correct handling of their waste. Market forces can be influenced by communities, governments, industry and nongovernmental organisations. When used in parallel with public education, adequate waste management infrastructure and other related efforts, market based instruments (MBIs) can be extremely effective.[193]

MBIs addressing the inland sources of marine debris are discussed in Report I; an integrated approach must be adopted to ensure the different incentives address different target audiences and can be feasibly used in parallel. MBIs for ocean based sources of marine debris are not yet widespread.

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[189] Seas at Risk (2006) *Implementing the Clean Ship Approach: closing the gap between what is possible and what is required by law*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/SAR%20Mind%20the%20Gap%20seminar%20presentation.pdf

[190] UNEP, and IEEP (2009) *Guidelines on the Use of Market Based Instruments to Address the Problem of Marine Litter*, accessed 11 October 2013, http://www.unep.org/regionalseas/marinelitter/publications/docs/Economic_Instruments_and_Marine_Litter.pdf

[191] For example: loss of biodiversity, loss of ecosystem functions, loss of revenue, loss of livelihood of population groups, and increased maintenance costs.

[192] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

[193] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

An instrument that actively encourages relevant operators to adopt best practice may be more effective where enforcement is particularly challenging. For example, offering appropriate tax relief or a reduction in port fees to ships or fleets that operate a zero waste discharge at sea policy, would give significant advantages to commercial shipping operators that employ best practice, therefore encouraging the industry to adopt best practice. In theory, port operators that support this scenario would in turn receive benefits through a greater number of ships calling into the port in question.

However, it is important to remember that nations vary in their stages of economic, social and political development, all of which affect their ability to respond to environmental problems such as marine debris. Measures are more likely to be effective if the regulatory framework and institutional infrastructures are in place. Nations also differ in their ability to afford some of the expenses associated with strategies and programmes. The relevance and effectiveness of any instrument will need to be assessed on a case -by-case basis to determine its potential for success.[194]

6.5 Role for CMS

The maritime industry is a complex sector with stakeholders engaging at all levels. These interdependencies between fuel suppliers, ship owners, cargo owners and financing and insurance companies mean that the implementation of best practice requires not only technological, but also social and organisational changes. Ensuring success calls for a multi-stakeholder approach; the crew and ship owner are important, but a number of other players in the maritime industry must also be involved. When thinking about incentives or possible actions that are to be included it is essential to ensure they are well targeted to actors that can and are willing to make a difference. [195]

As in other spheres there is always a tendency to try and shift the responsibilities to others. An example is waste collection and treatment. Ship operators complain that ports do not offer reception facilities while ports claim that the crew of visiting ships do not deliver their waste in port. Without clear directions, problems – and associated solutions – will be put on the shoulders of others. [196]

UNEP, perhaps through the Regional Seas Programme, can facilitate coordination between all of the different stakeholders to enable best practice measures to be implemented. International forums such as the IMO take decisions on the basis of a consensus, which invariably means that large flag-States (particularly those acting as

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[194] UNEP (2009) *Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter*, 2009

[195] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

[196] Seas at Risk (2007) *The Clean Ship Concept: A strategy for uncoupling growth in shipping from environmental harm*, accessed 10 October 2013, http://www.seas-at-risk.org/1mages/Seas%20At%20Risk%20Policy%20Analysis%20_V_W%20case%20study%201_.pdf

"open registry" for a large proportion of ships) have a loud voice and considerable influence. Therefore, the outcome of IMO deliberations may be somewhat lacking in ambition at times. It is important that key players are supported in promoting best practice and addressing the gaps identified to ensure improvements in international legislation and the global situation do not get overlooked, and UNEP, supported by CMS, can help provide this support.

To this end, CMS can encourage Parties to the Convention on Migratory Species to:

- Ratify key international legislation such as MARPOL Annex V (where CMS Parties have not yet done so);
- Initiate and support the improvement of MARPOL Annex V so that exemptions are tightened, in order to include most fishing vessels.
- Encourage ships and shipping operators from CMS Parties to sign up to measures such as the Clean Shipping Index;
- Encourage and support every seafarer to attend a marine environmental awareness course provided by ProSea or another similar organisation;
- Encourage shipping operators and other key industries from CMS Parties involved with the international transport of goods to drive environmental demands;
- Promote the wider rollout of the indirect fees system in ports, and support the improvement of port waste reception facilities in general; and
- Support and encourage CMS Parties to implement and achieve relevant ISO standards.

Many of the activities suggested here may involve approaching governments, industries and international organisations to facilitate research and explore funding potential for investigating how such actions could be best implemented. CMS may not be able to undertake all these activities alone, and so should support UNEP and the Regional Seas Programme to do so. Developing research questions around these topics and co-ordinating research to address information gaps is a good approach. For instance, initiating further research to investigate whether market based instruments are appropriate measures for preventing commercial shipping from disposing of garbage at sea. Additionally, identifying a strategy to target specific audiences and work with key industries in order to improve awareness, knowledge and behaviour with regards to marine debris would be beneficial. We recommend that one of the first industries to target would be the cruise ship industry, as they produce a significant amount of garbage at sea, therefore improving waste management and performance in this global industry would potentially have a large and beneficial impact.

Encouraging ratification of international legislation such as MARPOL is all well and good, but this report clearly shows that there are significant gaps that need to be addressed if the legislation is to become more effective. Therefore one of the key recommendations for CMS Parties and the Secretariat is to focus on the gaps identified in this report and explore the possible means to address them.